Congress of European Forum for Research in Rehabilitation

University Rehabilitation Institute
Republic of Slovenia

BOOK OF ABSTRACTS
with
PROGRAMME

September 23 – 25, 2021
Ljubljana, Slovenia

Congress of European Forum for Research in Rehabilitation

University Rehabilitation Institute
Republic of Slovenia

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Scientific Programme Information

Prof. Dr. Helena Burger, MD, PhD
University Rehabilitation Institute Republic of Slovenia

The abstracts have been peer-reviewed

University Rehabilitation Institute
Republic of Slovenia

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WELCOME ADDRESS

Dear Colleagues,

It is our great pleasure to invite you to participate in the on line 16th Congress of European Forum for Research in Rehabilitation with the theme “Innovating rehabilitation: building bridges between research, technology and practice“ to be held from September 23 – 25, 2021, Ljubljana, Slovenia, organized by European Forum for Research in Rehabilitation – EFRR and University Rehabilitation Institute Republic of Slovenia.

The event, as all previous EFRR congresses, will be multiprofesional: we would like to invite all researchers and clinicians who work in rehabilitation, with topics ranging from basic research to return to work and quality of life, including technological and clinical viewpoints.

Besides plenary and invited lectures, the participants will enjoy the opportunity to present their work at various oral presentations and poster sessions. We will also organise some workshops, mainly for young researchers.

On behalf of European Forum for Research in Rehabilitation – EFRR and University Rehabilitation Institute Republic of Slovenia, we look forward to welcoming you to the on line 16th EFRR Congress!

Chair of the Scientific Committee

Prof. Dr. Helena Burger, MD, PhD

COMMITTESS

Chairs of the scientific committee

- Helena Burger
- Gabor Fazekas

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- Piotr Tederko, *Poland*
- Cecilia Varju, *Hungary*
- Susanne Weinbrenner, *Germany*
- Frederike van Wijck, *United Kingdom*

INVITED SPEAKERS

- Matteo Cesari, *Italy*
- Stefano Negrini, *Italy*
- Katharina Stibrant Sunnerhagen, *Sweden*
- Johan Rietman, *Netherlands*
- Helena Fordell, *Sweden*
- Susanne Weinbrenner, *Germany*
- Nick Ward, *United Kingdom*
- S. Stokic, *United States of America*

ACKNOWLEDGEMENT

The Organising Committee is deeply appreciative of the sponsorship generously provided by the following industry sponsors:

BRONZE SPONSORS

PROGRAMME AT A GLANCE

THURSDAY, SEPTEMBER 23

Time	Room 1	Room 2	Room 3
8.15 – 8.45	Opening		
8.45 – 10.30	**PLENARY SESSION 1:** Session of European Academy of Rehabilitation Medicine (EARM) Henk Stam, Netherlands: Ethics in Rehabilitation Research Stefano Negrini, Italy: Usefulness for clinicians and researchers of the REHabilitation COVID-19 Evidence based Response (REH-COVER) Action by Cochrane Rehabilitation Katharina Stibrant Sunnerhagen, Sweden: Sick-leave due to COVID-19 - a report from national cohorts in Sweden		
10.30 – 11.00	Break		
11.00 – 12.30	**ORAL SESSION 1** Rehabilitation of SARS CoV-2 patients	**ORAL SESSION 2** International Classification of Functioning, Disability and Health – ICF	**WORKSHOP 1 – TILL 13:00** Gaj Vidmar, Slovenia: Research Design
12.30 – 14.00	Lunch break/ sponsor chat, Participant's networking		
14.00 – 15.15	**PLENARY SESSION 2:** Susanne Weinbrenner, Germany: Return to work (RtW) - Germany patient reported outcome measures Dobrivoje Stokić, USA: The content and recent changes to Inpatient Rehabilitation Facility-Patient Assessment Instrument (IRF-PAI) used in the United States		
15.15 – 15.30	Break/ participants networking		

15.30 – 17.15	**ORAL SESSION 3** Return to work 1(RtW)	**ORAL SESSION 4** Environment and other topics	**WORKSHOP 2** Franco Franchignoni, Italy, Levent Ozçakar, Turkey: How to write an article
17.15 – 18.30	**POSTER SESSION 1**	**POSTER SESSION 2**	**POSTER SESSION 3**
19.00 – 20.00	**WELCOME RECEPTION**		
FRIDAY, SEPTEMBER 24			
8.00 – 9.15	**WORKSHOP 3** Matilde Leonardi, Alberto Raggi, Italy: Implementing ICF and WHO-DAS II in clinical practice	**WORKSHOP 4** Frederike van Wijck, Dora Regoczi, United Kingdom: Enhancing physical activity in people with stroke and other neurological conditions: how everyone can make a difference	**POSTER SESSION 4**
9.20 – 10.35	**PLENARY SESSION 3** Nick Ward, United Kingdom: Promoting recovery after stroke Matteo Cesari, Italy: Ageing		
10.35 – 11.00	Break/ Networking with participants		
11.00 – 12.30	**ORAL SESSION 5** Stroke	**ORAL SESSION 6** Quality of Life	**ORAL SESSION 7** Limb Loss and Technology
12.30 – 13.00	Lunch break/Sponsor chat		
13.00 – 14.00	**EFRR GENERAL ASSEMBLY**		

14.15 – 15.30	**PLENARY SESSION 4** Hermano Igo Krebs, USA, Frederike van Wijck, United Kingdom: Robotics: Robot-assisted arm training after stroke: insights from the RATULS study		
15.30 – 15.45	Break, chat with participants		
15.45 – 17.30	**ORAL SESSION 8** Balance problems and Robotics	**ORAL SESSION 9** Return to work 2 (RtW)	**ORAL SESSION 10** Rehabilitation of people with neurological problems and Spasticity

SATURDAY, SEPTEMBER 25

8.30 – 10.00	**WORKSHOP 5** Črt Marinček, Slovenia, Dobrivoje S. Stokic USA, Lajos Kullmann, Hungary, Gaj Vidmar, Slovenia: From Annoyances to Fatal Flaws: What IJRR Editors Do Not Want to See in Submitted Manuscripts?	**WORKSHOP 6** Gulseren Akyuz, Evrim Karadag-Saygi, Ozge Kenis-Coskun, Ezra Giray, Turkey: Caregiver burden in disabilities	**ORAL SESSION 11** (Re)habilitation of children
10.00 – 11.15	**PLENARY SESSION 5** Hans Rietman, Netherlands: Modern technology for assessment and functional independence Helena Fordell, Sweden: Virtual reality		
11.15 – 11.30	Break/Participants networking		
11.30 – 13.00	**ORAL SESSION 12** Driving for People with Disabilities	**ORAL SESSION 13** Sport and Sport for Disabled	**ORAL SESSION 14** Telerehabilitation
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University Rehabilitation Institute
Republic of Slovenia

SCIENTIFIC PROGRAMME

THURSDAY, SEPTEMBER 23

8.15 – 8.45 Opening

8.45 – 10.30

PLENARY SESSION 1: SESSION OF EUROPEAN ACADEMY OF REHABILITATION MEDICINE (EARM)

Chairs: **Helena Burger**, SLOVENIA, **Susanne Weinbrenner**, GERMANY

8.45 – 9.20 **Ethics in rehabilitation research**
Henk Stam, NETHERLANDS

9.20 – 9.55 **Usefulness for clinicians and researchers of the Rehabilitation COVID-19 Evidence based Response (REH-COVER) Action by Cochrane Rehabilitation**
Stefano Negrini, ITALY

9.55 – 10.30 **Sick-leave due to COVID-19 – a report from national cohorts in Sweden**
Katharina Stibrant Sunnerhagen, SWEDEN

10.30 – 11.00 Break

10.30 – 10. 45 **Intermittent catheterization with innovative coated greencath catheters® by TIK d.o.o**
Anita Stojanović Pevc, SLOVENIA

11.00 – 12.30

ORAL SESSION 1: REHABILITATION OF SARS CoV-2 PATIENTS

(10 minutes for presentation and 5 minutes for discusssion)

Chairs: **Matilde Leonardi,** ITALY, **Primož Novak,** SLOVENIA

11.00 – 11.15 **Complex rehabilitation of COVID-19 patients – experiences from a Hungarian post-COVID impatient rehabilitation unit**
Vanessza Arkus, Anita Palfi, Emese Tasnadi, HUNGARY

11.15 – 11.30 **Acute and subacute complications after severe COVID–19 disease**

Katarina Cunder, Olga Petrovič, Tina Oblak, Nataša Kic, Maja Vrabič, Neža Majdič, SLOVENIA

11.30 – 11.45 **Cross-sectional observations following telemedicine assessment for post-COVID-19 rehabilitation in a young active population**

Oliver O'Sullivan, Robert Barker-Davies, Sardar Bahadur, Mike Gough, Mark Cranley, UNITED KINGDOM

11.45 – 12.00 **Clinical features of patients referred to our electroneurophysiology laboratory post COVID-19 infection in the first year of the pandemic**

Selin Ozen, Oya Umit Yemisci, Sacide Nur Saracgil Cosar, TURKEY

12.00 – 12.15 **Risk perception and coping strategies of aging people during COVID-19 pandemic in Lombardy region of Italy**

Erika Guastafierro, Claudia Toppo, Francesca Magnani, Rosa Romano, Carla Facchini, Rino Campioni, Ersilia Brambilla, Matilde Leonardi, ITALY

12.15 – 12.30 **The impact of the SARS-CoV-2 outbreak on physical activity and mental well-being in Slovenian university students**

Joca Zurc, SLOVENIA

11.00 - 12.30

ORAL SESSION 2: INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH – ICF

(10 minutes for presentation and 5 minutes for discusssion)

Chairs: **Alexander Vladimirovich Shoshmin**, RUSSIA, **Yanina Besstrashova**, RUSSIA

11.00 – 11.15 **Validity of the ICF Generic-30 set in rehabilitation clinical practice**

Masahiko Mukaino, Shin Yamada, Shin-Ichi Izumi, Eiichi Saitoh, Yohei Otaka, JAPAN

11.15 – 11.30 **Information system for cross-sector cooperation in rehabilitation in the framework of ICF**

Alexander Shoshmin, Larisa Samarina, Evgenia Ermolaeva, Svetlana Manankova Bye, Yanina Besstrashnova, RUSSIAN FEDERATION

11.30 – 11.45 **Delphi study to develop minimum reporting set of contextual factors for rehabilitation studies based on ICSO-R 2.0**

Boya Nugraha, Grace Engen, Cecelie Roe, Marit Kirkevold, Helene L Soberg, Nada Andelic, Christoph Gutenbrunner, GERMANY

11.30 – 11.45 **Organization of rehabilitation services in randomized controlled trials - which factors influence functional outcome? A systematic review**

Cecilie Røe, Erik Bautz-Holter, Nada Andelic, Helene L Søberg, Boya Nugraha, Christoph Gutenbrunner, Andrea Boekel, Marit Kirkevold, Grace Engen, Juan Lu, NORWAY

12.00 – 12.15 **Developing an ICF-based process profiling for qualification measures in vocational rehabilitation centers: results of a qualitative multicenter study**

Regina Weißmann, Joachim Thomas, GERMANY

12.15 – 12.30 **Capacity limitations and workplace problems in patients with psychosomatic disorders**

Michael Linden, Beate Muschalla, GERMANY

11.00 – 13.00 **WORKSHOP 1**

Research design

Gaj Vidmar, SLOVENIA

12.30 – 14.00 **Lunch break/ Sponsors chat, Participants networking**

14.00 – 15.15 **PLENARY SESSION 2**

Chairs: Frederike van Wijck, UNITED KINGDOM, **Metka Moharić**, SLOVENIA

14.00 – 14.35 **Return to work (RTW) – the potential of patient reported outcome measures (PROMs) in Germany**

Susanne Weinbrenner, GERMANY

14.35 – 15.10 **The content and recent changes to Inpatient Rehabilitation Facility-Patient Assessment Instrument (IRF-PAI) used in the United States**

Dobrivoje Stokić, UNITED STATES

15.15 – 15.30 **Break/Participants networking**

15.30 – 17.00

ORAL SESSION 3: RETURN TO WORK 1

(10 minutes for presentation and 5 minutes for discusssion)

Chairs: Beate Muschalla, GERMANY, **Aleksandra Tabaj**, SLOVENIA

15.30 – 15.45 **Joint negotiations on the employee's return-to-work solutions**
Pirjo Juvonen-Posti, Hanna-Leena Ristimäki, Sanna Pesonen, Elina Weiste, Inka Koskela, Helena Nyman, Johanna Ruusuvuori, FINLAND

15.45 – 16.00 **Strengthening competence in work-related rehabilitation to lengthen work careers – the KUURA project**
Nina Nevala, FINLAND

16.00 – 16.15 **Early vocational rehabilitation in the return-to-work process**
Metka Teržan, Valentina Brecelj, Nuša Kerč, SLOVENIA

16.15 – 16.30 **Rehabilitation care for injured workers: highlighting how policies frame professional practices in four jurisdictions**
Anne Hudon, Ellen MacEachen, Katherine Lippel, CANADA

16.30 – 16.45 **Employment of persons with disabilities in Slovenia**
Aleksandra Tabaj, Črtomir Bitenc, SLOVENIA

16.45 – 17.00 **Artificial Intelligence technologies in vocational rehabilitation: practical approaches for a digital transformation**
Rolf Feichtenbeiner, Susanne Bartel, Michael Thieke-Beneke, Berit Blanc, GERMANY

15.30 – 17.00

ORAL SESSION 4: ENVIRONMENT AND OTHER TOPICS

(10 minutes for presentation and 5 minutes for discusssion)

Chairs: **Cecilia Varju**, HUNGARY, **Metka Moharić**, SLOVENIA

15.30 – 15.45 **Review of 18 different European countries on housing adjustments for (physically) disabled people**
Črtomir Bitenc, Aleksandra Tabaj, SLOVENIA

15.45 – 16.00 **What kind of advice do the outpatients in the Smart Home IRIS seek**
Metka Moharić, SLOVENIA

16.00 – 16.15 **Factors underlying the regional differences in rehabilitation participation in Finland**
Sari Miettinen, Ismo Ukkola, FINLAND

16.15 – 16.30 **Social work in rehabilitation: applying action research principles to practice**
Andrej Poglajen, Špela Malečihar, SLOVENIA

16.30 – 16.45 **Wrist flexion and extension strength in patients suffering from work-related chronic elbow pain: the isokinetic effort factor and its implications**
Joaquim Chaler, Mercè Torra, Eduard Pujol, Anna Maiques, Federica Federica Anasetti, Roser Garreta, Zeevi Dvir, SPAIN

16.45 – 17.00 **Assessment of cognitive function in patients with systemic sclerosis**
Cecília Varjú, Antonietta Kovács, Luca Krampek, Nelli Farkas, László Czirják, Tünde Minier, Gyöngyvér Birkás, Gabriella Nagy, Gábor Kumánovics, HUNGARY

15.30 – 17.15 **WORKSHOP 2**

How to write an article
Franco Franchignoni, ITALY, Levent Ozçakar, TURKEY

17.15 – 18.30 **POSTER SESSION 1**
(3 minutes for presentation)

Chairs: **Cecilia Varju**, HUNGARY, **Primož Novak**, SLOVENIA

17.15 – 17.18 **Comprehensive rehabilitation of COVID-19 patients with pneumonia and respiratory failure – first experiences**
Primož Novak, Aleksander Zupanc, Zdenka Prosič, Bernarda Hafner, Nataša Kic, SLOVENIA

17.19 – 17.22 **Evaluation of the rehabilitation program in the PostCovid Day Clinic for Physical Medicine and Rehabilitation in patients after mechanical ventilation due to COVID-19 pneumonia**
Jan Aksentijević, Luciana Mijačika, Dubravka Bobek, CROATIA

17.23 – 17.26	**Never neglect rehabilitation** Yasemin Yumusakhuylu, Belgin Erhan, Ismail Hakan Akbulut, Tolga Aksan, TURKEY
17.27 - 17.30	**Post-COVID pain syndrome in Turkish population: a descriptive study** Can Ilknur, Necdet Özçelik, Ali Timuçin Atayoğlu, TURKEY
17.31 – 17.34	**High-intensity electromagnetic field in post-COVID-19 rehabilitation** Aleksandra Ilieva, BULGARIA
17.35 – 17.38	**Assistive technology for patients after COVID-19 at discharge from rehabilitation** Nataša Ogrin Jurjevič, Zdenka Prosič, SLOVENIA
17.39 – 17.42	**The ICD-11 adjustment disorder: triggering events and symptom constellations.** Alexa Kupferschmitt, Volker Köllner, GERMANY
17.42 – 17.52	**10-minute break**
17.52 – 17.55	**Entering vocational rehabilitation in Slovenia** Aleksandra Tabaj, Črtomir Bitenc, SLOVENIA
17.56 – 17.59	**Work anxiety and capacity impairments in a national representative sample** Beate Muschalla, GERMANY
18.00– 18.03	**Employment and workability in patients with brain tumor and breast cancer: preliminary results of a prospective study** Fabiola Silvaggi, Claudia Toppo, Matilde Leonardi, Fabrizio Tagliavini, Antonio Silvani, Elena Lamperti, Silvia Schiavolin, Giovani Apolone, Serena Di Cosimo, Secondo Follil, ITALY
18.04 – 18.07	**Who is at risk? – Type-D personality in patients in psychosomatic rehabilitation as a risk factor for work-related impairments** Alexa Kupferschmitt, GERMANY
18.08 – 18.11	**Mental health and well-being in the workplace: the EMPOWER project** Alberto Raggi, Claudia Toppo, Beatriz Olaya, Ellen Vorstenbosch, Josep Maria Haro, Matilde Leonardi, ITALY

18.12 – 18.15	**An example of successful rehabilitation of a young woman after traumatic knee extraarticulation** Ana Golež, SLOVENIA
18.16 – 18.19	**Rehabilitation services for closing the rehabilitative gap after major amputation of lower extremity** Christoph Egen, GERMANY
18.20 – 18.23	**Piloting coaching for mobility in SAAM project application for patients after lower limb amputation** Mojca Debeljak, Zlatko Matjačić, Helena Burger, SLOVENIA
18.24 – 18.27	**Numerical approach for optimization of prosthetic sockets and liners** Vasja Plesec, Gregor Harih, SLOVENIA
18.27 – 18.35	**Discussion**

17.15 – 18.30 POSTER SESSION 2

(3 minutes for presentation)

Chairs: **Matilde Leonardi**, ITALY, **Katja Groleger Sršen**, SLOVENIA

17.15 – 17.18	**Communication profile of a patient after brain tumor removal** Saša Juretič, Maja Ogrin, Emica Farago, SLOVENIA
17.19 – 17.22	**Preoperative cognitive and psychosocial characteristics of elderly patients with brain tumors** Arianna Mariniello, Silvia Schiavolin, Morgan Broggi, Paolo Ferroli, Matilde Leonardi, ITALY
17.23 – 17.26	**Pilot study on sleep pathologies treatments in patients with vegetative and minimally conscious state diagnosis for improving consciounsess level – the STRIVE project** Davide Sattin, Francesca Magnani, Martina Cacciatore, Davide Rossi Sebastiano, Matilde Leonardi, ITALY
17.27 – 17.30	**Contribution of multidisciplinary rehabilitation management during severe myasthenia gravis: a case study** Maëva Cotinat, Annie Verschueren, Shahram Attarian, Jean Michel Viton, Laurent Benoussan, FRANCE

17.31 – 17.34	**The role of the cerebellum in MS-related fatigue and disability** Michela Bossa, Alberto Raggi, Ornella Argento, Barbara Spanò, Chiara Concetta Incerti, Leonardo Pellicciari, Valerio Pisani, Marco Bozzali, Calogero Foti, Ugo Nocentini, ITALY
17.35 – 17.38	**The time of first prescription of electric wheelchairs for children with neuromuscular diseases: are we too late?** Darinka Brezovar, Katja Groleger Sršen, SLOVENIA
17.38 – 17.48	**10-minute break**
17.48 – 17.51	**What are the first words that typically-developing Slovenian infants and toddlers say?** Nika Jelenc, Nuša Slana, Katja Groleger Sršen, SLOVENIA
17.52 – 17.55	**Functional gait problems and hip range of motion in children with an intoed gait pattern** Teja Hermann Kovacec, Varja Flander, Katja Groleger Sršen, SLOVENIA
17.56 – 17.59	**Parental opinion toward adjusting clothes in children with motor impairment** Simona Korelc Primc, Katja Groleger Sršen, SLOVENIA
18.00 – 18.03	**First impressions with lower extremity exoskeleton during rehabilitation of spinal cord injured patients** Benjamin Shenker, Luca Tóth, Péter Maróti, Gergely Hrivnák, Péter Cserháti, HUNGARY
18.04 – 18.07	**Botulinum toxin application to internal and external oblique muscles for abdominal spasms in spinal cord injury** Ozge Kenis-Coskun, Osman Albayrak, Esra Giray, Evrim Karadağ Saygi, TURKEY
18.08 – 18.11	**Chroncity in outpatient psychotherapy** Michael Linden, Julia Solvie, David Schymainski, GERMANY
18.12 – 18.15	**Adequacy of current Slovenian criteria for prescribing electric powered wheelchairs (EW)** David Brecelj, SLOVENIA
18.16 – 18.19	**The psychosocial context of divorce disputes with allegations of violence** Jitka Fialová, CZECH REPUBLIC

18.19 – 18.30 **Discussion**

17.15 – 18.30 **POSTER SESSION 3**
(3 minutes for presentation)

Chairs: **Gulseren Akyuz**, TURKEY, **Evrim Karadag-Saygi**, TURKEY

~~17.15 – 17.18~~ ~~**Goal-Setting and Functioning in Rehabilitation Inventory (GoFoRIt) – an ICF-based screening for rehabilitative needs and participative treatment goal setting**~~

cancelled ~~Christoph Korallus, Christoph Egen, Christoph Gutenbrunner, Andrea Bökel, GERMANY~~

17.19 – 17.22 **The role and use of time and space in aging: the TAPAS in Aging project**

Alberto Raggi, Claudia Toppo, Erika Guastafierro, Rosa Romano, Sara Bordoni, Rino Campioni, Ersilia Brambilla, Carla Facchini, Matilde Leonardi, ITALY

17.23 – 17.26 **SAAM Sleep Better – improving older adults' sleep quality with the help of SAAM, an AAL coaching system for a healthy sleep**

Magdalena Gärtner, Anna Winkler, Alexander Meschtscherjakov, AUSTRIA

17.27 – 17.30 **Awareness and acceptance of smart services among elderly – a survey conducted in three European countries**

Gabriella Tónay, András Tóth, Tamás Pilissy, Vera Stara, Margherita Rampioni, Sorin-Aure Moraru, Adrian Alexandru, Gábor Fazekas, HUNGARY

17.31 – 17.34 **Efficacy of high intensity preoperative training on postoperative outcomes in Greek patients undergoing total knee arthroplasty: a randomized controlled study**

Dimitrios Vasileiadis, Georgios Drossos, Georgios Charitoudis, Ismene Dontas, John Vlamis, GREECE

17.35 – 17.38 **Management of massive heterotopic ossification after primary total hip arthroplasty**

Samo Fokter, SLOVENIA

17.39 – 17.42 **Acupuncture as a pain management treatment in a patient with facioscapulohumeral muscular dystrophy**

Louise Foster, Bryn Edwards, UNITED KINGDOM

17.42 – 17.52	**10-minute break**
17.52 – 17.55	**Complex regional pain syndrome as a consequence of deviated organization of local and whole-brain network** Milica Klopčič Spevak, SLOVENIA
17.56 – 17.59	**Short term effect of radial shock wave therapy on function and pain in subjects with calcific tendinitis of supraspinatus** Klemen Grabljevec, Neža Majdič, SLOVENIA
18.00 – 18.03	**Effects of low level laser therapy and local corticosteroid injection in the treatment of plantar fasciitis** Ayşegül Yetisir, Erkan Kozanoglu, Bayram Kelle, TURKEY
18.04 – 18.07	**High intensity laser therapy in patients with rheumatoid arthritis** Aleksandra Ilieva, Mariela Geneva-Popova, BULGARIA
18.08 – 18. 11	**Interrater reliability of the Nine Hole Peg Test performed according to a new Czech manual in rheumatological patients** Kateřina Rybářová, Barbora Nováková, Jitka Sýkorová, Olga Nováková, Yvona Angerová, CZECH REPUBLIC
18.12 – 18.15	**The meaning of eclecticism in psychological treatment of children and adolescents with non-malignant chronic pain** Barbara Rauter, Svetlana Logar, SLOVENIA
18.16 – 18.19	**Physiotherapeutic treatment of a patient with endometriosis (case report)** Klaudia Michalčinová, Yvona Angerová, CZECH REPUBLIC
18.19 – 18.30	**Discussion**
18.45 – 19.30	**Welcome Reception**

FRIDAY, SEPTEMBER 24

8.00 – 9.15

WORKSHOP 3

Implementing ICF and WHO-DAS in clinical practice

Matilde Leonardi, Alberto Raggi, ITALY

8.00 – 9.15

WORKSHOP 4

Enhancing physical activity in people with stroke and other neurological conditions: how everyone can make a difference

Frederike van Wijck, Dora Regoczi, UNITED KINGDOM

8.00 – 9.15

POSTER SESSION 4

(3 minutes for presentation)

Chairs: **Susanna Melkas,** FINLAND, **Zlatko Matjačić**, SLOVENIA

8.00 – 8.03 **Heart rate responses between the circuit class training stations and the effects of training in chronic stroke**

Tina Novak, Urška Puh, SLOVENIA

8.04 – 8.07 **Post-stroke cognitive impairment is frequent after infratentorial infarct**

Henrik Moliis, Hanna Jokinen, Eeva Parkkonen, Markku Kaste, Timo Erkinjuntti, Susanna Melkas, FINLAND

8.08 – 8.11 **Pilot study investigating the improvement of arm function and enjoyment after class circuit training or goal directed training after stroke**

S.G. Rozevink, C.K. van der Sluis, J.M. Hijmans, NETHERLANDS

8.12 – 8.15 **Activity monitoring in stroke rehabilitation: advanced information for therapists and motivational factors for patients**

Peter Schubert, Lukas Wohofsky, Daniela Krainer, AUSTRIA

8.16 – 8.19 **Successful paths from requirements to demonstrator via User-Centered Design**

Philip Scharf, Lukas Wohofsky, Sandra Lattacher, AUSTRIA

8.20 – 8.23	**Smartphone-based upper limb rehabilitation system for post-stroke patients** Primož Čuvan, Matjaž Mihelj, Margit Gföhler, AUSTRIA
8.24 – 8.27	**Instrumentation opportunities in the status assessment of post-stroke patients with shoulder pain** Tamás Pilissy, Zsófia Markó, Ibolya Tavaszi, András Tóth, Gábor Fazekas, HUNGARY
8.28 – 8.38	**10-minute break**
8.38 – 8.41	**Robotic upper-limb rehabilitation in chronic stroke patients** Tea Schnurrer-Luke-Vrbanic, Ivana Banicek-Sosa, Matea Bagatin, Viviana Avancini-Dobrovic, CROATIA
8.42 – 8.45	**Structured open-source procedure for the design and validation of an arm rehabilitation device** Tomislav Bazina, Ervin Kamenar, Saša Zelenika, Tea Schnurrer-Luke-Vrbanić, Ana Škifić, Jasen Zenzerović, CROATIA
8.46 – 8.49	**Technological platform to support REHA2030 telerehabilitation service** Aleksander Rajhard, SLOVENIA
8.50 – 8.53	**Service model REHA2030 for post-hospital tele-rehabilitation of stroke patients** Katja Steinhauser, Josef Tuppinger, AUSTRIA
8.54 – 8.57	**A simulation model for analysing the effects of external assistance and perturbations during gait** Matej Tomc, Zlatko Matjačić, SLOVENIA
8.58 – 9.01	**Virtual versus real world in robot assisted therapy** Ibolya Tavaszi, András Tóth, Tamás Pilissy, Gábor Fazekas, HUNGARY
9.02 – 9.05	**Development and a preliminary efficacy study of Lateral Transfer Assist Robot (LTAR): effects on lower limb muscle activity during transferring** Soichiro Koyama, Shigeo Tanabe, Shotaro Furuzawa, Eiichi Saitoh, Yohei Otaka, JAPAN
9.05 – 9.15	**Discussion**

9.30 – 10.40	**PLENARY SESSION 3**
Chairs:	**Gabor Fazekas**, HUNGARY, **Nika Goljar**, SLOVENIA
9.30 – 10.05	**A framework for investigating recovery after stroke** Nick Ward, UNITED KINGDOM
10.05 – 10.40	**Ageing** Matteo Cesari, ITALY
10.40 – 11.00	**Break/Networking with participants**
11.00 - 12.30	**ORAL SESSION 5: STROKE** **(10 minutes for presentation and 5 minutes for discusssion)**
Chairs:	**Nirmal Surya**, INDIA, **Nika Goljar**, SLOVENIA
11.00 – 11.15	**Stroke rehabilitation challenges in the Slovenian-Austrian region: novel telerehabilitation approaches to enhance service provision** Lukas Wohofsky, Daniela Krainer, AUSTRIA
11.15 – 11.30	**Early edaravone use in acute ischemic stroke patients: the resurgence of an old promise?** Nuno Caria Ramalhão, Raquel Araujo, Margarida Ribeiro, Sara Caldas Afonso, Rosa Amorim, PORTUGAL
11.30 – 11.45	**Urinary incontinence and lower urinary tract symptoms in patients after stroke during subacute rehabilitation** Nataša Bizovičar, Brigita Mali, Nika Goljar, SLOVENIA
11.45 – 12.00	**Long-term functional electrical stimulation in spastic stroke patients** Nika Goljar, Nataša Bizovičar, Marko Rudolf, SLOVENIA
12.00 – 12.15	**Efficacy of mindfulness-based cognitive therapy in post-stroke rehabilitation** Veronika Udvardi, Gábor Fazekas, HUNGARY
12.15 – 12.30	**A qualitative exploration of barriers and facilitators to physical activity participation among a group of Turkish patients with stroke who are community-dwelling and physically inactive** Evrim Karadag-saygi, Esra Giray, Nurullah Eren, Gunay Yolcu, Ozge Kenis-Coskun, Serap Ciftcili, TURKEY

11.00 – 12.30

ORAL SESSION 6: QUALITY OF LIFE

(10 minutes for presentation and 5 minutes for discusssion)

Chairs: **Lajos Kullman**, HUNGARY, **Metka Moharić**, SLOVENIA

11.00 – 11.15 **Perceived environmental barriers of people with spinal cord injury in Germany and their impact on quality of life**

Andrea Bökel, GERMANY

11.15 – 11.30 **Quality of life in Slovenian patients with slowly progressive neuromuscular disease**

Metka Moharić, Nika Lajlar, Gaj Vidmar, SLOVENIA

11.30 – 11.45 **Which components of physical fitness affect the quality of life of adults with intellectual disabilities: a mixed methods study**

Tine Kovačič, Joca Zurc, SLOVENIA

11.45 – 12.00 **Web-based adaptation training has a positive influence on subjective well-being – preliminary results**

Piia Pietilä, Ilja Salakka, Heidi Anttila, Sinikka Hiekkala, Erja Poutiainen, FINLAND

12.00 – 12.15 **The possible role of animal-assisted therapy in clinical recovery and improving quality of life**

Veronika Mittly, György Purebl, Veronika Fáy, HUNGARY

12.15 – 12.30 **The effect of telerehabilitation on quality of life, anxiety and depression levels in children with cystic fibrosis and their caregivers**

Ozge Kenis-Coskun, Ahsen Nihal Aksoy, Aybike Yilmaz, Eda Nur Kumaş, Elifnur Güven, Hatice Hilal Ayaz, Pinar Almala Ergenekon, Tugce Sozer, Evrim Karadag- Saygi, TURKEY

11.00 – 12.30 **ORAL SESSION 7: LIMB LOSS AND TECHNOLOGY**
(10 minutes for presentation and 5 minutes for discusssion)

Chairs: **Helena Burger**, SLOVENIA, **Johan Rietman**, NETHERLANDS

11.00 – 11.15 **The development of a patient decision aid for upper limb prostheses: a co-creation process**
Nienke Kerver, Laura Boerema, Corry K. van der Sluis, Sacha van Twillert, NETHERLANDS

11.15 – 11.30 **An application of multivariate statistical process control for mixed-type data in prosthetic rehabilitation after lower-limb amputation**
Neža Majdič, Rok Blagus, Gaj Vidmar, Helena Burger, SLOVENIA

11.30 – 11.45 **Falls as an important indicator of health-care quality in patients after amputation**
Romana Petkovšek-Gregorin, Agata Križnar, Helena Burger, Gaj Vidmar, SLOVENIA

11.45 – 12.00 **The Walking Ability Scale for lower-limb prosthesis users**
Helena Burger, Franco Franchignoni, Andrej Bavec, Andrea Giordano, SLOVENIA

12.00 – 12.15 **Automated process of making custom-made insoles**
Karlo Obrovac, Jadranka Vuković Obrovac, Adriana Obrovac, CROATIA

12.30 – 13.00 **Lunch break/Sponsors chat**

13.00 – 14.00 **EFRR GENERAL ASSEMBLY**

14.15 – 15.30 **PLENARY SESSION 4**

Chairs: **Gabor Fazekas**, HUNGARY, **Susanne Weinbrenner**, GERMANY

14.15 – 15.30 **Robotics: robot-assisted arm training after stroke: insights from the RATULS study**
Hermano Igo Krebs, USA, Frederike van Wijck, UNITED KINGDOM

15.30 – 15.45 **Break/participants networking**

15.45 – 17.30

ORAL SESSION 8: BALANCE PROBLEMS AND ROBOTICS

(10 minutes for presentation and 5 minutes for discusssion)

Chairs: **Zlatko Matjačić**, SLOVENIA, **Frederike van Wijck**, UNITED KINGDOM

15.45 – 16.00 **Reliability of stabilometry according to the modified clinical test of sensory interaction and balance and differences between age groups**

Mojca Pišotek, Urška Puh, SLOVENIA

16.00 – 16.15 **Early balance training may accelerate the motor learning process of trans-tibial prosthesis users**

Imre Cikajlo, Jovana Mitić, Helena Burger, SLOVENIA

16.15 – 16.30 **The effect of balance training program on postural stability in children with dyslexia**

Rekib Sacaklıdır, Evrim Karadag-Saygi, Nurullah Eren, Kardelen Gencer-Atalay, Burcu Erdoğdu, TURKEY

16.30 – 16.45 **Integration of HMD-based immersive virtual reality in a Lokomat gait rehabilitation robot**

Jan Veneman, SWITZERLAND

16.45 – 17.00 **Implementation of robotics in rehabilitation: does it make sense?**

Gabor Fazekas, HUNGARY

Posters

(3 minutes for presentation)

17.00 – 17.03 **Dynamic balancing responses in unilateral transtibial amputees following perturbation in anteroposterior direction during slow treadmill walking**

Andrej Olenšek, Matjaž Zadravec, Helena Burger, Zlatko Matjačić, SLOVENIA

17.04 – 17.07 **Perturbation-based gait training may require subject-specific approach: results of an exploratory study**

Matjaž Zadravec, Andrej Olenšek, Marko Rudolf, Nataša Bizovičar, Nika Goljar, Zlatko Matjačić, SLOVENIA

17.07 – 17.15 **Discusion**

15.45 – 17.30

ORAL SESSION 9: RETURN TO WORK 2

(10 minutes for presentation and 5 minutes for discusssion)

Chairs: **Sven-Uno Marnetoft**, SWEDEN, **Marko Sremec**, SLOVENIA

15.45 – 16.00 **Who returns to work partially after mild traumatic brain injury?**

Antti Huovinen, Ivan Marinkovic, Harri Isokuortti, Antti Korvenoja, Kaisa Mäki, Taina Nybo, Rahul Raj, Susanna Melkas, FINLAND

16.00 – 16.15 **Possible factors influencing participation in working life for persons with spinal cord injury**

Christian Sturm, Andrea Bökel, Christoph Gutenbrunner, GERMANY

16.15 – 16.30 **Work participation after multimodal rehabilitation due to respiratory diseases: representative analyses using routine data of the German Pension Insurance**

Marco Streibelt, Pia Zollmann, GERMANY

16.30 – 16.45 **People with intellectual disabilities in the general labor market? A qualitative interview study from the perspective of parents**

Regina Weißmann, Burcu Ilkay Köse, Joachim Thomas, GERMANY

16.45 – 17.00 **The effectiveness of rehabilitation interventions on the employment and functioning of people with intellectual disabilities: a systematic review**

Nina Nevala, Irmeli Pehkonen, Antti Teittinen, Hannu T. Vesala, Heidi Anttila, FINLAND

17.00 – 17.15 **Guidelines for the employment of people with autism spectrum disorders**

Valentina Brecelj, Tina Janežič, SLOVENIA

17.15 – 17.30 **Evaluation of vocational rehabilitation for 2018: satisfaction with the process of vocational rehabilitation and quality of life of service users**

Črtomir Bitenc, Valentina Brecelj, SLOVENIA

15.45 – 17.30

ORAL SESSION 10: REHABILITATION OF PEOPLE WITH NEUROLOGICAL PROBLEMS AND SPASTICITY

(10 minutes for presentation and 5 minutes for discusssion)

Chairs: **Susanna Melkas**, FINLAND, **Nika Goljar**, SLOVENIA

15.45 – 16.00 **Audit on the use of benzodiazepines and Z-drug hypnotics (BZRA) in acquired brain injury (ABI) inpatients in a rehabilitation hospital**
Catherine Boyle, Patrick Bell, Aaisha Khan, IRELAND

16.00 – 16.15 **Improvement of care for families of people after traumatic brain injury in Czech Republic**
Yvona Angerova, Zuzana Jarosova, Maria Krivosikova, CZECH REPUBLIC

16.15 – 16.30 **Neurorehabilitation of multiple sclerosis in the British military**
Oliver O'Sullivan, James Mitchell, Shreshth Dharm-Datta, Henrietta Ellis, UNITED KINGDOM

16.30 – 16.45 **Alternative and augmentative communication for adults in Slovenia**
Katja Galič Brancelj, Mojca Debeljak, Metka Moharić, SLOVENIA

16.45 – 17.00 **BoNT-A therapy in the early acute phase following stroke to avoid disabling spasticity**
Jörg Wissel, Songjin Ri, Anatol Kivi, Stefanie Gläß, GERMANY

17.00 – 17.15 **Long-term compliance of botulinum toxin A injection in a patient with spasticity**
Belgin Erhan, Işıl Fazilet Turna, TURKEY

17.15 – 17.30 **Intra- and interrater reliability of the Modified Ashworth Scale for twelve muscle groups in patients after stroke**
Tjaša Vidmar, Nika Goljar Kregar, Marko Rudolf, Urška Puh, SLOVENIA

SATURDAY, SEPTEMBER 25

8.30 – 10.00 **WORKSHOP 5**

8.30 – 10.00 **From annoyances to fatal flaws: what IJRR editors do not want to see in submitted manuscripts?**

Črt Marinček, SLOVENIA, Dobrivoje S. Stokic, UNITED STATES OF AMERICA, Lajos Kullmann, HUNGARY, Gaj Vidmar, SLOVENIA

8.30 – 10.00 **WORKSHOP 6**

8.30 – 10.00 **Caregiver burden in disabilities**

Gulseren Akyuz, Evrim Karadag-Saygi, Ozge Kenis-Coskun, Esra Giray, TURKEY

8.30 – 9.45 **ORAL SESSION 11: (RE)HABILITATION OF CHILDREN**

(10 minutes for presentation and 5 minutes for discusssion)

Chairs: **Resa Aydın**, Turkey, **Katja Groleger Sršen**, Slovenia

8.30 – 8.45 **Norway and the right to respect family life from the perspective of the European Court of Human Rights**

Tomáš Zdechovský, Jitka Fialová, CZECH REPUBLIC

8.45 – 9.00 **The efficiency of selective dorsal rhizotomy and intensive physiotherapy program for non-walking children with cerebral palsy**

Katja Groleger Sršen, Irena Jemec Štukl, Neža Majdič, SLOVENIA

9.00 – 9.15 **Long-term results of pelvic floor animated biofeedback in children with different types of lower urinary tract symptoms**

Maria Laura Sollini, Maria Luisa Capitanucci, Giovanni Mosiello, Giuseppina Di Serio, Calogero Foti, Ugo Nocentini, ITALY

9.15 – 9.30 **Rehabilitation outcome of comprehensive approach to new-borns and infants with brachial plexus impairment**

Zala Kacijan, Monika Dolinar, Katja Groleger Sršen, SLOVENIA

9.30 – 9.45 **A pilot study of effectiveness of interdisciplinary treatment in children and adolescent with chronic non-malignant pain**

Barbara Horvat Rauter, Katja Groleger Sršen, SLOVENIA

10.10 – 11.20 PLENARY SESSION 5

Chairs: **Susanna Melkas**, FINLAND, **Helena Burger**, SLOVENIA

10.10 – 10.45 **Modern technology for assessment and functional independence**
Johan Rietman, NETHERLANDS

10.45 – 11.20 **Virtual reality**
Helena Fordell, SWEDEN

11.20 – 11.30 **Break**

11.30 – 13.00 ORAL SESSION 12: DRIVING FOR PEOPLE WITH DISABILITIES

(10 minutes for presentation and 5 minutes for discusssion)

Chairs: **John Hunter**, UNITED KINGDOM, **Marko Sremec**, SLOVENIA

11.30 – 11.45 **Assessing fitness to drive of neurological patients using a driving simulator**
Kristina Stojmenova, Lenart Motnikar, Urša Čižman Štaba, Karmen Resnik Robida, Jaka Sodnik, SLOVENIA

11.45 – 12.00 **SimFit2Drive – a screening tool for holistic assessment of driver's fitness to drive**
Kristina Stojmenova, Marko Sremec, Jaka Sodnik, SLOVENIA

12.00 – 12.15 **Functional differences between lower limbs in drivers with right transtibial amputation and fitted prosthesis**
Marko Sremec, SLOVENIA

12.15 – 12.30 **Abilities of patients after stroke to drive an electric scooter or powered wheelchair**
Julija Ocepek, Nataša Bizovičar, Vesna Mlinarič Lešnik, SLOVENIA

12.30 – 12.45 **Evaluation of management and driving skills of wheelchair: a pilot study**
Katja Groleger Sršen, Simona Korelc, Darinka Brezovar, Laura Kostanjšek, Jana Brodnik, Anita Merhar, SLOVENIA

Posters

(3 minutes for presentation)

12.45 – 12.48 **Assessment of fitness-to-drive after stroke: a neuropsychological perspective**

Gábor Szabó, HUNGARY

12.49 – 12.52 **Comparison of neuropsychological assessment and driving-simulation variables in a sample of neurological patients**

Urša Čižman Štaba, SLOVENIA

12.53 – 12.55 **Adaptation of vehicles for physically handicapped in Slovenia**

Rajmond Šavrin, SLOVENIA

12.55 – 13.00 **Discusion**

11.30 – 13.00

ORAL SESSION 13: SPORT AND SPORT FOR DISABLED

(10 minutes for presentation and 5 minutes for discusssion)

Chairs: **Frederike van Wijck**, United Kingdom, **Helena Burger**, Slovenia

11.30 – 11.45 **„Be silent and carry on": normalising injuries and lack of rehabilitation in the elite women's artistic gymnastics**

Joca Zurc, SLOVENIA

11.45 – 12.00 **Effectiveness of Tulppa program on cardiovascular risk factors and emotional well-being - preliminary results of a controlled study**

Piia Pietilä, Ilja Salakka, Marjaana Lahti-Koski, Anna-Mari Hekkala, Anneli Luoma-Kuikka, Erja Poutiainen, FINLAND

12.00 – 12.15 **Evaluation of glenohumeral rotators using isokinetic testing in sitting volleyball players**

Andrej Bavec, Helena Burger, SLOVENIA

12.15 – 12.30 **Lower-limb muscle contractile proprieties, explosive power and subjective response in Slovenian First League soccer players to COVID-19 lockdown**

Rado Pišot, A. Paravlić, B. Šimunić, M. Kleva, M. Vogrin, K. Teraž, U. Marušić, SLOVENIA

12.30 – 12.45 **„Let's kick the disease": karate and rehabilitation. A pilot study.**
Stefano Faraci, Elisa Porcu, Vincenzo D'Onofrio, Gennaro Gatto, Maria Teresa La Torre, Concetta Ljoka, Laura Giordani, Calogero Foti, Ugo Nocentini, ITALY

11.30 – 13.00 **ORAL SESSION 14: TELEREHABILITATION**
(10 minutes for presentation and 5 minutes for discusssion)

Chairs: **Gülseren Akyüz**, Turkey, **Katja Groleger Sršen**, Slovenia

11.30 – 11.45 **Remote rehabilitation that incorporates discussion of values in therapy is possible with an online card-sorting exercise**
Andrew Bateman, UNITED KINGDOM

11.45 – 12.00 **Does combining face-to-face treatment with telerehabilitation affect functional outcomes in chronic pain patients' rehabilitation?**
Zala Kuret, Nika Bolle, Neža Majdič, Saša Bole, SLOVENIA

12.00 – 12.15 **From face-to-face treatment of chronic pain patients to part-telerehabilitation in time of COVID-19 – do occupational performance outcomes vary?**
Barbara Osolnik, Nika Bolle, Andreja Švajger, Helena Grilj, Neža Majdič, Zala Kuret, SLOVENIA

12.15 – 12.30 **Ambulatory monitoring and coaching for the aftercare of occupational rehabilitants: low-threshold, discreet and practicable provision of need-oriented support**
Elisabeth Riedl, Anna Moraß, Regina Schmid, Wolfgang Dings, Joachim Thomas, GERMANY

12.30 – 12.45 **Assessment of coaching technology for seniors by potential users in Bulgaria – SAAM project**
Zlatka Gospodinova, Nadejda Miteva, Vera Veleva, Yordan Dimitrov, BULGARIA

12.45 – 13.00 **Ethical considerations in designing and implementing AAL technologies: the SAAM case study**
Nadejda Miteva, Zlatka Gospodinova, Vera Veleva, Yordan Dimitrov, BULGARIA

13.10 – 13.20 **CLOSING**

ABSTRACTS

Ethics in rehabilitation research

Henk J. Stam[1]

[1]*Erasmus University Rotterdam, Netherlands*

BACKGROUND:

Ethics is defined as a moral philosophy or code of morals practiced by a person or group of people.
Examples of some of the most common personal ethics shared by professionals are:

- Honesty
- Loyalty
- Integrity
- Respect
- Selflessness
- Responsibility

MATERIALS AND METHODS:

This presentation has a focus on applied ethics, a discipline of philosophy that attempts to apply ethical theory to real-life situations. Common issues in applied ethics are: “Is getting an abortion immoral?” Or: “Is euthanasia immoral?” People, in general, are more comfortable with dichotomies (two opposites). However, in ethics, the issues are most often multifaceted, and the best-proposed actions address many different areas concurrently. In ethical decisions, the answer is almost never a "yes or no" or a "right or wrong" statement. In this presentation I will try to increase your awareness for ethical issues in clinical practice, research and education of Rehabilitation Medicine. An important principle is that ethical issues or dilemmas are best dealt with by considering several options, instead of focusing on one correct answer or solution. Reflection on different options and attempting to provide arguments for each solution assists in creating a broader vision about the ethical question and also to understand people who have a different point of view.

RESULTS:

During the presentation I will present a number of ethical issues and discuss them with the audience. Examples are: What do you do when a college has an intimate relationship with a resident? What do you do when you discover fraude in a paper of your student? What do you do when a collegue uses cannabis in his free time?

REFERENCES:

[1] Dilemmas in Rehabilitation Medicine: The dilemma game exercise book. A publication of the European Academy of Rehabilitation Medicine. Editor H J Stam.

Usefulness for clinicians and researchers of the Rehabilitation COVID-19 Evidence based Response (REH-COVER) Action by Cochrane Rehabilitation

Stefano Negrini[1]
[1]*University of Milan, Italy*

BACKGROUND

On January 30th, 2020, the World Health Organization declared a state of emergency to combat the spread of COVID-19. Beyond the acute illness, patients develop consequences requiring rehabilitation. This has led to an increased interest in the role of rehabilitation medicine. However, the intricacies of this role remain unknown and only research can provide us with the necessary answers. The interest is further fuelled by how the consequences of quarantine, social isolation, movement restriction and healthcare systems' disruption influence the rehabilitation of people with disabilities and chronic diseases. Thus, it is ever more important to communicate the currently available evidence to reduce any resulting clinical uncertainty.

MATERIALS AND METHODS

To update the rehabilitation community on the growing evidence for the role of rehabilitation in management of COVID-19 patients, Cochrane Rehabilitation launched the REH-COVER action. The aim is the timely collection, review and dissemination of evidence relating to COVID-19 and rehabilitation: an evidence-based clinical answers repository. The action was developed by an International Multiprofessional Steering Committee, whose role will continue to advice on all initiatives included in this action.

RESULTS

Cochrane Rehabilitation REH-COVER action currently includes:

1. Rapid living Systematic Reviews on Rehabilitation and COVID-19 with monthly updates (March 2020)
2. Interactive living evidence map on Rehabilitation and COVID-19 (April 2020)
3. Definition of the research topics on "Rehabilitation and COVID-19" in collaboration with the WHO rehabilitation programme (May 2020)
4. Cochrane Library Special Collection: Coronavirus (COVID-19): rehabilitation of patients with functional consequences of acute illness and its treatments (June 2020)

CONCLUSION

The REH-COVER action provides a repository of evidence for all clinicians and researchers.

REFERENCES

[1] www.rehabilitation.cochrane.org

“Sick-leave due to COVID-19- a report from national cohorts in Sweden”

Katharina Sunnerhagen[1]

[1]*University of Gothenburg, Institute of Neuroscience and Physiology, Section of Clinical Neuroscience, Sweden*

The long-term consequences of by the COVID-19 pandemic are immeasurable for the affected person and the family, as well as for the economy, public health, healthcare and the health insurance system. The number that has been infected are still rising, the symptoms are diverse, and the severity, symptoms and functional impairment vary over time as well as in length.

Post- covid is when the infection is over, but it is unclear how long this can persist and how many that are suffering. Post infection, rehabilitative actions to improved ability for people to return to ordinary routines, including work, are needed. Sick leave is an indicator of well-being in the working-age population. In Sweden, sick leave rates almost doubled during March and April 2020 compared with the previous year. The financial compensation for sick leave is tax-funded and comprehensive in Sweden.

The aim was to investigate patterns of sick leave, as well as factors predicting sick leave ≥1 month and sick leave for post- covid, in a comprehensive national population (both hospitalised as well as non-hospitalised persons),

To do this, we used the unique Swedish personal identification number and retrieved data from the Swedish Social Insurance Agency, the Swedish National Board of Health and Welfare, and Statistics Sweden. The files were merged by Statistics Sweden and were delivered pseudonymized. Data covered those on sick leave due to COVID-19 that started between March 1 and August 31, 2020, with follow-up for 4 month (first wave in Sweden).

Almost 12,000 people (of 5.8 million between 20 64 year of age) started sick leave for COVID-19 within the inclusion period. The median sick leave was 35 days, 13.3% were on sick leave for more than 90 days, and 9.0% remained for the whole follow-up. 2960 received inpatient care due to COVID-19, which was the strongest predictor of longer sick leave. Sick leave the year prior to COVID-19 and older age also predicted longer sick leave. No clear pattern of socioeconomic factors was noted.

To conclude, the group needing long sick leave after COVID-19 seems to be heterogeneous, indicating a knowledge gap. This needs to be further addressed. Still, we can identify try to support and rehabilitate those with prior sick-leave who are at risk for long sick leave.

Complex rehabilitation of COVID-19 patients – experiences from a Hungarian post-COVID impatient rehabilitation unit

Vanessza Arkus[1], Anita Palfi[2], Emese Tasnadi[1]

[1]Department of Neurosurgery, University of Pecs, [2]1st Department of Internal Medicine, University of Pecs, Hungary

BACKGROUND: The emergence of the SARS-CoV-2 coronavirus pandemic in 2019 has posed entirely new challenges to healthcare systems worldwide. In severe cases of coronavirus disease (COVID-19) prolonged ventilation, several weeks stay in intensive care unit and life-threatening complications were already described. As varied experiences and detailed databases were gained during the treatment of this potentially deadly virus, we managed to learn more about the course, possible therapies and also common complications of COVID-19.

MATERIALS AND METHODS: In February 2021 a 12-bed post-Covid rehabilitation unit was introduced with the aim of providing early, intensive rehabilitation for previously hospitalized patients recovering from COVID-19. In accordance with the rules and principles of the rehabilitation profession: physiotherapists, psychologists, speech therapists, experienced nurses, 2 rehabilitation specialists with the help of pulmonologist, infectologist and intensive care consultants participated in the patient care.

RESULTS: During the 2-month operation 24 patients were admitted and 16 of them were sent to their homes with a significantly improved general condition. The extremely diverse patient material constantly challenged and educated the established team.

CONCLUSION: In addition to respiratory rehabilitation and physiotherapy, psychological-, cardiac- and neurorehabilitation had to be started as soon as possible in patients recovering from COVID-19. A multidisciplinary, complex, individualized and gradual rehabilitation approach is essential for post-COVID-19 patients. Continuous learning is required not only for the health care providers but for patients themselves, as well.

REFERENCES:

[1] American Society of Hematology 2021 Guidelines on the use of anticoagulation for thromboprophylaxis in patients with COVID-19 (Adam Cuker, Eric K. Tseng et al)

Acute and subacute complications after severe COVID–19 disease

Katarina Cunder[1], Olga Petrovič[1], Tina Oblak[1], Nataša Kic[1], Maja Vrabič[1], Neža Majdič[1]
[1]*University Rehabilitation Institute, Republic of Slovenia*

BACKGROUND: COVID-19 is highly infectious disease affecting different organic systems. Five percent of patients develop severe form of the disease that leads to an acute respiratory failure with the need for mechanical ventilation and different acute and subacute complications.

MATERIALS AND METHODS: After reviewing the documentation of 39 patients that concluded rehabilitation between November 2020 and March 2021, we coded acute and subacute complications based on International Classification of Disease - ICD. Descriptive statistics were prepared.

RESULTS: More than three quarters of patients were male, with average age of 61 (SD 11, range 37 – 81) years. The mean length of the acute treatment was 54 (SD 21, range 16 – 103) days. Rehabilitation lasted on average for 40 (SD 15, range 17 – 80) days. On average, individual patient suffered from three acute (2 – 5) and four subacute (3 – 5) complications. Most common acute complications were secondary pneumonia, pressure wound, adrenal insufficiency, thromboembolic event and electrolyte disbalance. The most common documented complications during rehabilitation were urinary tract infection, ulnar and peroneal nerve palsy, an episode of mental disorder, hypokalemia and tachycardia.

CONCLUSION: Patients, included in this study suffered complications from different organic systems. Complex rehabilitation approach was therefore needed. Future prospective observational studies about long-term impairment are in process.

Conflict of interest: None to declare.

REFERENCES:

[1] Kordzadeh-Kermani E, Khalili H, Karimzadeh I. Pathogenesis, clinical manifestations and complications of coronavirus disease 2019 (COVID-19). Future Microbiol 2020.
[2] De Sire A, Adrenelli E, Negrini F et al. Rehabilitation and COVID-19: a rapid living systematic review by Cochrane Rehabilitation Field. Eur J Phys Rehabil Med 2021.
[3] SeyedAlinaghi S, Afsahi AM, MohsseniPour M et al. Late Complications of COVID–19; a systematic review of current evidence. Arch Acad Emerg Med 2021.

Cross-sectional observations following telemedicine assessment for post-COVID-19 rehabilitation in a young active population

Oliver O'Sullivan[1], Robert Barker-Davies[1], Sardar Bahadur[2], Mike Gough[2], Mark Cranley[2]
[1]Academic Department of Military Rehabilitation, DMRC Stanford Hall, [2]DMRC Stanford Hall, United Kingdom

BACKGROUND: Coronavirus disease 2019 (COVID-19) can cause prolonged symptoms requiring rehabilitation [1,2]. A remote rehabilitation assessment tool was created at Defence Medical Rehabilitation Centre (DMRC) Stanford Hall to allow timely triage, assessment and management via a telemedicine platform.

MATERIALS AND METHODS: Cross-sectional study of consecutive patients referred between April-November 2020. Binary logistic regression was used to test association between acute presentation and post-COVID-19 symptomology, with primary outcomes the presence/absence of anticipated sequelae.

RESULTS: 155 patients (n=127 male, n=28 female, median age 39, median 13 weeks post illness) was assessed. Acute symptoms were most commonly, shortness of breath (SOB) (74.2%), fever (73.5%), fatigue (70.3%) and cough (64.5%), and post-acutely, SOB (76.7%), fatigue (70.3%), cough (57.4%) and anxiety/mood disturbance (39.4%). Individuals with a confirmed diagnosis of COVID-19 were 69% and 63% less likely to have anxiety/mood disturbance and pain respectively at three months. Those with laboratory confirmation had an assessment sooner following the onset of symptoms than those without.

CONCLUSION: Rehabilitation assessment should be offered to all patients suffering post-COVID-19 symptoms, not only those with laboratory confirmation, and considered independently from acute illness severity. Telemedicine improves accessibility amid changing National restrictions. Post-COVID-19 programmes should include SOB, fatigue and mood disturbance management.

REFERENCES:

[1] O'Sullivan O. Long-term sequelae following previous coronavirus epidemics Clin Med November 2020, DOI: https://doi.org/10.7861/clinmed.2020-0204
[2] Barker-Davies RM, et al. The Stanford Hall consensus statement for post-COVID-19 rehabilitation British Journal of Sports Medicine 2020; 54:949-959

Clinical features of patients referred to our electroneurophysiology laboratory post COVID-19 infection in the first year of the pandemic

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BACKGROUND: Peripheral nervous system (PNS) manifestations following SARS-CoV-2 include myopathy and polyneuropathy. Electrophysiological tests are used to diagnose neuromuscular diseases and determine severity and prognosis. To the best of our knowledge, to date there is no study on the electroneuromyographic (ENMG) findings and neurophysiological diagnoses in patients presenting with neuromuscular complaints following SARS-CoV-2 infection.
The aim of this study was to determine the clinical features and electrophysiological diagnoses of patients referred to our ENMG laboratory following covid-19 infection in the first year of the pandemic.

MATERIALS AND METHODS: Medical records of patients referred to the ENMG laboratory between 11 March 2020 and 11 March 2021 with neuromuscular signs and symptoms, preceded by a diagnosis of SARS-CoV-2, were reviewed.

RESULTS: 1274 medical records were reviewed; 62 patients were included in the study. Mean age was 50 (SD 17) years, 36 (58%) were male. Covid-19 diagnoses were made on average 7.3 (SD 1.6) months into the pandemic. Patients presented with neuromuscular complaints on average 2.6 (SD 1.9) months after COVID-19 diagnosis. Common symptoms were paraesthesia (42%) and pain in the extremities (18%). Changes in sensation and reflexes and reduced muscle power were detected in 31%. Most common ENMG diagnosis was polyneuropathy (22%). ENMG findings were normal in 42%.

CONCLUSION: Repeat ENMG and further, more sensitive electrophysiological testing should be considered in those with continued PNS complaints, despite initially normal electrophysiological findings. Further studies should establish whether SARS-CoV-2 infection is causal or coincidental in the development of PNS pathologies and related ENMG findings.

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Risk perception and coping strategies of aging people during COVID-19 pandemic in Lombardy region of Italy

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BACKGROUND: During the COVID-19 pandemic, older adults are the segment of the population at higher risk for health problems and isolation. When exploring the aging people's needs and reactions to the situation, it is crucial to plan appropriate interventions and supporting strategies. The present study aimed to investigate risk perception and coping strategies in older adults during the COVID-19 pandemic in Italy.

MATERIALS AND METHODS: 514 people over 65 years, residing in the Lombardy region of Italy, were administered with a structured online interview collecting socio-demographic information, sources of information used, daily actions undertaken to avoid the contagion, risk perception related to COVID-19 and other threats, and coping strategies used to face the situation.

RESULTS: Risk perception related to COVID-19 was significantly lower than the perceived risk associated with other threats, and it was correlated to the number of sources of information used. Most of the sample relied on avoidant coping strategies with a tendency to accept the situation by avoiding stressors more than rebelling to the situation with approaching strategies.

CONCLUSION: Participants put into action most of the possible behaviors aimed to avoid contracting the COVID-19, showing a tendency in using avoidance strategies. This confirmed that the choice of the best strategy to use depends on the features of the situation a person must face. Regarding risk perception, it is necessary to take into consideration its link with the perception of control: the lockdown condition lets older adults to feel safer and less vulnerable to the virus.

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The impact of the SARS-CoV-2 outbreak on physical activity and mental well-being in Slovenian university students

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BACKGROUND: The pandemic of the severe respiratory syndrome of SARS-CoV-2 drastically changed lifestyles, especially among youth [1]. Physical activity proved to be one of the most relevant factors for managing the negative impacts of COVID-19 pandemics on mental health [2]. However, there is still a lack of evidence of how this relationship is acting among youth. This study examined the interactions between physical activity and mental well-being among university students during the first outbreak of the COVID-19 pandemic.

MATERIALS AND METHODS: A cross-sectional study involving 95 students of different study programs from the three higher education institutions (84 % females, average 26, SD 7 years of age) was conducted. Physical activity and mental well-being were self-reported by the online survey. The relations between physical activity and mental well-being were assessed using the Spearman correlation.

RESULTS: 53 % of students reported being active at least 30 minutes per day. A typical physical activity was moderate-to-lower intensity, non-organised, aerobic, and performed in a natural environment. A positive attitude towards physical activity, aerobic exercises, and an active lifestyle were significantly related to better mood, self-confidence, study discipline, tasks efficiency, lower tiredness, and overall better well-being among respondents ($P \leq 0.05$).

CONCLUSION: Moderate aerobic physical activity seems to have positive effects on the mental well-being of university students. Further studies are needed to examine the long-term impact of physical activity on mental health during the COVID-19 pandemic.

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Validity of the ICF Generic-30 set in rehabilitation clinical practice

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BACKGROUND:
The International Classification of Functioning, Disability, and Health (ICF) provides a comprehensive framework for describing information on patients' functioning profiles. Previously, the ICF Generic-30 set (also known as the ICF Rehabilitation Set), consisting of 30 categories, was introduced for evaluating functioning across various populations. The present study aimed to evaluate the validity of using the ICF Generic-30 Set for patients who receive inpatient rehabilitation.

MATERIALS AND METHODS:
The study included 1102 in patients who received rehabilitation in 20 hospitals. Each patient's functioning profile was evaluated using the ICF Generic-30 Set, the WHO Disability Assessment Schedule (WHO-DAS) and the Functional Independence Measure (FIM). A rating reference guide developed for the ICF in Japanese clinical practice [1,2] was used for all ratings based on the Generic-30 Set. The internal construct validity was examined by conducting a Rasch analysis, after eliminating the categories with many missing values (>10%). The concurrent validity in comparison with WHO-DAS and FIM was also examined.

RESULTS:
The mean age of patients was 77 (SD 29) years, the gender distribution was 499 males/603 females. Seven categories were excluded from the analysis because of high missing values. A Rasch analysis of 23 categories resulted in a good fit after grouping categories into testlets and item-splitting based on differential item functioning, supporting internal construct validity of the ICF Generic-30 set. The results' high correlation with WHO-DAS and FIM supported the concurrent validity of the ICF Generic-30 Set.

CONCLUSION:
The present results supported the validity of the ICF Generic-30 Set for use in inpatient rehabilitation settings.

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Information system for cross-sector cooperation in rehabilitation in the framework of ICF

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BACKGROUND:
Providing cross-sector cooperation in rehabilitation is feasible in many countries. Gaps in legislation and intention of agencies to take a leading position can be noted. ICT provides an integrated database and standards of rehabilitation services, while preserving features of each sector. The easiest way of implementing information system is to start from the least developed area in the light of legislation. In Russia, it is the early aid (interventions) to children and their families.

MATERIALS AND METHODS:
ICF links working in the sectors, it is used for the initial assessment to identify needs in (re)habilitation services and the advanced one to develop individualized programs. ICF supports the technology that makes work of a professional easier by applying ICF core sets or customized standards. The standard of descriptions for assessment, rehabilitation process and outcomes in the ICF terminology was developed. The study included analysis of the legislation of three agencies (education, healthcare, social protection), persons in need for rehabilitation and practices in organizations.

RESULTS:
In Russian regions three agencies are involved in rehabilitation with dominating education or social sectors. All measures aim at person's skills taking into account the environmental factors. Healthcare does not play the key role due to standards of medical insurance.
The information system supporting decision-making process was designed for a region. It contains data about children of early age who needs (re)habilitation and their families. This approach enables to organize vertical and horizontal consultations between professionals and academics, and to maintain activities of agencies and organizations.
Standardization of the services in the sectors was complicated. The classification based on the International Classification of Health Interventions is relevant.

CONCLUSION:
Information systems help to solve problems of acting in cooperation in rehabilitation.

Delphi study to develop minimum reporting set of Ccntextual factors for rehabilitation studies based on ICSO-R 2.0

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BACKGROUND: Rehabilitation studies are important to recommend the best effective treatment. But contradiction results often occurred in different studies with similar interventions. One of the reasons could be the difference in contextual factors (CFs). Therefore, this Delphi study, which is part of large studies to develop a minimum reporting set (MRS) of CFs for rehabilitation study, was performed.

MATERIALS AND METHODS: International Classification of Service Organization in Rehabilitation (ICSO-R) 2.0 was used to identify the CFs. Participants from different rehabilitation professionals and different world regions were invited. This Delphi consisted of two rounds. At the first round, all participants were asked to rate (as yes/no/cannot decide) dimensions, categories, and subcategories of ICSO-R 2.0 along with the following criteria as being relevant for study outcomes; being distinctive among different rehabilitation settings; and being feasible to use and ideally can be reported by objective figures or other clear characterization. All the categories rated relevant, distinctive and feasible by more than 60% from the first round, were included in the second round. At the second round, the 6 categories at provider level and 8 categories at service delivery level had to be ranked by participants that participants think should be included in the MRS for rehabilitation studies

RESULTS: The proposed CFs for MRS from the Delphi study at the provider level are human resources, context, technical resources, quality assurance and management, location of the provider, and ownership. At the level of service delivery are target group, rehabilitation team, aspect of time and intensity, setting, location of service delivery, modes of referral, facility, and reporting and documentation.

CONCLUSION: Six and eight categories at provider and service delivery levels were proposed, respectively. These categories will be discussed in the consensus meeting to finalize the MRS.

Organization of rehabilitation services in randomized controlled trials - which factors influence functional outcome? A systematic review

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BACKGROUND:
To identify factors related to the organization of rehabilitation services that may influence patients' functional outcome and make recommendations for categories to be used in the reporting of rehabilitation interventions.

MATERIALS AND METHODS:
A systematic review based on a search in Medline indexed journals (Medline (OVID), Cumulative Index of Nursing and Allied Health Literature (CINAHL), PsycINFO, and Cochrane Central Register of Controlled Trials (CENTRAL) until June 2019 identified 8587 potential randomized controlled trials with multidisciplinary rehabilitation interventions reporting and analyzing organizational factors regarding functional outcome. Additional 1534 trials were identified from June 2019 to March 2021. The organizational factors were classified according to the International Classification of Service Organization in Rehabilitation (ICSO-R 2.0).

RESULTS:
In total 80 articles fulfilled the inclusion criteria. There was a great heterogeneity in the terminology and reporting of service organizations across all studies. Aspects of Settings including the Mode of Service delivery, was the most explicitly analyzed organizational (44 studies). The importance of the integration of rehabilitation in the inpatient services was supported. Furthermore, several studies documented a lack of difference between outpatient versus inpatient service delivery. Patient Centeredness, Integration of Care and Time and Intensity factors were also analyzed, but heterogeneity of interventions in these studies prohibited aggregation of results.

CONCLUSION:
Settings and the way the services were delivered to the users influenced functional outcome. Hence, it should be compulsory to include a standardized reporting of settings in clinical trials. We would also advice further standardization in the description of organizational factors in rehabilitation interventions in order to build knowledge of effective service organization.

Developing an ICF-based process profiling for qualification measures in vocational rehabilitation centers: results of a qualitative multicenter study

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BACKGROUND:
The ICF (WHO 2001) allows a holistic view of individual's functioning in work context and provides a common language for all associated professionals in vocational rehabilitation centers (VRC). It facilitates a consistent orientation towards the integration goal and person-centered support plans. This project presents the development and qualitative evaluation of an ICF-based process profiling for support planning and progress analysis in VRC.

MATERIALS AND METHODS:
Managers, employees and clients from six VRC were involved in the development. The workgroup selected the ICF items that were important for progress analysis and support planning in VRC. For these 43 variables, a self-assessment form for clients and a foreign-assessment form for professionals were created. Following the ICF, a five-point response scale was chosen. Each level of competence was described qualitatively and item-specifically, to provide a contextual anchor for rating. In the qualitative evaluation process, N=60 clients and their responsible professionals from the participating VRC were asked to answer the items, to rate each item in terms of content and language, and, if needed, to provide input on how to reshape the item.

RESULTS:
Results show that the ICF-based profiling is well accepted by clients and particularly suitable for participatory goal agreement and support planning. The respondents attribute this mainly to the concrete operationalization of the ICF-items. Furthermore, the descriptive, competence-related response format gives a general orientation for rating and reduces assessment bias.

CONCLUSION:
All suggestions for improvement were used as a basis for the revision of the instrument. In a next step, the process profiling will be implemented in all participating VRC as standard instrument for all clients, to follow up with a quantitative evaluation.

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Capacity limitations and workplace problems in patients with psychosomatic disorders

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BACKGROUND:
According to the bio-psycho-social concept, chronic illness must not only be described at the level of symptoms, but also in respect to capacity limitations. This poses special problems in regard to mental and psychosomatic disorders. A self-rating instrument which asks for the self-evaluation of psychological capacities ist he Mini-ICF-APP-S (self-rating of activities and participation according to the International Classification of Impairment Diasability and Handicap). Goal of the present study was to investigate whether different types of workplace problems are associated with different capacity profiles in patients with psychosomatic disorders.

METHODS:
The Mini-ICF-APP-S was answered by 1143 patients from an inpatient psychosomatic hospital. Sociodemographic data and the work situation were assessed by social workers.

RESULTS:
Employed patients reported better capacities than unemployed patients. Among the employed patients, those without workplace problems reported better capacities than those with workplace-problems. Different types of workplace-problems were related with specific capacity levels, for example, problems with bullying or conflicts were associated with lower interactional capacities (assertiveness, group integration, dyadic relations), whereas patients with over-taxation problems perceived lower levels of flexibility, competency, structuring of tasks, proactivity and endurance.

CONCLUSIONS:
Capacity limitations are related to problems at the workplace. The Mini-ICF-APP-S can help to assess the psychological capacity profiles of patients. The results can guide treatment.

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Research design

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The workshop will provide an overview of the main concepts and issues in designing quantitative research. The topics will include types of studies, randomisation, levels of evidence, statistical sample size estimation and single-case research design. The coverage will be introductory and illustrative examples will be given. The participants will be invited to present and discuss their own research proposals.

Return to work (RTW) – the potential of patient reported outcome measures (PROMs) in Germany

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BACKGROUND:

Rehabilitation aims to support return to work (RTW), improve workability and prevent early retirement. PROMs are questionnaires designed with patients and clinicians as value based healthcare instruments. PROMs can be applied before, during and after rehabilitation services to increase their quality and promote RTW. For specific outcomes e.g., cardiovascular diseases1, PROMs have already shown their ability to predict return to work and health related quality of life.

MATERIALS AND METHODS:

The German Statutory Pension Insurance (GPI) is developing a PROMs framework, which encourages a number of projects and initiatives in testing validity, reliability and acceptance of PROMs.

a) Access

Using computer adaptive testing procedures (CAT) the insured person performs an assessment to determine the functional capacity on the physical and psychosocial level. When applying for a disability pension or rehabilitation service the assessment is performed. By this means, individual needs for rehabilitation or disability pension are assessed (patient-oriented).

a)Course of rehabilitation

PROMs based testing procedures are used within rehabilitation services for initial and follow-up diagnosis, to support the treatment plan, and to monitor the course of rehabilitation, supporting the individual tailoring of rehabilitation services. Specific testing procedures (CAT) keep the number of questions as low as possible for the patient.

c) Outcome measurements

With a PROMs-based measurement of the outcome quality of rehabilitation services, GPI can promote service providers to strive for higher quality in rehabilitation, measure sustainability of rehabilitation services and is finally aiming to strengthen the connection to acute care.

RESULTS:

PROMs serve to assess rehabilitation needs, to validate application requirements for rehabilitation or for early retirement. During rehabilitation, PROMs can be used for therapy planning and adaptation as well as for quality assurance. After rehabilitation, PROMs can finally act as a measurement for immediate outcome quality; follow up and for overall quality assurance.

CONCLUSION:

PROMs have a high potential to support the entire health care process. Specifically for rehabilitation and RTW, PROMs obviously illustrate individual needs. In the course of therapy planning and adjusting during rehabilitation process, individual aspects can easily be adopted. This approach will increase efficacy of rehabilitation services, promote RTW and clarify access to early retirement or disability pension. First results of the running studies and initiatives under the PROMs Framework will be presented in the congress.

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The content and recent changes to Inpatient Rehabilitation Facility-Patient Assessment Instrument (IRF-PAI) used in the United States

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In the US, inpatient rehabilitation for people who are 65 years and older and certain younger people with disabilities are covered by the federal health insurance program called Medicare. The Medicare reimbursement for inpatient rehabilitation is based on a Prospective Payment System (PPS) put in place nearly 20 years ago. The PPS applies to inpatient rehabilitation facilities (IRFs), which include free-standing rehabilitation hospitals and rehabilitation units of acute care hospitals. The PPS method of reimbursement is based on a predetermined, fixed amount after accounting for certain patient characteristics and projected resource needs but irrespective of the actual length of stay. The reimbursement differs between IRFs as it is adjusted for geographic factors and the specifics of each facility. It is updated annually.

To characterize the patient, the IRF PPS utilizes the patient assessment instrument (IRF-PAI). The IRF-PAI contains demographic, medical comorbidity, and functional abilities information. Relevant medical comorbidities are grouped into 4 categories (tiers). Based on the age and functional motor abilities on admission, the patient is classified into a diagnosis-specific Case Mix Group (CMG). The number of CMGs varies across 21 diagnostic categories (Rehabilitation Impairment Categories). For example, there are 4 CMGs for lower limb amputation, 5 for lower limb joint replacement and TBI, 6 for stroke, and 7 for traumatic SCI.

Until October 2019, functional abilities were assessed with the Functional Independence Measure (7 levels per item) and admission and discharge. Since then, self-care and mobility have been assessed on a 6-level scale, bladder continence on a 7-level scale, and bowel continence on a 5-level scale. Although the general idea is the same, the scoring rules have been revised somewhat and will be explained. Examples of how different combinations of CMGs and comorbidity tiers affect the reimbursement rate will also be presented.

Joint negotiations on the employee's return-to-work solutions.

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BACKGROUND:
A sustainable return to work (RTW) can be influenced by adjustments to an employee's work and working conditions according to the employee's work ability and by a supervisor's active role. This is done in joint negotiations where representatives of occupational health care and employer participate in together with an employee. However, little research on the negotiation processes is available.

MATERIALS AND METHODS:
The multiperspective data on 14 cases was collected: three questionnaires, the video-recorded data of the joint negotiation, three interviews and two documents. The data was analyze by a multidisciplinary research team using case study and conversation analysis methods. The research interests were how negotiation is used as a tool for planning and follow-ups in supporting RTW, what is discussed in a joint dialogue, what kind of negotiation process is used when making decisions concerning RTW, and how each participates in decision-making, and what were the experiences of the parties from the joint negotiation.

RESULTS:
The decision regarding the employee's RTW was mostly taken in mutual agreement. The benefits of the negotiation included gaining information, making concrete decisions and working together to draw up a plan for the RTW. The employees' expectations on joint negotiations realized best. The physicians were less content with the negotiation results.

CONCLUSION:
The results highlight the collaborational nature of these joint negotiations. They describe contextual practices of interaction that promote equal participation and enable a decision-making process where each participant can commit to the mutually agreed decisions. The experiences of the participants highlight the importance of being heard, gaining information and finding mutual solutions.

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Strengthening competence in work-related rehabilitation to lengthen work careers – the KUURA project

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BACKGROUND:
Competence in work-related rehabilitation will be developed in the ESF-funded KUURA project 2020-2023. Supporting work ability requires multiprofessional competence, which should be realised through flexible cooperation between workplace actors, occupational health care and rehabilitation professionals. The aim is to create a comprehensive information package on rehabilitation linked to work and an operating model for adapting work.

MATERIALS AND METHODS:
The collaborative development process supports the implementation of results and progresses through four stages: 1) The orientation phase 2) The joint planning phase 3) The information package and the operating model for the adaptation of work will be piloted and evaluated and 4) The best practices will be collected.

RESULTS: The information package on rehabilitation linked to the work consists of four sections: 1) Develop effective practices 2) Support at an early stage 3) Support return to work and 4) Adapt work. Topics of collaborative workshops will include: A workplace that promotes positivity, Broaching difficult issues and An operating model for adaptation of work.

CONCLUSION:
Workplace will enhance competence in workrelated rehabilitation and cooperation-based operating models to extend the working careers of employees. The information package and work adaptation operating model can be adopted nationally in workplaces, occupational health care and rehabilitation integrated into degree programmes in the sector's universities of applied sciences and universities.

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Early vocational rehabilitation in the return-to-work process

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BACKGROUND:
Slovenia is facing problems regarding long term sickness leave and consequently exclusion from the labour market. To ensure and protect the employment of people with disabilities (PWD), the Slovenian legislation offers them the right to vocational rehabilitation (VR). Researches show the right is underutilised as only 50% of eligible insured parties assert their rights. Therefore, systemic change needs to be undertaken.

MATERIALS AND METHODS:
Ministry of Labour, Family, Social Affairs and Equal Opportunities took the initiative to tackle the mentioned issue and proposed a development project. The Early Vocational Rehabilitation in the Return-to-Work Process project is being carried out at University rehabilitation institute. The main activity is the pilot testing of the new comprehensive VR model. The pilot is based on the treatment of 100 insured people in a long-term sickness leave who are returning to work with the support of a professional team and their employers' cooperation. Individual return-to-work plan based on a biopsychosocial model is prepared.

RESULTS:
The project is in the implementation phase. On its basis, guidelines on early return to work process and recommendations for legislation amendments will be prepared. The main result will be a comprehensive VR model in which various procedures and programmes will be unified and upgraded. In order to achieve a successful systemic implementation broad range of stakeholders are included.

CONCLUSION:
The initial phase has already shown that the introduction of a biopsychosocial model in the assessment of work ability is demanding. Insured persons and employers are motivated for participation. Considerable changes in the mindset and attitude towards the issue of employability of people with health problems are being encouraged on the societal level.

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[2] White paper on pensions, 2016

Rehabilitation care for injured workers: highlighting how policies frame professional practices in four jurisdictions

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BACKGROUND:
Few studies have addressed the distinct ways in which workers' compensation policies influence the work of professionals and how they can ultimately impact workers' trajectories of care and return to work. The goal of this study was to explore how healthcare policies of workers' compensation systems shape the practices of rehabilitation professionals and the provision of care for workers.

MATERIALS AND METHODS:
We conducted a cross-jurisdictional policy analysis using key informant in-depth interviews in Ontario and Quebec (Canada), Washington State (United States) and Victoria (Australia). These informants were selected for their capacity to provide a comprehensive view of the phenomena and were situated within five groups with different perspectives: workers, employers, workers' compensation, healthcare (including rehabilitation) and researchers. We conducted 41 semi-structured interviews with 42 participants. All interviews were analysed using steps from the Framework Analysis for policy review and from Grounded Theory.

RESULTS: Our results demonstrate that in the four jurisdictions studied, rehabilitation professionals' practices are shaped by economic and non-economic incentives from workers' compensation policies. These incentives are put in place for rehabilitation professionals to treat injured workers, to drive rapid return to work and to train on occupational health. Non-economic incentives are also used and mostly take the form of clinical guidelines developed by compensation boards. These incentives do have an impact on worker's care trajectory.

CONCLUSION: Rehabilitation professionals might not always be aware that compensation policies influence their professional practices. However, these incentives can have important impacts on injured workers' rehabilitation care. These influences need to be exposed and discussed.

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Employment of persons with disabilities in Slovenia

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BACKGROUND:
Our research focused on experience in companies for persons with disabilities, with an accent on support for persons with disabilities after they are being employed [1].

MATERIALS AND METHODS:
We used quantitative methods of research, four questionnaires: descriptive, frequency distribution, hi-square statistical methods and content classification on several cathegories.

RESULTS:
The majority of persons with disabilities get support in their work environment [2], from their co-workers, professional workers and menthors. Support from outside (providers of employment rehabilitation and persons with disabilities associations) is rarely recognized from persons with disabilities. The majority of persons with disabilities assessed their working conditions as appropriate and having adapted working premises or declared, that they do not need any adaptation. Sickness absence was higher for persons with disabilities than to other employed persons.

CONCLUSION:
One of the major issues in the future will be ageing of persons with disabilities and related problems as absence from work due to sickness, lowering of working efficiency and higher possibility of conflicts appearing in the work environment [3].

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Artificial Intelligence technologies in vocational rehabilitation: practical approaches for a digital transformation

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BACKGROUND:
Digital transformation by means of Artificial Intelligence (AI) and assistance services is seen in numerous industries and sectors. These transformation processes have so far hardly taken persons with disabilities (PWD) into account. The AI. ASSIST project investigates which groups of PWD can be supported by AI-based assistance systems (AI-AS) in vocational rehabilitation and in working life.

MATERIALS AND METHODS:
To support transformation processes for AI-AS in vocational rehabilitation, various theoretical and practical approaches are pursued in the project. Two of them are particularly relevant: A systematic monitoring helps identifying and structuring available AI-AS for working and learning of PWD. Selected AI-based assistance technologies are then tested and evaluated in innovation spaces with PWD in rehabilitation institutions and one company.

RESULTS:
The combination of a technological monitoring and organisational innovation spaces supports vocational rehabilitation institutions to access the topic of AI by identifying and testing AI-AS outside of the daily routines. This way, information on available AI-AS is made accessible for stakeholders and more PWD can benefit from technological progress. Also, gaps between the individual needs of PWD and the availability of suitable AI-AS are uncovered supporting the further transformation processes for AI-AS in vocational rehabilitation.

CONCLUSION:
For sustainable transformation processes for AI-AS in vocational rehabilitation, the presented concepts and processes need to be integrated in the vocational rehabilitation processes and structures. A special focus should be put on the research and development of AI-AS, that fit the specific needs of PWD. Furthermore, relevant stakeholders in the process of rehabilitation need to become involved in AI-AS through transparent information and competence development processes.

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Review of 18 different European countries on housing adjustments for (physically) disabled people

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BACKGROUND:
Lack of mobility has a severe impact on people with disabilities, as it limits them from carrying out basic activities of daily living. There are three main types of barriers that restrict the free movement of people: external architectural barriers, vehicle-related barriers, and internal housing barriers. Providing adequate housing for people with disabilities is crucial, as it is a basic condition for a safe and independent life.

MATERIALS AND METHODS:
In 2019, we reviewed the current situation in housing adjustments for (physically) disabled people in 17 European countries and compared the results to the situation in Slovenia. Firstly, we looked into the EASPD 2017-2018 thematic study of 18 European countries on all services for people with disabilities. Afterwards, we developed a questionnaire, with which we wanted to deepen the information regarding housing adjustments and sent it to all of the 18 countries. Since only 6 countries completed our questionnaire, we have also done online research on the topic for other countries that have not completed it.

RESULTS:
After reviewing the documentation, we can conclude that all of the reviewed countries have regulated legislation on housing adjustments for the (physically) disabled except (apart from Slovenia) Greece, for which we were unable to find any information on the legislative regulation of housing adjustments. Differences between countries were found and discussed in relation to the situation in Slovenia.

CONCLUSION:
Based on the research, we suggest that Slovenia consider how Article 19 of the UN CRPD could be taken into account to an even greater extent and put into practice, according to which States parties must ensure that persons with disabilities can equally choose, where and with whom they want to live and are not forced to live in a special environment - the adaptation of the living environment (for the disabled) could be one of such essential solutions.

What kind of advice do the outpatients in the Smart Home IRIS seek

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BACKGROUND:
The main aim of the Smart Home IRIS is demonstration, testing, and application of contemporary technological solutions that compensate for diverse kinds of disabilities and thereby improve the quality of life of persons with disabilities [1]. The aim of the study was to find out what kind of advice or technology seek outpatients treated in Smart home IRIS at University Rehabilitation Institute in Ljubljana.

MATERIALS AND METHODS:
We searched the documentation of patients treated as outpatients in Smart home IRIS in year 2019. Collected were their general data (age, sex, diagnosis), functional status (Functional Independence Measure, FIM), their problems (the Canadian Occupational Performance Measure, COPM) and what assistive technologies and/or technical solutions for their independent living was suggested (14 different categories).

RESULTS:
Included were 79 (44 male) adult patients. On average they were 56 years old, almost half of them (46%) were patients with ALS. Average FIM score was 71.6. In COPM, the patients exposed on average 2.3 problems (range 1-5). Based on those problems, they got advice in 1-9 categories. 43 patients received information on augmentative communication, 32 patients about devices that facilitate the use of bath/shower/toilet, 28 patients on transfering and moving around, 20 about bathroom adjustments.

CONCLUSION:
The patients in Slovenia prefer simple assistive devices, paid by health insurance. Even though controlling the living environment leads to a better quality of life, the patients rarely seek that kind of advice due to their socioeconomic status.

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Factors underlying the regional differences in rehabilitation participation in Finland

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BACKGROUND:
People do not always have equal access to the rehabilitation services they need in the different regions of Finland. From the system perspective, access to rehabilitation services is affected not only by the way in which the system is structured and organized but also the practices employed. In this study, regional differences in rehabilitation participation are studied by comparing individual hospital districts. The focus is on high and low rates of take-up of rehabilitation services. The study aims to understand the systemic reasons underlying the regional differences by analysing five discrete stages of entry into rehabilitation services. The focus is on the rehabilitation services organized by the Social Insurance Institution of Finland (Kela). Kela plays an important role in facilitating access to rehabilitation services in Finland.

MATERIALS AND METHODS:
Data were obtained from the national registers maintained by Kela and a nationwide survey. The register data describes the regional differences in rehabilitation participation. The survey portrays the perspectives of professionals on the stages of entry into rehabilitation services. The methods used are descriptive analysis, statistical methods, and qualitative content analysis.

RESULTS:
Several differences were identified between the individual regions in rehabilitation participation. No clear explanation could be found in the register data for these differences. However, the nationwide survey revealed some regional differences in the stages whereby clients enter rehabilitation services. The professionals responding to the survey also described various factors widening or narrowing the regional differences.

CONCLUSION:
The regional differences seen in the discrete stages whereby clients enter the rehabilitation services contribute to an understanding of the factors behind the regional differences in rehabilitation participation between individual hospital districts in Finland.

Social work in rehabilitation: applying action research principles to practice.

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BACKGROUND:
Social work in rehabilitation needs constant development and embetterment of its practitioners. When working with people in rehabilitation, social workers partake in many different roles to co-create a positive change. These aren't universal and that is where a social worker can find guidance in the principles of action research. This method, when simplified, can be understood as ''learning by doing'' which translates to all of the involved co-identifying a problem, trying to resolve it, assessing successfulness, and if not satisfied, trying again. Social workers perceive people as experts on experience which explains why the principles can be applied to practice so instinctively.

MATERIALS AND METHODS:
Ten randomly selected case files of clinical social work practice were selected and qualitatively analysed by using the six common action research principles and societal roles. Benefits of applying principles of action research were assessed in a process of intervision.

RESULTS:
There are some similarities between social work and action research core values and practices, particularly when it comes to including a person in the process of finding their sources of empowerment during rehabilitation. Certain cases could improve even further when factoring in the use of additional action research principles. A reflection on what is needed for this to happen is included.

CONCLUSION:
Action research can serve as a good practice guide and also as a tool to describe the variety of different roles a social worker undertakes in clinical practice. These principles can also empower a person by actively engaging them in their rehabilitation process. The analysis and reflection of the authors' clinical work lights the benefits and challenges of including action research principles into daily practice.

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Wrist flexion and extension strength in patients suffering from work-related chronic elbow pain: the isokinetic effort factor and its implications

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BACKGROUND:
The validity of isokinetic strength findings relating to forearm muscles in patients suffering from chronic elbow pain and/or epicondylitis is not well established. Furthermore, given the nature of this disorder, ensuring maximal effort in performing the tests is an essential prerequisite. The isokinetic-based DEC parameter has been shown to efficiently detect maximal effort. The purpose of present study was therefore to assess the validity of isokinetic strength tests in chronic elbow pain / epicondylitis patients.

MATERIALS AND METHODS:
A cohort consisting of 44 male patients suffering from chronic elbow pain (average evolution time 262, SD 193 days) was recruited. Wrist extensor (E) and flexor (F) concentric and eccentric isokinetic strength of the involved (I) and uninvolved (U) side was measured. The I/U and F/E ratios as well as the DEC were computed based on peak moment (PM) values. Work disability and relapse within the first year were registered. In maximal performers associations between deficits, F/E ratios, work disability and symptom relapse were explored applying multiple comparisons.

RESULTS:
68% of the patients met maximal effort criteria with the I side muscles being significantly weaker than their U counterparts in most cases. While the mean deficit in this group was not associated with either work disability or relapse, patients with relapse of symptoms within the first year had a significant higher F/E ratio than those without relapse.

CONCLUSION:
In patients presenting with chronic elbow pain who perform at maximal level of effort, high wrist F/E strength ratios may predict symptom relapse.

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Assessment of cognitive function in patients with systemic sclerosis

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BACKGROUND:
Systemic sclerosis (SSc) is a chronic disease characterized by generalized vasculopathy, autoimmune inflammation and fibrosis of various internal organs. The latest investigations have showed a mild impairment of cognitive function such as attention, focus, memory or other higher-order thinking. These problems significantly affect patients' activities of daily living and quality of life. This study examined, whether there is an association between cognitive impairment and different organ manifestations of SSc.

MATERIALS AND METHODS:
One hundred and sixty consecutive patients with SSc, 138 females and 22 males, with a mean of 56 (SD 13) years, 78 with diffuse- (dcSSc) and 88 with limited cutaneous (lcSSc), and 62 healthy controls, with a mean age of 555 (SD 14 years), were included in the study. Demographic, clinical data and results of neuropsychological measures (Mini-Mental State Examination, Digit Span Forward-Backward, Trail making A, B, and the Digit Symbol tests) were analysed.

RESULTS:
Healthy controls scored higher on each cognitive test compared to the patients with SSc ($p<0.001$). The younger dcSSc patients with a shorter disease duration performed better on all tests compared to older patients with lcSSc ($p<0.05$). Significant positive correlations ($p<0.001$) were found between scores on the cognitive tests and the number of years spent studying, the 6-minutes walking distances (6-MWD), scores on the manual muscle test-8 (MMT8) and significant negative correlations with age, disease duration and left ventricular mass index.

CONCLUSION:
Deterioration of cognitive function is highly related to age, disease duration time, level of educational and physical status in patients with SSc. The strong association between the results of the cognitive tests, the 6-MWD and the MMT8 emphasizes the importance of the good physical status and the regular exercise, when setting up rehabilitation programme.

Before writing a manuscript – Hints and tips for the researcher

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Medical writing is close to being a science, because it requires knowledge and skills to produce well-structured documents that present information clearly and concisely. One of the natural by-products of learning "how to write a paper" is the ability to critically read, understand and memorize the scientific literature. Moreover, the more you know about "how to write", the faster and more effectively you read.

KEY ISSUES TO CONSIDER BEFORE WRITING A MANUSCRIPT

1. Originality: Same or similar studies already done? How your research adds to the literature? (e.g. bigger sample size, better methods, different population…) Does the study examine an important topic? Review literature thoroughly before getting started. Clearly define the background with a focused review; then identify knowledge gap and formulate the research question. The research question should be: Feasible (adequate/ affordable/ manageable); Interesting (new understanding); Novel (confirms/ refutes/ extends/ provides…); Ethical; and Relevant (to scientific knowledge, clinical & health policy, future research, etc.).

Use the "PICO model": P = Patient, Problem, Population (How would you describe the most important characteristics of the patient?); I = Intervention, Prognostic Factor, Exposure (What main intervention are you considering? What do you want to do with this patient? etc); C = Comparison (What is the main alternative to compare with the intervention? O= Outcome (How to measure it?).

2. The study protocol: The protocol of a clinical trial serves as the foundation for study planning, conduct, reporting and appraisal (refer to the SPIRIT statement)

3. The reporting guidelines: please read www.equator-network.org

4. English style: Be ready to correct grammar, polish the style, keep sentences short, clear and accurate; involve an English-speaking professional medical writer to check (at least) the final version; use the spell-check function of your PC.

5. Identify valid mentors and solid research groups with time and commitment to help: ask for their opinion, discuss, listen and learn.

6. Choosing the "right" journal: Carefully read the Journal's aim; Select journals with specific interest in the subject you analyze.

7. Take care of the layout (Instruction for authors): Check instruction for authors and conform; Check format, consistency of tables with text, references.

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The soul of publishing and the art of reporting: writing a manuscript

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BACKGROUND:
Scholarly publishing is paramount in the world of evidence based medicine. Physicians/academicians should initially convince other people what they believe/practice is correct and then also show them how to do the same. Yet, we are physicians and treating human beings 'not fixing radios'.

MATERIALS AND METHODS:
In this presentation, tips and tricks for penning scientific papers will be discussed with real/simple examples.

RESULTS:
Herewith, hypothesis construction for research, methodological issues or further stages of scholarly publishing after drafting the manuscript fall beyond the scope of this lecture and will not be dived into.

CONCLUSION:
Following certain hints, scientific publishing is actually/really possible even for novice researchers/colleagues.

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Comprehensive rehabilitation of COVID-19 patients with pneumonia and respiratory failure – first experiences

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BACKGROUND:
COVID-19 infection can cause pneumonia with respiratory and multi-organ failure in severe cases leading to critical illness disease.

MATERIALS AND METHODS:
Data on patients, admitted to our department for comprehensive rehabilitation after COVID-19 pneumonia with respiratory failure, were acquired from available medical documentation. The outcome of their rehabilitation was assessed.

RESULTS:
6 patients after COVID-19 pneumonia with respiratory failure and consequent critical illness myopathy/neuropathy were admitted for rehabilitation from acute hospital wards on average 72.5 days after disease onset. Average age at admission was 65 years (range 49 to 77 years). Average rehabilitation duration was 35 days (range 25-53 days). Average motor FIM score improved from 55.5 (range 32 to 80) to 79 points (range 48 to 89). Average improvement during rehabilitation (difference between motor FIM at discharge and motor FIM at admission) was 23.6 points (range 8 do 45). Average rehabilitation efficiency (motor FIM improvement/day) was 0.67 points/day (range 0.32 to 1.73). At admission, 5/6 patients required assistance with basic activities of daily living. At discharge, they were all independent, one required supervision due to cognitive impairment. Muscle strength and respiratory parameters relevantly improved in all patients. The average de Morton Mobility Index (DEMMI) at admission was 43/100 (range 27 to 62), and at discharge 67/100 (range 41 do 85). Average result at 6-minute walking test at admission was 103 m (range 15 m to 340 m), and at discharge 311 m (range 130 m to 540 m).

CONCLUSION:
With comprehensive rehabilitation, patients after COVID-19 pneumonia with respiratory failure and consequent critical illness myopathy/neuropathy, achieve important improvement of body functions and reduce limitations in their activities.

Evaluation of the rehabilitation program in the PostCovid Day Clinic for Physical Medicine and Rehabilitation in patients after mechanical ventilation due to COVID-19 pneumonia

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BACKGROUND: Dubrava University Hospital, as a primary respiratory intensive care center in the Republic of Croatia for the care of acute patients with COVID-19, established a PostCovid Day Clinic for Physical and Rehabilitation Medicine. We review the evaluation and rehabilitation management of a patient with persistent symptoms after a critical form of COVID-19.

MATERIALS AND METHODS:
A 70-year-old patient presents to PostCovid Day Clinic with symptoms of Long COVID in the form of increased fatigue, dyspnea, shortened walking track, and gait instability. Diagnostic workup included HRCT of the chest, spirometry, diffusion capacity for carbon monoxide, arterial blood gas analysis, and functional testing with a 6-MWT, Modified Borg scale of dyspnea, SPPB, HAQ, Barthel Index, MMSE, and fist muscle strength assessment. The patient participated in an individualized outpatient rehabilitation program for 10 weeks with components including respiratory training, strengthening exercises, cardiorespiratory reconditioning, balance and proprioception exercises. A re-evaluation was performed after the completion of the rehabilitation program.

RESULTS: The re-evaluation showed significant functional recovery in the 6-MWT, with no residual dyspnea. In the SPPB, HAQ, MMSE and Barthel index, the patient achieved the maximum score. Control spirometry confirmed recovery of lung function and residual decrease in diffusing capacity for CO. The patient reported no remaining limitations in performing activities of daily living.

CONCLUSION: Adequate rehabilitation of patients with persistent symptoms after overcoming COVID-19 requires a multidimensional, holistic approach to the patient, which will be increasingly incorporated into clinical practice in the coming period.

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Never Neglet Rehabilitation

Yasemin Yumusakhuylu[1], Belgin Erhan[1], Ismail Hakan Akbulut[1], Tolga Aksan[1]
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BACKGROUND:
Geriatric population, especially those with comorbidities, are at high risk of developing serious illness and impairment in motor functions with SARS-CoV-2 infection. A 91-year-old female COVID-19 survivor, who was not directed to rehabilitation and became immobile for a long time due to a severe infection and developed pressure ulcers, is presented here to emphasize the importance of rehabilitation.

MATERIALS AND METHODS: A 91-year-old obese woman with hypertension and hip prosthesis, hospitalized for SARS-CoV-2 infection. Because of chronic fatigue, deconditioning and weakness she became immobile and developed a deep pressure ulcer on right trochanteric region. She hospitalized again for operation and reconstruction with flap. Then she transferred to PM&R clinic for rehabilitation and ambulation. On admission, she was able to turn inside the bed with support. She had short and long sitting balance, but no standing balance. She could not ambulate and was on indwelling catheter. ROM, strengthening, respiration, balance and coordination exercises; mobilization activities; posture training and exercises were applied. Stepping and walking exercises with parallel bar were added in following process. At the end of the program, she was able to do all in-bed activities on by her own, ambulate with walker.

RESULTS:
Decline of exercise endurance associated with cardiopulmonary dysfunction, and muscle atrophy caused by long-term immobilization are the common musculoskeletal complications of SARS-COV-2 infection. It is common to ignore rehabilitation needs of geriatric patients while majoring on primary problems. The intensity of the internal problems and the short life expectancy of our patient lead to be less cared about her life quality, functionality and musculoskeletal system problems.

CONCLUSION:
We would like to emphasize the importance of rehabilitation which can contribute a lot to functionality.

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Post-COVID pain syndrome in Turkish population: a descriptive study

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OBJECTIVE:
The COVID-19 pandemic has been affecting the whole world since 2019.The new type of corona virus has a wide range of symptoms. Recently, various post-COVID syndromes have also been defined. In our study, we aimed to evaluate persistent musculoskeletal pain after COVID-19 infection.

MATERIALS AND METHODS:
During the pandemic, 501 patients who applied to our hospital and were diagnosed with COVID-19 infection were called by phone and questioned if they had persistent pain in their bodies after the infection. Demographic data of the patients, hospitalization history, presence of additional disease and smoking history were questioned. His symptoms during the COVID-19 infection were recorded. The duration of the pain, the area of pain, and the presence of accompanying neuropathic symptoms were questioned in those with persistent pain. Obtained results were evaluated.

RESULTS:
Muscle pain developed in 325 patients during COVID-19 infection, and this condition persisted in 69 (13.8%) of them. The mean duration of pain was 4.4 (SD 1.7) months. These pains were mostly seen in the neck, arms, back and waist regions. Of the cases, 29 (42%) were male and 40 (48%) were female. Neuropathic pain symptoms such as burning 16 (23.2%), numbness 15 (21.7%), tingling 10 (14.5%), stinging4 (5.8%), freezing one (1.4%) were accompanied in patients with persistent musculoskeletal pain.

CONCLUSION:
People with COVID-19 infection may develop post-COVID pain syndrome. Neuropathic pain symptoms may also precede these cases. Knowing the character of post-COVID pain is important for early detection and management of pain.

High-intensity electromagnetic field in post-COVID-19 rehabilitation

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BACKGROUND:
The COVID-19 pandemic and its consequences are an unprecedented challenge to healthcare systems, societies and individuals. A significant percent of patients who have survived COVID-19 have long-term persistent symptoms – such as fatigue, muscle weakness, dyspnea and other, that lead to activity limitations and participation restrictions. The management of these patients requires a multidisciplinary team approach including a specialist in physical and rehabilitation medicine (PRM). High intensity electromagnetic field (HIEMF) - up to 2.5 Tesla, is a PRM intervention that has proved its effectiveness in pain management, spasticity reduction, muscle stimulation, including stimulation of the breathing muscles in patients with respiratory diseases.

AIM: To study the efficacy and safety of HIEMF in patients after COVID-19 associated pneumonia.

MATERIALS AND METHODS: Two patients – a female aged 80 and a 73-years old man with persistent symptoms after severe COVID-19 associated pneumonia a month after hospital discharge underwent 10 sessions of HIEMF (BTL Super Inductive System) applied once a day for a period of 10 days. No side effects were observed. The outcome measures used were Perceived Exertion Scale (PES), Modified Medical Research Council Dyspnea Scale (mMRCDS) and post-COVID-19 Functional Status (PCFS) Scale before and after the treatment.

RESULTS: The results of the first patient changed from 8 to 6 according to PES, from 3 to 2 for the mMRCDS and from grade 4 to grade 3 functional status. There was also an improvement in the outcome measures of the second patient – from 7 to 4 in PES, from 4 to 1 in mMRCDS and from grade 2 to grade 1 according to PCFS.

CONCLUSION: The good results observed gives us the confidence to proceed with studying the effect of HIEMF in patients suffering from long-term persistent symptoms after COVID-19 associated pneumonia.

Assistive Technology for patients after COVID-19 at Discharge from rehabilitation

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BACKGROUND:
Occupational therapists have important role in rehabilitation of the patients after COVID-19. One of the focuses in occupational therapy is evaluating of needed assistive technology. The aim of the survey was to find out which assistive technology is most needed to the patients after COVID-19 at discharge from rehabilitation for their home environment.

MATERIALS AND METHODS:
The data was collected from occupational therapists' documentation and medical records at rehabilitation department. The survey included 50 patients in rehabilitation after impacts of COVID-19 from April 2020 to May 2021. Only the assistive technology assessed by occupational therapists that can be prescribed by physician and paid by medical insurance, were taken into account.

RESULTS:
50 patients were included, 78% men and 22 % women, with an average age of 63 (range 37-82) years. The average length of rehabilitation was 41 days (range 21-70). 59 assistive technology order forms were prescribed (wheelchair, wheelchair cushion, shower seat, bathtub seat, toilet seat raiser, commode chair, electric care bed). 34% of the patients did not need any of those assistive devices, 66% of the patients needed from one to six of them.

CONCLUSIONS:
For safe participation in daily activities in home environment, patients after COVID-19, need assistive technology at discharge from rehabilitation.

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The ICD-11 adjustment disorder: triggering events and symptom constellations.

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BACKGROUND:
The ICD-11 adjustment disorder (AjD) describes the development of emotional and behavioral symptoms in response to non-traumatic but stressful life events. Studies show that AjD is associated with a high psychological distress and work-related impairment such as incapacity for work or early retirement. Therefore, AjD and triggering events are becoming more and more relevant for psychosomatic rehabilitation.

MATERIALS AND METHODS:
Patients (N total=573) of a German psychosomatic rehabilitation clinic with a clinically relevant score in adjustment disorder - New Module (ADNM-20; Glaesmer et al., 2015) (n=348, 60.7%) were examined for triggering events and differences in symptom constellation/severity. The independence or overlap of adjustment disorder symptoms with depression was controlled by the Beck Depression Inventory (BDI). Mean differences, correlation, and regression analyses were calculated.

RESULTS:
Family conflicts (52.3%) and own serious illness (52.6%) were named as stressfull triggering events. Predominantly considered as very stresssfull were work-related problems such as job conflicts (61.5%), time pressure (63.8%) and workload (54.02). For all triggering events, slightly differently weighted, but overall comparable symptom constellations were present. The BDI sum score contributed significantly to the prediction of the ADNM-20 sum score (β=0.57, t (1.11)= 45.4,$p<.001$,$R2=.32$, $F(1,346)=165.6$, $p<.001$); this applies in particular to the single scales of failure to adapt (β=0.53) and depressive mood (β=0.56). Preoccupation, disruption of impulse control, avoidance and anxiety seemed largely independent (β=0.27, β=0.31, β=0.39) from depressive symptoms.

CONCLUSION:
Occupational stress is a major cause of AjD.

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Entering vocational rehabilitation in Slovenia

Aleksandra Tabaj[1], Črtomir Bitenc
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BACKGROUND:
Research concentrated on experience in entering employment rehabilitation of persons with disabilities after they are being unemployed.

MATERIALS AND METHODS:
We used quantitative and qualitative methods of research. Results were interpreted with descriptive, frequency distribution, hi-square, content classification on several cathegories was used. Questionnaires for persons with disabilities, providers of vocational rehabilitation and rehabilitation councellors were prepared.

RESULTS:
Past experience revealed waiting lists at some areas in Slovenia, due to higher numbers of appointed persons with disabilities. In year 2020, numbers of persons with disabilities at waiting lists decreased due to reasons connected with Covid-19. Interviews with persons with disabilities, providers of vocational rehabilitation and rehabilitation councellors revealed motivation, mental health issues, and organizational procedures as main reasons of delays for employment rehabilitation.

CONCLUSIONS:
Long waiting lists, longer than 6 months, should be prevented with protocols, connecting providers of employment rehabilitation and Employment service of Slovenia.

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Work anxiety and capacity impairments in a national representative sample

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BACKGROUND:
Work anxieties are common problems in rehabilitation patients that are often overseen. However, there are often long periods of sick leave due to work anxiety. Until now there have been no epidemiological data on the frequency of high work anxiety in the general population. It is also unknown to which degree work-related capacity limitations (work ability problems) are accompanying work anxiety.

MATERIALS AND METHODS:
A national representative sample of 2030 persons in Germany was assessed. The participants gave ratings on their work anxiety (Workplace Phobia Scale, [1]), their psychological capacity profile (Mini-ICF-APP-S, [2]), sick leave duration and reported on socio demographics.

RESULTS:
Among all participants of working age (18-67 years), 7% had increased work anxiety of a moderate (5% with scores >1.5-2.5 on a scale from 0-4) or high (2% with scores >2.5-4) degree. In the group of high work anxiety, there were proportionally more blue-collar workers and state employees than in the low work anxiety group. Persons with high work-phobic anxiety had the longest sick leave durations within the past 12 months (8 weeks), and most unemployment periods in the professional past. The three groups were similar concerning distribution of age, sex and partnership status. In almost all psychological capacity dimensions the persons with high work anxiety perceived themselves as less competent than persons without work anxiety.

CONCLUSION:
Rehabilitation clinicians, work managers and occupational physicians should be aware of work anxiety and informed about preventive and rehabilitative possibilities. Work anxiety is not a rare phenomenon in the general population (here: 7%), but potentially not always recognized.

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Employment and workability in patients with brain tumor and breast cancer: preliminary results of a prospective study

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BACKGROUND:
An increasing number of cancer survivors return to work following surgery reporting consistent limitations at work due to their health conditions. Patients often see return to work as a mark of complete recovery and of regaining a normal life. The aim of the study is to examine changes in work ability scores in patients with brain cancers and patients with breast cancer at 6 and 12 months after surgery and to assess the factors related to their workability. We present the methodology and preliminary result of a study funded by Lombardy Region, that started in September 2019 and will finish in September 2021.

MATERIALS AND METHODS:
An observational prospective study on patients of all working-ages, undergoing brain or breast surgery in the period between March 2019 and July 2020 has been done. 7 questionnaires were used to obtain information on fatigue, social support, resilience, cognitive difficulties. Semi-structured interviews to workers that they underwent a job change after the surgery to know if this situation is due to treatments or Covid-19 emergency.

RESULTS:
The sample is composed of 38 patients with brain cancer (glioma II and III) and 61 patients with breast cancer enrolled after surgery. The study has been carried out with the approval of the Institutes' ethical committees. Questionnaires were distributed at 6 and 12 months after surgery. Preliminary results show a relationship between high scores of resilience and high scores of work ability. The changes on job hour or the job loss is due to fatigue for treatments.

CONCLUSION:
The measure of workability allows to take appropriate actions to prevent declining capacity. Future studies should take into account the differences between self-employed versus employees, the differences in working in small medium or large enterprises.

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Who is at risk? – Type-D personality in patients in psychosomatic rehabilitation as a risk factor for work-related impairments

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BACKGROUND:
An individual's personality is reflected in their emotions, thoughts, and behavior, which influences the health. Negative affectivity and social inhibition are components of Type-D personality, which is considered a cardiovascular risk factor. Severe emotional distress has significant consequences for the ability to cope with private or professional tasks, with significant consequences in the professional context, especially with regard to occupational and social medicine parameters (work ability, performance/capacity limitations e.g., not being able to work six hours a day).

MATERIALS AND METHODS:
On admission (t1) and discharge (t2), psychocardiological patients were examined regarding Type-D (DS-14; Grande et al., 2010) and social-medical parameters (sick leave, ability to work, productivity).

RESULTS:
Of N=208 patients, 66% fulfilled the criteria of Type-D. Contrary to expectations, Type-D patients were significantly more likely to be able to work than none-Type-D. In terms of the length of incapacity for work before t1, however, Type-D was associated with long-term sickness. If none-Type-D patients were on sick leave before t1, the length of the sick leave was shorter than in Type-D patients who were on sick leave. Type-D patients were more likely to be unable to work than none-Type-D. In addition, Type-D patients needed more frequently a gradual reintegration program for return to work. With regards to Capacity limitations none-Type-D patients were less impacted.

CONCLUSION:
In this study Type-D was associated with more problems in terms of occupational aspects (longer sick leave, more Capacity limitations). Type-D can be seen as a risk factor for the level of complaint and occupational und social medicine parameters.

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Mental health and well-being in the workplace: the EMPOWER project

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BACKGROUND:
Mental health problems, such as stress, depression and anxiety, cause an enormous burden for the individual and the society, with significant economic cost due to lost productivity at the workplace. A number of interventions have been developed to promote wellbeing in the workplace; however, their impact has been moderate and widespread implementation has faced a number of barriers. The aim of EMPOWER (European platforM to PromOte Wellbeing and HEalth in the woRkplace) is to prevent common mental health problems and to reduce their impact at the workplace through the development and implementation of a novel eHealth multimodal platform.

MATERIALS AND METHODS:
The EMPOWER platform will have a modular structure, acting at different levels: primary, secondary and tertiary prevention. The implementation of the eHealth platform will be piloted through a randomized controlled trial directed to employees and employers of SMEs and public agencies from four European countries representing different cultural settings: UK, Spain, Poland and Finland. During all the phases of the project, stakeholders will be involved to provide input and feedback on the platform components and to evaluate barriers and facilitator to implementation of the program.

RESULTS:
EMPOWER is expected to provide a feasible, brief and cost-effective intervention to support the management of mental health issues in the work sector, with a broad applicability, but also context-specific, and suggestions about the most appropriate and effective strategies for a successful uptake of the eHealth platform will emerge.

CONCLUSION:
Mental health and wellbeing in the workplace are public health issues that need to be addressed with effective intervention strategies, that are also applicable by organizations.

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An example of successful rehabilitation of a young woman after traumatic knee extraarticulation

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BACKGROUND:
Knee extraarticulation is not a usual type of lower limb amputation [1]. It is often a result of an accident in traffic or at work [1,2]. After amputation, many patients do not walk anymore, are not independent in daily living activities, do not return to work or drive a car (1-3). Especially young people would like to live like they used to before the amputation [2,3]. One aim of the study was to find out how many lower limb amputations were performed in the Celje General Hospital in the last years and how many patients walk with the prosthesis, are independentint in every-day activitiest and drive a car. Another goal is to present a rehabilitation of a young woman with a knee extraarticulation.

MATERIALS AND METHODS: A retrospective study was performed in the Celje General Hospital in Slovenia. Lower limb amputees were included.

RESULTS:
On average, one hundred lower limb amputations were performed in Celje General Hospital in the last years; on average, one of them was knee extraarticulation. Nearly one fourth of patients after lower limb amputation had complex rehabilitation and among them, nearly three fourths walk with a prosthesis but fewer of them drive a car.

CONCLUSION:
Nearly one fourth of patients after lower limb amputation walk with the prosthesis, they are mostly independent in everyday occupations, and some drive a car. Rehabilitation is important and helps lower limb amputees to stay independent in activities of daily living.

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Rehabilitation services for closing the rehabilitative gap after major amputation of lower extremity

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BACKGROUND:

In Germany, rehabilitation is firmly established by law, but certain patient groups fall through the rehabilitative gap that can arise between acute hospital and rehabilitation center. One of these groups are peoples with lower leg amputation. Due to a high level of comorbidity, frequently delayed wound healing and variations in the circumference of the residual limb, it is often not possible to plan the start of rehabilitation from the acute hospital. Other problems include:

- Lack of patient information about the phase after the amputation
- Rehabilitation facilities hardly specialized in amputations
- Rehabilitation without interim prosthesis
- No cross-sectoral cooperation between the medical professions

MATERIALS AND METHODS:

In order to improve this situation, a project has been initiated which uses the following modules to optimize the treatment of people with lower leg amputation:

1. Implementation of a care/coordination management from the acute hospital to long-term care to clarify questions and helping with different interface problems
2. Outpatient multimodal physical therapy is implemented directly after the acute hospital stay and right before rehabilitation aiming to prepare for rehabilitation with interim prosthesis. The aim is to enable clients to take the first steps with a prosthetic leg and to enter the rehabilitation at an optimal time.
3. In-patient or full-day out-patient rehabilitation by one of the cooperation partners to promote regional care
4. Lifetime aftercare by trainings for physicians and therapists (PT, OT)

RESULTS:

First results from practical experience indicate that optimized treatment is possible with little effort.

CONCLUSION:

A university outpatient department of PRM offers a good answer to the requirements of this group of patients.

Piloting coaching for mobility in SAAM project application for patients after lower limb amputation

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BACKGROUND:
People after lower limb amputation (LLA) who get a prosthesis for walking have to slowly increase the time of wearing prosthesis and walking distance Regularly, they have to check the stump to prevent wounds, which disables them from walking. Within the European project SAAM (Supporting Active Ageing through Multimodal coaching), a system SAAM with pipeline "mobility instructed" was designed for people after LLA. The aim of the system in this research was to provide coaching regarding walking for people after LLA, so they consider not to overdo with walking and at the same time stay active.

MATERIALS AND METHODS:
The system was composed of a sensor for mobility, namely inertial measurement unit, connected through Bluetooth to a smartphone with adherent SAAM application. Application tracks time of walking in minutes and compares with the goals set by the patient's physiotherapist. Goals are maximum time of walking at once and maximum cumulative time of walking per day. Both phone and the sensor were fitted in a belt-bag. The SAAM application delivered coaching from 8:00 AM to 8:00 PM every four hours. We included patients at primary rehabilitation after LLA at our Institute who had a prosthesis during a weekend before the discharge. Afterwards, a questionnaire with five questions and answers on 1-10 scale was admitted to the patients.

RESULTS:
Seven participants agreed to participate in the research, 4 male and 3 females, 2 declined. The results of the questionnaire showed that they were in average neither satisfied nor dissatisfied with the system, only three of them checked the coaching messages, the SAAM app was not annoying for all but one participant, only two of them would definitely test SAAM for another weekend and two were indifferent and three of them would find useful to have SAAM system at home.

CONCLUSION:
People have various views on technology: some prefer to be coached by it and others prefer to listen to their bodies.

Numerical approach for optimization of prosthetic sockets and liners

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BACKGROUND:
Despite the rapid development of computer technology, work in lower limb prosthetics is still predominantly manual. This is reflected in the time-consuming and costly approach, which requires a great deal of knowledge, experience and ingenuity on the part of the prosthetist. The work is still largely handcrafted because the problem is highly subjective and has complex constraints. Several researchers have shown that nonlinear computer simulations can be used to analyse the conditions inside the socket.

MATERIALS AND METHODS:
The numerically controlled process can be divided into three major subsections, namely:
- geometry acquisition,
- finite element method (FEM),
- additive manufacturing processes.

CT, MRI, ultrasound imaging and 3D scanning enable the acquisition of the external and internal geometry. The next step is FEM analysis on the 3D model to simulate the mechanical behaviour inside the socket. The final step is to fabricate a computer-optimised socket-liner system, which can be produced most efficiently with modern additive technologies.

RESULTS:
Numerical simulations give us the results of various mechanical quantities, but the most important one for our case is the contact pressure at the limb/liner interface since the contact pressure is relatively easy to measure. In addition, since the problem is very subjective, it is helpful to conduct a Socket Comfort Score questionnaire that allows a direct subjective comparison between a conventional and an optimized socket-liner system.

CONCLUSION:
Some facilities are already adopting computerised technology on a larger scale, which improves results, makes the work more manageable and offers a more cost-effective process in the long run.

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Communication profile of a patient after brain tumor removal

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BACKGROUND:
Brain tumor is one of the more common causes of neurogenic communication disorders. Research has shown that the communication profiles of patients with neoplastic aphasia differ from those of patients with vascular aphasia. Experts therefore emphasize the specificity of neoplastic aphasia and the importance of designing appropriate therapies to treat these patients. The purpose of the study was to investigate the field of communication in a patient with aphasia and apraxia of speech after primary brain tumor removal. The main goal was to present a communication profile of the patient before, during and after speech and language therapy.

MATERIALS AND METHODS:
The case study sample was a 78-year-old male with neoplastic motor-anomic aphasia and apraxia of speech. A comprehensive speech and language therapy treatment was performed over a period of six months. The diagnostic assessment of speech and language skills was performed three times during the study.

RESULTS:
Diagnostic assessment showed relatively well-preserved diadochokinesis, repetition and comprehension. Oral-motor skills, automatic and spontaneous speech were partially preserved. The naming and narration were severely damaged. After six months of therapy the communication profile did not change according to the conservation categories. However, a detailed analysis revealed small but significant progress within all assessed skills.

CONCLUSION:
The results of the study show that the patient's communication profile has been changing and improving during the therapy period. Nevertheless, the progress was not sufficient for fully functional oral communication. The results of the study provide a new set of information for further research in the field of communication disorders that occur as a result of brain tumor removal.

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Preoperative cognitive and psychosocial characteristics of elderly patients with brain tumors

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BACKGROUND:
Emotional distress and cognitive impairment are common aspects in patients with brain tumors that are associated to a worsening in quality of life and disability. The aim of this study is to report the most frequent preoperative cognitive and psychosocial characteristics of aged patients with brain tumors.

MATERIALS AND METHODS:
Patients were evaluated before surgery. The assessment of cognitive status was performed with The Montreal Cognitive Assessment test (MOCA), the Trial-Making Test (TMT), the 15-word Rey-Osterriet Word List immediate and delayed recall (ROWL IR, ROWL DR), and the F-A-S test (word fluency). Emotional distress, disability level and quality of life were evaluated with the following patient-reported outcome measures (PROMs): Hospital Anxiety and Depression Scale (HADS), WHO Disability Assessment Schedule (WHODAS-12) and European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC-QLQ C30). Descriptive analyses were performed to report sample characteristics, test and questionnaire scores.

RESULTS:
A total of 42 patients with diagnosis of glioma and meningioma were included (mean age=71.4 ± 4.6). The preoperative mean scores are WHODAS-12=20.3±18; HADS=12.2±6.3; EORTC QLQ global health=54.4±23.4; MOCA=21.1±4.3; TMT A=39.8±23.5; TMT B=125.6±84.1; FAS=33.5±14.3; ROWL IR= 36.2±9; ROWL DR=7.3±2.5.

CONCLUSION:
In our study patients show preoperative severe disability, low quality of life, high emotional distress, and lower scores in memory and executive functions. Our study provides a more complete patients' profile taking into account their psychosocial characteristics and cognitive status. This kind of personalized information would allow to identify elderly patients who need major support and should be taken into account also after surgery in order to plan more comprehensive and tailored interventions.

Pilot study on sleep pathologies treatments in patients with vegetative and minimally conscious state diagnosis for improving consciounsess level – the strive project

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BACKGROUND:
Some patients do not recover consciousness following acquired brain injuries remaining with several comorbidities. Among these, sleep pathologies are of particular interest. Specifically, three pathologies (Apnea, Periodic Limb Movements and Bruxism) seem to be frequently encountered, disrupting restorative sleep function [1]. However, very few studies analysed this issue in patients with disorders of consciousness (DOC).

MATERIALS AND METHODS:
STRIVE project aims to explore the relationship between sleep patterns and cognition to promote tailored treatments for patients with low functioning level for whom rehabilitation programs are still limited. STRIVE is a longitudinal multicentric explorative pilot project on a cohort of patients with DOC. All patients will be evaluated and treated following three phases: (i) definition of clinical interventions for sleep pathologies in patients with DOC; (ii) evaluation of sleep patterns of the enrolled patients; (iii) evaluation of sleep patterns after tailored treatments.

RESULTS:
The STRIVE project is on-going and the expected outcomes are: the development of innovative protocol for sleep pathologies treatment in patients with DOC; the creation of new behavioral evaluation ICT system for patients with DOC recording movements and their integration with data derived from clinical behavioral assessment; the evidence of a correlation between sleep patterns of DOC patients and their cognitive/consciousness level.

CONCLUSION:
STRIVE will make conceptual, methodological, and analytical contributions to the integration of sleep and behavioral data in patients with DOC resulting in personalized treatments. Moreover, as clinicians are usually focused on physical issues due to severe brain injury, STRIVE will aim to help these professionals developing a patentable ICT integrated system for cognitive and behavioural evaluation of DOC patients.

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Contribution of multidisciplinary rehabilitation management during severe myasthenia gravis: a case study

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BACKGROUND:
Besides the advent of new therapies for Myasthenia gravis (MG), patients' activities and quality of life remain impaired [1]. We report on multidisciplinary management in rehabilitation medicine of a patient suffering from severe MG. The originality relies on studying a severe MG, while the published studies on rehabilitation concern only mild to moderate forms [2].

MATERIALS AND METHODS:
We retrospectively evaluated the effect of multidisciplinary rehabilitation on an individual with a severe seronegative MG (MGFA IVa). Rehabilitation sessions included physiotherapy, occupational therapy, adapted physical activity, speech therapy and nutritional management. Three assessments were carried out: on arrival, during rehabilitation and after. We used specific scores for MG assessing impairments (MMS), activities of daily living (MG-ADL), quality of life (MG-QOL15) and non-specific scores assessing functional abilities (10MWT), sleep (PSQI, ISI), fatigue (FSS, MFIS) and depressive syndrome (BDI21).

RESULTS:
All of the tests carried out showed an improvement in the patient's condition during his rehabilitation. In particular, there was a clinically relevant improvement in the MMS of 37 points between evaluation 1 and 2 (from 43 to 80) and then stabilisation. Interestingly, the other specific myasthenia scores were improved from evaluation 1 to 3 (from 18 to 5 then to 3 for MG-ADL and from 58 to 39 then to 24 for MG-QOL 15).

CONCLUSION:
Multidisciplinary management in rehabilitation medicine of this person with severe MG seems to have a synergistic effect with drug therapy. Our results show an improvement over time in MG symptoms', as well as on a more general level (motor function, activity limitations, fatigue, sleep, quality of life, mood), in the absence of reported side effect. This is the first report about rehabilitation on severe MG, to our knowledge.

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The role of the cerebellum in MS-related fatigue and disability

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BACKGROUND:
Fatigue causes Multiple Sclerosis (MS) patients to fail in performing mental and physical tasks. Although previous studies [1,2] have demonstrated cerebellum damage role in central fatigue (CF), this role is poorly understood in relation to different kinds of fatigue and cerebellar sub-structures.

MATERIALS AND METHODS:
44 MS patients were enrolled. The Modified Fatigue Impact Scale (cognitive, physical, and psychosocial: cMFIS, pMFIS, psMFIS) was used to assess CF, clinical disability was rated by the Expanded Disability Status Scale. Based on the score of MFIS, patients were subdivided into fatigued (F-MS: score>38) and non-fatigued (nF-MS: score<38). Gray/white matter volumes of each cerebellar lobule were acquired by 3 Tesla Magnetic Resonance Imaging (MRI), normalized by use of intracranial volume. Correlations between MRI and clinical parameters were assessed using the Spearman rank correlation coefficient.

RESULTS:
In F-MS, higher disability was correlated with cognitive and limbic cerebellum atrophy. Instead, consistently with the functional topography [3] (sensorimotor vs cognitive/emotional) of the cerebellum, physical and psychosocial fatigue are significant related to, respectively, the sensorimotor and the limbic cerebellum. Finally, cognitive fatigue is inversely related to the limbic cerebellum volume.

CONCLUSION:
Actual data confirm that MS CF construct is complex and refers to several components. It is possible that the various components of fatigue are related to the damage of different cerebellum sub-structures according to the role that has been attributed to them based on previous studies. New hypotheses emerge on the role of the cerebellum itself, which assume relevance in a neuro-rehabilitative perspective.

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The time of first prescription of electric wheelchairs for children with neuromuscular diseases: are we too late?

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BACKGROUND:
The process of test and prescription of wheelchairs for children with neuromuscular diseases (NMD) is led by a team of professionals in rehabilitation. There are few data available in literature on how soon to prescribe an electric powered wheelchair (EPW) for a child with NMD. Further, we wanted to evaluate satisfaction of parents with the technical characteristics of wheelchairs and associated professional services.

MATERIALS AND METHODS:
Retrospectively, we've checked the age of children with NMD at the first prescription with EPW in the period from November 2013 to November 2019. Parents of these children were asked to fill in the QUEST 2.0 questionnaire (Quebec User Evaluation of Satisfaction with assistive Technology, version 2.0).

RESULTS:
We analysed data of 13 children in the time, they've come to be tested for the second EPW. Parents reported they were most satisfied with the dimensions of the present EPW and ease of use and adjustments (QUEST 2.0 mean scores 4.6), and least with its weight (mean score 4.1) and durability (4.2). They were also satisfied with the care provision (mean score 4.4). In average, children with spinal muscular atrophy (SMA) were prescribed an electric wheelchair at the average age of 5.3 years, whereas the children with Duchenne muscular dystrophy (DMD) at the average age of 8.2 years.

CONCLUSION:
Considering the gross motor development milestones, the prescription of the first EPW for children with SMA was rather late, while the prescription for children with DMD is judged as being on time when needed. The parental satisfaction was high, but there is still room for improvement considering weight and durability of EPW.

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What are the first word that typically developing Slovenian infants and toddlers say?

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BACKGROUND:
A child's first word is a highly memorable moment for parents and an important indicator of early linguistic, social, and conceptual development. This study investigated the age of first word acquisition and the characteristics of early expressive vocabulary in Slovenian–speaking infants and toddlers.

MATERIALS AND METHODS:
An online vocabulary survey was conducted with 126 parents of Slovenian preschool children. The survey focused on the first five words and the age at which these words occurred.

RESULTS:
The results show an early onset of the first word before children's first birthday, with 90 % of children saying at least five words before 18 months of age. In terms of lexical features, a predominance of people terms and a relatively high proportion of verbs and adverbs were found in the children's very first vocabulary. In addition, a phonological simplicity of the first words and an affinity toward initial bilabials were observed. No gender differences were found with regard to age of first word acquisition and word class selection. The results on Slovenian children's first word acquisition are in line with other studies.

CONCLUSION:
This work provides valuable insights for understanding fundamental issues of language development and for applying this knowledge in clinical practice. Further analysis of language development in children with developmental delay should follow.

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Functional gait problems and hip range of motion in children with an intoed gait pattern

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BACKGROUND:
The intoed gait pattern (IGP) is described as a rotational variation of the lower extremities where the feet point toward the midline. Common causes originate in the hip, lower leg or foot. Children with IGP may stumble more frequently. We wanted to describe the degree of functional problems using the comprehensive International Classification of Functioning (ICF) core set for the IGP. We also wanted to find out if children with IGP have increased internal hip rotation (IHP), decreased external hip rotation (EHR) and increased femoral anteversion (FAV).

MATERIALS AND METHODS:
We retrospectively analyzed data of children with IGP who were referred to rehabilitation program from June 2019 to May 2021 (age, diagnosis, hip range of motion (ROM), degree of functional problems according to the comprehensive ICF core set). Descriptive statistics were calculated. Due to different normative values (different age groups), we calculated the quotient between the measured ROM and the mean ROM of the age group in question.

RESULTS:
We included data from 47 children (28 boys and 19 girls; mean age 7.0 years). Nine of them had additional comorbidities. We assessed 19 ICF categories (Body Functions and Activity) and identified very frequent problems in b770 Gait pattern functions (N=47) and b7100 Mobility of a single joint (N=31). The first corresponds with reports of parents. The average left IHR was 70,9° (SD 11.1), right 72,0° (SD 9.6). The average left EHR was 28,1° (SD 9.4), right 29,1° (SD 9.4). The average FAV was left 40.8° (SD 11.3), right 42,0° (SD 8.7). The average IHR was higher than normative data for the corresponding age group by a factor of 1.4 (SD 0.2), and the EHR lower by a factor of 0.6 (SD 0.2).

CONCLUSION:
Children with IGP had increased mean IHR and decreased mean EHR. They also had significant functional problems in 2 ICF categories which should be addressed in rehabilitation program.

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Parental opinion toward adjusting clothes in children with motor impairment

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BACKGROUND:
Clothes have an important role in our lives, such as to protect us insulation against cold or hot conditions and providing a hygienic barrier. Wearing clothes is also a social norm, might indicate a social status and a part of our self-expression. From the functionality point, clothes can hinder or support our movement. We wanted to find out, how parents of children with motor impairments are dealing with clothes for children.

MATERIALS AND METHODS:
We prepared a short questionnaire for parents to find out how they are able to find, buy and adjust clothes for their children and weather they would be interested in workshop or some other help in adjusting clothes for children. We invited parents of children who were referred to the University Rehabilitation Institute in Ljubljana in the period from August 2020 to May 2021.

RESULTS:
50 parents agreed to fill-in the questionnaire. The majority of parents reported they are dressing their children either in lying or supported sitting position, whereby they have more problems in dressing the upper part. Just a small proportion bought adjusted clothes in a shop or at a website. Further, more than half of the parents never tried to adjust clothes to ease clothing and just a small proportion asked someone else to adjust clothes. Close to half of them would like to learn how to adjust clothes, 75 % would join a sewing workshop at the institute if it were available.

CONCLUSION:
Parents of children with gross motor impairment report frequent problems with clothing of their children. They lack resources to solve these problems (either buy adjusted clothes or have the knowledge to adjust them by themselves). They feel interested in an instructional sewing workshop, so we plan to organize it as a part of future rehabilitation program.

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First impressions with lower extremity exoskeleton during rehabilitation of spinal cord injured patients

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BACKGROUND:
Rehabilitation technologies are recently gaining focus, especially exoskeletons. With the help of this robotic technology the users are able to stand up, walk and climb stairs.

MATERIALS AND METHODS:
The University of Pécs and the National Institute of Medical Rehabilitation set up a multicentric research project. The primary aim of the study is to measure the efficacy of exoskeletons in the rehabilitation of spinal cord injury patients.

RESULTS:
The initial study could not start because of the COVID-19 pandemic. However, the research team from Pécs has been successfully training a paraplegic patient for two years with a lower extremity exoskeleton. At the National Institute of Medical Rehabilitation recently two inpatients were effectively mobilised with the same type of exoskeleton. Here we present our first impressions with three spinal-cord-injured patients using the device.

CONCLUSION: The planned study will hopefully soon commence, which could provide valuable information on the role of lower extremity exoskeletons in the rehabilitation process of spinal cord injured patients.

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Botulinum toxin application to internal and external oblique muscles for abdominal spasms in spinal cord injury

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BACKGROUND:
We want to report a spinal cord injury case that has benefited from botulinum toxin injections for abdominal spasms.

MATERIALS AND METHODS:
A 42-year-old male patient presented with the complaint of repetitive and uncomfortable abdominal muscle contractions. The patient was classified as International Standards for Neurological Classification of SCI (ISNCSCI) T8 AIS grade-B. His complaint of contraction and spasms in his abdominal muscles has been present for 2 years but has escalated significantly in the last 3 months. It was the main reason for the patient's application. He used oral baclofen 20 mg three times a day for the complaint of contraction, but his complaints did not completely disappear.

RESULTS:
Due to the lack of alternatives and considering the local nature of the complaints, we planned botulinum toxin injection for the patient's bilateral internal oblique and external oblique abdominal muscles with ultrasonography guidance. 25 IU of onabotulinumtoxinA was applied for each internal and external oblique abdominal muscle, amounting to a total of 100 IU. We evaluated the patient in the outpatient clinic at the 3rd-week check-up. He reported a significant reduction in his complaints. Before the botulinum toxin injection, the abdominal contractions recurred every day. According to Penn spasm scale it was 4 on severity and 3 on frequency. After the injection the spasms changed to 3 for severity and 2 for frequency. On his 3rd month evaluation, the patient reported that the frequency of the spams was still decreased with 1 for frequency, but its severity was 4. He stated that he benefited significantly from the injection.

CONCLUSION:
Botulinum toxin application can be used for patients with SCI for abdominal spasms.

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Chronicity in outpatient psychotherapy

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BACKGROUND:
Mental disorders often take a chronic course and are therefore regularly associated with disability and/or participation restrictions. Therefore, therapy must take into account the long-term course and sociomedical problems. In a survey of psychotherapy patients, the rate of chronic disorders was assessed.

MATERIALS AND METHODS:
In the area of Berlin Brandenburg, 131 psychotherapists (44% psychodynamic, 56% cognitive behavior therapy) who were on average 16 years in the job, reported about 322 patients. Therapists were interviewed in person by two research psychotherapists in regard to illness characteristics of unselected patients, they had recently seen.

RESULTS:
The duration of the disorder was longer than 1 year in 99% of patients, and 46% longer than ten years. There was a chronic persistent course in 79%. In about 25%, there were significant participation restrictions in everyday activities, leisure time, and work. Patients had undergone already multiple pretreatments of all kinds. In 79% therapists did not expect that their treatment could lead to remission.

CONCLUSION:
The data show that chronic disorders are the rule rather than the exception in psychotherapy. This requires a multidimensional and interdisciplinary treatment approach, including sociomedical interventions in order to sustain participation in life.

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Adequacy of current Slovenian criteria for prescribing electric powered wheelchairs (EW)

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BACKGROUND:
Current Slovenian criteria for prescribing EW are in use from 2007. Nowadays EW offer much more possibilities, which are not included. The main differences among 3 categories for EW are application of electric powered tilt and back-rest angle adjustment.

MATERIALS AND METHODS:
We examined 188 assessment papers for EW made in 2020 on tertiary level in University rehabilitation institute Soča. Additional adaptations were marked as »functionally appropriate«. On the majority of assessments more than one adaptation was needed. Different adaptations were categorized and compared with 106 assessments from 2007.

RESULTS:
In 61% of assessments made in 2020, the actual category did not match with appropriate EW for the user's needs (only 23% in 2007). In 40% of all tests, individual adjustments of seating units were made (17% in 2007). The most frequent adjustments (43%) were additional electric powered movement of seating unit, footrest and headrest (10% in 2007). Adjustments for use of additional devices, like respirator or communicator, were made in 22%. External electric propulsion was applied on active wheelchairs in 19%. Less common were individual adjustments of control units and application of environmental control units.

CONCLUSION:
Large number of »functionally appropriate« adaptations clearly show a need to update or renovate the Slovenian criteria and categories for EW. The current system is mainly based on functional impairment and user diagnosis. In accordance with the ICF, the new system should emphasize participation and physical, social and attitudinal environment in order to match the actual user's needs and the biopsychosocial models of health and well-being.

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The psychosocial context of divorce disputes with allegations of violence

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BACKGROUND:
Although divorce is perceived as one of the most stressful situations in a person's life, it is becoming commonplace. Long-standing disputes, literally a war for children, are no exception. Some parents are then able to accuse the ex-parter of violence - in their efforts to get the child into their exclusive care or due to the increased sensitivity and criticism of the partner's behaviour. Some experts estimate that up to 200 cases of false or outright allegations are detected each year. Although the accusations are eventually acquitted, its consequences tend to be far-reaching and often permanent (loss of reputation, destruction of the child's relationship with the other parent, etc.). The situation could be significantly facilitated by the introduction of the so-called Cochem practice, which is still not officially supported in the Czech Republic.

MATERIALS AND METHODS:
A literature review of relevant documents [1] and case studies (based on interviews with falsely accused fathers) was performed.

RESULTS:
The Czech Government Office's Action Plan for the Prevention of Domestic and Gender-Based Violence for 2019–2022 does not support Cochem practice, literature review shows it may conflict with principles of the IC.

CONCLUSION:
The IC has a relevant and completely legitimate goal of preventing violence against women and domestic violence. However, we can say that there is not sufficient evidence that, in the future, women will not be at an unfair advantage in divorce disputes and that there will not be negative influences on interdisciplinary cooperation regarding Cochem practice.

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The role and use of time and space in aging: the TAPAS in Aging project

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BACKGROUND:
Recently, the increase in life expectancy worldwide is leading to an increment in chronic diseases and disability, and to a growing demand for health and social services, with significant concern about the management of chronic conditions and long-term care needs. In this scenario, investigating the aging process using a bio-psychosocial perspective is essential to understand how to reduce disability and improve functioning of aging people. Thus, it becomes essential to observe how aging people spend their time and how their physical and social environment can constitute a facilitator or a barrier. The aim of TAPAS (Time and Places and Space) in Aging study is to obtain valid and reliable information on aging, as well as on health and disability outcomes in the Italian context.

MATERIALS AND METHODS:
The study uses a quantitative methodology, based on a protocol which was carried out in previous research on determinants of aging in Europe and Italy. The protocol is administered to a cohort of people aged over 50 and resident in Lombardy Region (Northern Italy). The protocol is composed by different tools that collect information about socio-demographic characteristics, health status, social networks, well-being, quality of life and built environment.

RESULTS:
The results of TAPAS in Aging project are expected to provide valuable information on how to improve well-being and quality of life of older people through an enrichment of social networks and environmental factors that can act as facilitators.

CONCLUSION:
Based on project results, some recommendations on how to implement services to improve well-being and quality of life will be developed.

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SAAM Sleep Better – improving alder adults' sleep quality with the help of SAAM, an AAL coaching system for a healthy sleep

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BACKGROUND:
Good sleep quality in old age promotes better health and protects against age-related decline processes. Yet, up to 70 percent of older adults experience chronic sleep problems [1]. SAAM is an Ambient Assisted Living (AAL) system, developed in the Horizon 2020 project SAAM (Supporting Active Aging Through Multimodal Coaching), to support older adults in maintaining and enhancing their health and wellbeing, including sleep quality.

MATERIALS AND METHODS:
Within a 3-months field study, 8 Austrian older adults (4f, 4m, mean age=75 years) tested SAAM to improve their overall sleep quality. SAAM provided them with personalized coaching messages based on data gathered via sensors as well as self-reports. To inquire participants' sleep quality, the Pittsburgh Sleep Quality Index (PSQI) was used at three times during the study. The PSQI includes 19 self-assessment questions, aggregated into 7 components, which can take a value between 0 and 3, with higher values indicating greater sleep problems [2]. The Friedman test [3] was performed to analyse the data.

RESULTS:
Subjective sleep quality had improved significantly between the first and third measurement point ($p<0,05$), with mean ranks at 2,50, 1,94 and 1,56, while overall sleep problems had decreased significantly, with mean ranks at 2,69, 1,81 and 1,50. Also, night-time and early wake-ups had become significantly less frequent while using SAAM ($p<0.05$). The greatest improvement occurred after 6 weeks.

CONCLUSION:
These first insights into the effectiveness of SAAM as a sleep coach are promising. Taking into account individual data to send personalized coaching messages, can successfully support older adults in improving their subjective sleep quality over time.

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Awareness and acceptance of smart services among elderly - a survey conducted in three European countries

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BACKGROUND:
Advanced technologies help older people maintain their independence living in their homes and the vicinity. The research presented is part of the Safety of the Elderly and Vicinity Ensuring (SAVE) project of the European Union's Active and Assisted Living program, carried out by Romanian, Italian and Hungarian partners.

MATERIALS AND METHODS:
The authors assessed first the needs of the users. Primary end-users are 65+ older adults suffering from moderate medical conditions or moderate impairments; Secondary end users are formal and/or informal caregivers, Tertiary end-users are care providers, public social service, end-user organizations, medical and nursing researchers. Eleven smart service candidates were designed and described. A questionnaire was also designed for users' opinion assessment. In Romania, 4 female and 4 male primary end-users (mean age 79.1 years), in Italy 3 females and 2 males (74.8), and in Hungary 3 females and 3 males (76.0) filled in the questionnaire. The total number of secondary end-users filled in the questionnaire in the three countries was 19, the same number as the primary end-users.

RESULTS:
The Romanian respondents prefer the subscription service in the first place. The second most preferred service was the emergency, while the third service was the location and orientation service. In Italy, the order of the services was: 1. emergency call service, 2. notification and alert service, 3. medication management service, while in Hungary: 1. emergency call service, 2. security services, 3. physical activity, exercise support.

CONCLUSION:
The research concluded that the SAVE users considered the security-enhancing services the most important. Secondarily, various, mainly support services were found necessary. The user research results helped us select and tailor the SAVE service toolkit, which will soon undergo pilot testing in the three participating countries.

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Efficacy of high intensity preoperative training on postoperative outcomes in Greek patients undergoing total knee arthroplasty: a randomized controlled study

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BACKGROUND:
Several studies have shown that patients with knee severe OA can reduce their knee pain, improve their quadriceps strength, and improve their functional ability through regular exercise training. The purpose of this study was to investigate the efficacy of a 6-week supervised high-intensity preoperative training program on muscle strength, functional performance and patient-reported outcomes in patients undergoing total knee arthroplasty (TKA).

MATERIALS AND METHODS:
Eighty-eight patients scheduled for unilateral TKA for severe osteoarthritis (OA) were randomly allocated to intervention group (N=44) completed a 6-week preoperative training program, 5 days per week prior to surgery and to control group (N=44) who lived as usual. Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), the Physical Functioning Scale of the Short Form-36 questionnaire (SF-36), Knee Injury and Osteoarthritis Outcome Score (KOOS), quadriceps strength, 20 meters walk test and 30 seconds chair stand test were assessed at 6 weeks before surgery (T0), after 6 weeks of preoperative training / preoperatively (T1), 4 weeks (T2) and finally 12 weeks (T3) after TKA.

RESULTS:
When comparing the changes from baseline to the primary test points at T1, T2 and T3, we found a statistically significant group difference in favor of the intervention group for quadriceps strength ($p<0.001$, 0.001, 0.009), 20 meters walk test ($p<0.001$, 0.023, 0.032), 30-second chair stand test ($p=0.001$, <0.001, <0.001) and all patient-reported outcomes on WOMAC ($p<0.001$, 0.001, 0.007), except on KOOS, which showed a statistically significant difference only at T1 ($p<0.001$) but not at T2 ($p=0.048$) and T3 ($p=0.087$).

CONCLUSION:
A 6-week preoperative training program supervised by a physiotherapist before total knee arthroplasty is efficacious for decreasing knee pain, improving knee function and enhancing daily living activities.

Management of massive heterotopic ossification after primary total hip arthroplasty

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BACKGROUND:
Postoperative heterotopic ossification (HO) varies in amount from faint indistinct islands of bone within periprosthetic soft tissues to complete bony ankylosis of the hip joint. Surgical excision of established heterotopic bone is fraught with complications, including the development of recurrent ectopic bone, and an operation to remove HO is a difficult procedure.

MATERIALS AND METHODS:
A 59-year-old male patient without any known risk factors for HO formation in medical records, who developed Brooker grade IV HO after routine uncomplicated primary uncemented total hip arthroplasty (THA) of his left osteoarthritic hip, is presented. Intraoperative and early postoperative course was uneventful. However, the patient's hip range-of-motion (ROM) was found severely restricted at routine follow-up 3 months after primary procedure and HO formation was confirmed on the X-rays. The patient was given the nonsteroidal antiinflammatory drugs (NSAIDs) for 12 weeks without any benefit. The patient was not able to drive a car, sit, lace his shoes and dress himself. His Harris Hip Score (HHS) was 32 points. 20 months after primary procedure the HO was found to be sufficiently mature to warrant a revision surgery. 6 hours prior to the secondary procedure, the involved hip region received a low-dose radiation (500 cGy). Through a wide exposure the abnormal bone was shelled out of the surrounding soft tissues with bone rasps and electrocautery. Excessive bone was chiseled off the normal bone with series of chisels. Wherever ectopic bone obscured normal landmarks, a C-arm was used to stay well orientated. Meticulous hemostasis was performed at all times. No tubing was placed and the wound was closed in layers as usual. Full weight bearing was allowed on first postoperative day and the patient was put on NSAID for 6 weeks.

RESULTS:
3 months after revision the patient was pain free, could drive his car, sit normally, lace his shoes and able to dress himself. His HHS was 98 points. No recurrence of HO was seen on the X-rays. The results of revision surgery remain stable at 1-year follow-up.

CONCLUSION:
HO presents a substantial barrier to expected good functional result after THA. Surgical resection of HO offers the only possibility for improving ROM and patient satisfaction.

Acupuncture as a pain management treatment in a patient with facioscapulohumeral muscular dystrophy

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BACKGROUND:
Facioscapulohumeral muscular dystrophy (FSHD) is a slowly progressing, genetic muscle wasting disease. Symptoms are most commonly seen to affect facial and shoulder girdle muscles but can present in other areas. Movement dysfunction, pain and fatigue are also common features of the condition. Pain is often described as the most disabling symptom and although there is increasing use of acupuncture in Western medicine for pain management, research into the use of acupuncture for patients with neuromuscular conditions is lacking.

MATERIALS AND METHODS:
This case report describes a 38-year-old male with a diagnosis of FSHD who, at his initial assessment, expressed pain as his primary concern. He received four sessions of acupuncture to the symptomatic area using a combination of western and eastern methods.

RESULTS:
There was a marked improvement in his symptoms using the Numerical Rating Scale (NRS), with a final report of being pain-free in the area treated. This resulted in the patient reporting an improved quality of life through increased work and social engagements.

CONCLUSION:
It was concluded that acupuncture was effective in reducing pain related to his underlying condition.

Complex regional pain syndrome as a consequence of deviated organization of local and whole-brain network

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HYPOTHESIS:
Complex regional pain syndrome (CRPS) is a functional pain syndrome triggered as unconscious overreaction to negative emotions, such as being in danger or feeling guilty. CRPS module in the brain network is unstable during the early stage and can be balanced by positive thoughts and expectations, e.g., by dry needling and explanation of washing out cytokines from the painful area, acupuncture or other means of making the person believe to be healthy. In the chronic stage, CRPS is less susceptible to normalisation.

METHODS AND SUBJECTS:
A retrospective analysis of 130 patients during the last 17 years was performed. CRPS diagnosis was confirmed by the Budapest criteria. Hand/leg function, temperature and skin sensation were assessed and pain was rated on the visual analogue scale (VAS). Therapy consisted of explaining the pain and dry needling (DN) of spots sensitive to pressure of 2 kg or less. There were two groups of patients. Group 1 comprised 38 patients (31 women), 21-81 years old; time between pain onset and DN was less than 3 months; maximum pain intensity was VAS 10 in 9 cases, VAS 8-9 in 8, and VAS 3-7 in 18 cases. Group 2 comprised 61 patients (48 women), 17-71 years old, with pain duration 3-11 months; maximum pain was VAS 6-10 in 38 cases. Group 3 comprised 37 patients (26 women), 25-71 years old, with pain duration 1-2 years; maximum pain was VAS 7-10 in 30 cases.

RESULTS:
In group 1, 18 out of 38 CRPS patients were completely healed; mild residual dysfunction remained in 20 cases. In group 2, after only one DN therapy, complete analgesia was observed in 38 cases without residual malfunction; the other patients were better with some residual dysfunction like stiff joints, hyperesthesia, allodynia or hypokinesia. In group 3, the outcome after DN repetitions was no pain in 5 patients, 19 patients had some improvement though the residual problems persisted after 3 to 28 DN repetitions, while 13 patients rejected DN due to pain elevation after the first trial.

CONCLUSION:
We confirmed that up to one year of pain duration, dry needling, explaining the pain and positive suggestions of healing (placebo) can result in dramatic analgesic effects. DN enhances the neural connection with the neighbouring regions and modulates the local information flow, thus participating in the reorganisation of the brain network and the process of neural plasticity.

Short term effect of radial shock wave therapy on function and pain in subjects with calcific tendinitis of supraspinatus

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BACKGROUND:
One of the most frequently represented causes of sudden pain in shoulder is calcific tendinitis of the rotator cuff (CTRC). The prevalence of CTRC is higher in women and generally affects individuals aged between 40 and 60 years. It is painful in 50% of patients and frequently leads to considerable restriction of motion. [1] In the last 10 to 15 years, extracorporeal shockwave therapy (ESWT) has been used as an alternate conservative management of CTRC. The treatment is based on the use of shock waves and pressure impulses capable of producing fragmentation of calcific deposits. The aim of our study was to assess the effectiveness of radial ESWT in patients with CTRC.

MATERIALS AND METHODS:
The empirical, prospective study included 76 patients. We measured ranges of motion without pain (anteflexion and elevation) before and after treatment. Secondly, we evaluated patients before and after treatment by using a self-administrated Slovenian translation of the Shoulder Pain and Disability Index (SPADI) which consists of pain dimension (five items) and activities dimension (eight items), thus producing a total score and two subscale scores. The third parameter was 4- level scale for rating problems (1-non, 4- a lot) before and after treatment. We used electromagnetic shock wave generator (Storz MP 200).

RESULTS:
The decrease of SPADI pain and disability subscale and total score after treatment was evident and highly statistically significant. The pain rating substantially (and highly statistically significantly, $p<0.001$) improved. It did not increase in any patient, remained unchanged in 8 patients (10.5%) and decreased in all other patients (89.5%).

CONCLUSION:
Radial ESWT seems to be efficient mono-therapy for CTRC related symptoms. With respect to the self-imposed severe criterion of SPADI score reduction by at least 50%, the estimated population proportion of patients responding to therapy was between 71% and 91%.

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Effects of low level laser therapy and local corticosteroid injection in the treatment of plantar fasciitis

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BACKGROUND:
One of the most common causes of the heel pain is plantar fasciitis (PF) which has nearly 10% prevalence rate in general population [1]. The aim of the study was to compare the effects of low-level laser therapy (LLLT) and local corticosteroid (CS) injection on the management of PF.

MATERIALS AND METHODS:
Patients who had a diagnosis of PF based more than 1 month with a minimum visual analog scale (VAS) score was ≥ 4/10cm. Patients were selected from hospital records and patients files who had a local injection application (1 cc triamcinolone hexacetonide and 1 cc lidocaine hydrochloride) into the heel (Group I) or ten sessions of gallium arsenide laser therapy on the heel (Group II). Patients were evaluated five times during the study period: pretreatment, posttreatment, two weeks after posttreatment, 1 month and 3 months after the posttreatment visit. VAS (palpation, rest, walking, activity), Heel Tenderness Index (HTI) and Foot Function Index (FFI) were evaluated.

RESULTS:
No statistically significant differences were found between Group I and Group II pain values ($p>0.05$). There were significant differences on within groups analysis all VAS scores ($p<0.05$) except in Group II VAS at rest ($p=0.159$). There were no statistically significant differences between groups for FFI ($p>0.05$). Statistically significant differences were obtained within groups for all FFI subscores ($p<0.001$). There were no statistically significant differences between groups for all visits regarding the HTI scores ($p>0.05$). Each visit was compared with previous visit for within group analysis. Statistically significant differences at “after treatment” (T1) visit were found for all groups ($pT0\text{-}T1<0.05$). There were statistically significant differences in the first month (T3) ($pT2\text{-}T3=0.002$) and 3rd months (T4) ($pT3\text{-}T4=0.001$) for Group II.

CONCLUSIONS:
Both LLLT and local CS injection applications in the management of PF have positive effects during 3 months. LLLT seems better than local CS injection for long term by the means of local tenderness.

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High intensity laser therapy in patients with rheumatoid arthritis

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BACKGROUND:
Rheumatoid arthritis (RA) is a chronic inflammatory autoimmune disorder that causes irreversible joint damage, significant disability and decreased quality of life. Physical and Rehabilitation medicine and its variety of therapeutic modalities plays a major role in the treatment of patients with RA along with pharmacotherapy. A systematic review of Chia et al. finds that laser therapy provides significant immediate pain relief and improves function in patients with rheumatoid arthritis [1]. Most of the trials study the effect of Low-Level Laser Therapy. In the available literature there is a lack of trials that assess the effect of High Intensity Laser Therapy (HILT). Our aim was to study the effect of High Intensity Laser Therapy (HILT) on the arthropathy of the hands in patients suffering from RA.

MATERIALS AND METHODS:
A total of 10 cases with RA have been included up to now – mean age 61.6 years with a mean disease duration of 16.4 years. They underwent 7 sessions of HILT applied on the hands once a day for a period of 1 week. The outcome measures used were visual analogue scale (VAS) for pain, grip-strength and function according to Patient-Rated Wrist and Hand Evaluation (PRWHE) questionnaire. The assessment was performed at baseline and after the end of the treatment.

RESULTS:
A statistically significant relief in pain and improvement of function were observed. Mean VAS changed from 6.6 (SD 0.6) to 4.9 (SD 0.5) ($p<0.05$), mean grip-strength from 3.9 (SD 1.68) to 8.0 (SD 3.0) ($p<0.01$) and mean PRWHE score from 69.6 (SD 1.7) to 55.6 (SD 4.0) ($p<0.01$).

CONCLUSION:
The preliminary results of our pilot study are promising and we may suggest that HILT could be considered as an effective and safe therapeutic option for relief of the symptoms and improvement of function in patients with RA.

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Interrater reliability of the Nine Hole Peg Test performed according to a new Czech manual in rheumatological patients

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BACKGROUND:
Occupational therapists can assess the fine motor skills of people with rheumatoid arthritis (RA) or osteoarthritis (OA) by the Nine Hole Peg Test (NHPT). This standardized test is performed according to the manual, which also includes precise verbal instructions. The result is the time required to complete the task by the dominant hand (domH) and by the non-dominant hand (nondomH).
The aim is to determine interrater reliability based on testing a sample of subjects with OA or RA using NHPT performed according to a new Czech manual by two independent evaluators.

MATERIALS AND METHODS:
The Czech version of the NHPT manual was created by back translation method. In addition, it was supplemented with new instructions unifying the method of performing and evaluating the results of three consecutive attempts of testing domH and then nondomH. After the study was approved by the ethics committee, a total of 19 subjects with RA or OA aged 36-77 years were tested by a properly trained occupational therapy student with NHPT during 2-3/2021. Video recordings of the NHPT were made. One subject was excluded. The second occupational therapist then independently evaluated the NHPT. The data obtained from both evaluators were statistically analysed using descriptive statistics and Pearson's correlation coefficient.

RESULTS:
The interrater reliability of the NHPT administered according to the new Czech version of the manual was determined using Pearson's correlation coefficient (domH r = 0.9991; nondomH r = 0.9993). The greatest deviation between evaluators for the same attempt of the same subject was 0.72 second. No differences in their results were recorded five times.

CONCLUSION:
The results show that the new Czech version of the NHPT manual should be objective and useful in practice for quick assessment of fine motor skills of people with RA and OA. Audio recordings with the verbal instructions should be used in future researches.

The meaning of eclecticism in psychological treatment of children and adolescents with non-malignant chronic pain

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BACKGROUND:
Introduction: According to the criteria of the American College of Rheumatology (ACR) chronic non-malignant pain is defined as pain, lasting at least three months. This kind of pain is also present in the population of children and adolescents. One in four children experiences at least one episode of chronic pain. Because persistent pain has comprehensive consequences in terms of thinking, feeling, behaving, daily life activities, it impacts the child, the family and other systems in which the child is involved. Treating pain through the biopsychosocial model has become increasingly important also for psychologists who have taken an important place in the process of pain treatment. Different psychological models and theories that attempt to explain the transition from acute to chronic pain, and different modes of treatment, appeared. Psychological treatment should be planned according to the child's cognitive abilities, personality traits, emotional state, family characteristics, social environment. Through a case study, we will illustrate the implementation of elements of cognitive behavioral therapy, transactional analytical and family system psychotherapy, the importance of mindfulness and relaxation techniques.

MATERIALS AND METHODS:
We will present a case study of a 17-year-old girl. On her case we will show the use of different psychotherapeutic methods. The girl assesed the pain (questionnaires FPAQ and PCS-C) and her anxiety-depressive simptoms (RCADS) at the beginning and at the end of the psychotherapeutic process.
Results: A significant improvement in symptoms is noticeable.

CONCLUSION:
We establish the importance of eclecticism - the intertwining and integration of techniques and methods of different psychotherapeutic directions.

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Physiotherapeutic treatment of a patient with endometriosis (case report)

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BACKGROUND:
Endometriosis is a hormone-dependent disorder which affects approximately 10% women and nearly a half of infertile women. In this case report we present gynecological physiotherapy that focuses on treating muscle imbalances in the pelvis area as additional method of treating endometriosis symptoms.

MATERIALS AND METHODS:
A 34-year-old patient suffering from endometriosis underwent a focused physiotherapy as part of supportive treatment of infertility. The patient passed out her first (unsuccessful) IVF in August 2020. Physiotherapeutic methods were focused on muscle and soft tissue imbalances of the pelvis, pelvic floor and abdominal cavity. The goal was to improve the blood circulation in this area, decrease the pain and release the increased tension in pelvic ligaments, smooth and skeletal muscles. The applied treatment also included standardized questionnaires (State-Trait Anxiety Inventory and The Female Sexuale Function Index). In total, she underwent seven therapy sessions which were designed to be followed by a cryo-embryo transfer (frozen embryo from August 2020).

RESULTS:
We observede an improvement in both questionnaires. The patient underwent cryo-embryo transfer and now she is pregnant.

CONCLUSION:
The evaluation of the questionnaires as well as the results of an objective physiotherapeutic examination indicate that physiotherapy can positively affect not only the quality of a patient's life, but also the myofascial portion of pelvic pain. We believe that physiotherapy should become a standard part of treatment of endometriosis.

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Enhancing physical activity in people with stroke and other neurological conditions: how everyone can make a difference

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BACKGROUND:

The notion to "move more and sit less" is common sense, so why does physical inactivity remain so common after stroke and other long-term neurological conditions? The World Health Organisation's guidelines specify recommendations to enhance physical activity and reduce sedentary behavior. However, implementation remains poor, leading to suboptimal recovery of millions of people around the world.

AIM:

To encourage delegates to take home a number of practical, theory-and evidence-based action points to facilitate physical activity in people with stroke and other neurological conditions.

OUTLINE:

This workshop is for everyone involved in practice, education, research and policy in neurological rehabilitation. We will highlight common patterns of habitual physical activity and sedentary behaviour, followed by a discussion on common barriers and motivators to behaviour change in people with stroke and other neurological conditions, and factors that influence health professionals in promoting physical activity. We will discuss various theory- and evidence-based strategies for promoting physical activity (including but not limited to exercise and fitness training). Delegates will have an opportunity to discuss how they may be able to encourage people with stroke and other neurological conditions to become more physically active to optimise their recovery and benefit their health.

Implementing ICF and WHO DAS 2.0 in clinical practice

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Information about functioning and disability is essential for clinical practice, research, education, as well as for health and social policy and advocacy.

Increasingly, countries are enhancing their data about functioning and disability using the WHO International Classification of Functioning, Disability and Health (ICF). The ICF is an international standard for health and disability information - key for collecting valid, reliable and comparable health and disability data. To be a standard for harmonization and comparability, however, ICF has to be applied consistently around the world by all users, and that means the aims and rationale of the ICF, and the specific skills needed to use it, must be taught in an accessible and standardized manner. An international system such as the ICF offers a conceptual framework and a common language that can be used to set appropriate goals for intervention. Establishing a common language which all members of a rehabilitation team (including the patients themselves) can use when describing health and health-related constructs is very important. Person-centred care advocates for understanding the level of functioning and participation in relation to activities within each patient's environment Rehabilitation professionals therefore need to be able to evaluate functioning in everyday activities, in order to identify existing barriers and facilitatators so as to increase participation within these activities. From a rehabilitation perspective, the ICF with its bio-psychosocial framework, can be used to describe the functioning of individuals within and across different contexts. The ICF distinguishes different components which operationalize the interplay between the person, their performance and capacity and the environment. These include components of individual functioning (body structures, body functions; activities and participation) and contextual components (environmental factors and personal factors that are not classified in ICF).

A brief introduction to principles and use of ICF and WHO DAS 2.0, the ICF based assessment, will be provided during this EFRR Course.

Heart rate responses between the circuit class training stations and the effects of training in chronic stroke

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BACKGROUND:
Low cardiorespiratory fitness and decreased balance interact to drive post-stroke functional mobility limitations. Circuit class training (CCT) is recommended in all phases after stroke. HR responses within training and as an outcome have not been studied yet.

MATERIALS AND METHODS:
Eight people (aged 30−58 years), 2−27 years after stroke, who were independent in walking participated. The CCT consisted of 11 training stations (intensity: 55−80 %HRmax; 51−68 minutes; 3 times per week, 4 weeks). Before and after the training period, and at 10 weeks follow-up functional tests were performed. At rest, during the training sessions and following six-minute rest, HR (H10, Polar, Finland) and perceived exertion (Borg rating scale) − RPE were recorded. Descriptive statistics was used to compare %HRmax between the stations and paired-samples t-tests to compare HR responses and RPE between the 1st and 12th training sessions. RmANOVA and post hoc t-tests with Bonferroni correction were calculated to compare outcomes between the three assessment times.

RESULTS:
The average %HRmax was slightly lower during the training stations for coordination and balance (60.8−67.1 %HRmax) than during the aerobic stations (64.4−68.7 %HRmax). Only RPE significantly decreased during six-minute rest at the end of 12th CCT session, compared to the 1st ($p=0.001$). After the CCT period, there were statistically significant improvements in 5TSTS, FGA, 6MWT, and 2-minute step test (all $p<0.05$). No differences were found for the ABC scale, 10MWT, ascend/descend stair test. At follow-up, the improvements were maintained (all $p>0.05$), while the 10MWT at comfortable walking significantly improved ($p=0.002$).

CONCLUSION:
A trend of higher HR response at aerobic stations was shown. The moderate-intensity CCT resulted in improvement of walking balance, mobility, and exercise capacity in people with chronic stroke, while there was no change in HR. CCT has also the long-term effects.

Post-stroke cognitive impairment is frequent after infratentorial infarct

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BACKGROUND:
Post-stroke cognitive impairment is a common and well-known consequence of supratentorial infarct, but its prevalence and severity after infratentorial infarct is unclear. We compared the frequencies and prognostic value of domain-specific cognitive deficits after supratentorial and infratentorial infarct.

MATERIALS AND METHODS:
In a consecutive cohort of patients with first-ever stroke (N=244) admitted to Helsinki University Hospital, 37 patients had an infratentorial infarct. Patients were assessed with a comprehensive neuropsychological examination 3 months post-stroke covering 9 cognitive domains, and functional disability was assessed at 15 months with the modified Rankin Scale.

RESULTS:
There were no statistically significant differencies between the frequencies of cognitive deficits in patients with infratentorial vs supratentorial infarct. Altogether 73% of patients with infratentorial infarct and 82% of patients with supratentorial infarct had impairment in at least one cognitive domain. Further 42% of patients with infratentorial infarct and 47% of those with supratentorial infarct had deficits in 3 or more cognitive domains. In patients with infratentorial infarct, visuoconstructional deficits were significantly associated with functional disability at 15 months (OR 9.0, 95%CI 1.3-62.5, p=0.027). In patients with supratentorial infarct, executive deficits (OR 2.9, 95%CI 1.5-5.8, p=0.002) and visuoconstructional deficits (OR 2.9, 95%CI 1.5-5.7, p=0.001) showed associations with functional disability at 15 months.

CONCLUSION:
Cognitive deficits are as common in patients with infratentorial infarct as in those with supratentorial infarct, and it is important to recognize them to meet the needs of rehabilitation.

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Pilot study investigating the improvement of arm function and enjoyment after class circuit training or goal directed training after stroke

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BACKGROUND:
Patients recovering from stroke need intensive therapy to improve upper limb function, time and costs can be reduced by group therapy. Group training can be provided according to predefined workstations (Circuit Class Training (CCT)) or focussed on the patient's goals (Goal Directed Training (GDT)). The main aim of this pilot study was to compare the effectiveness of CCT versus GDT improving arm function after. Secondary aims were to investigate the differences in patient enjoyment and therapy load.

MATERIALS AND METHODS:
Patients in the subacute phase after stroke with arm/hand dysfunction who were admitted to the rehabilitation center were eligible. In this non-randomized pilot study, patients trained four weeks in either the CCT group or the GDT group, based on time of study entrance. CCT was provided in the first ten weeks of the study, subsequently ten weeks of GDT was provided. Outcomes were arm function tests and questionnaires about enjoyment, satisfaction with therapy, task load, perceived improvement and pain.

RESULTS:
Fourteen patients entered the study, seven in each group. The GDT group comprised significantly more patients who suffered a second stroke. No significant difference in improvement of arm function between the groups was observed. Ten patients did not attend all sessions or were discharged earlier which resulted in missing data in the questionnaires. Due to the small sample sizes and missing data, only descriptive statistics were used. Mean values showed a higher perceived enjoyment for GDT (10%). Satisfaction and task load were similar between the groups (CCT: GDT, 3.4:3.3 out of 4; 44:45 out of 100). The perceived improvement in arm function was larger in the CCT group (22%), however also more physical complaints were reported (CCT: GDT, n=6:3).

CONCLUSION:
CCT and GDT revealed similar results. To increase motivation and enjoyment, the CCT program could be improved with additional workstations.

Activity monitoring in stroke rehabilitation: advanced information for therapists and motivational factors for patients

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BACKGROUND:
Teletherapeutic devices and services enable new possibilities to track the rehabilitation process by gathering data and visualizing them in statistics. The REHA2030 project focuses on the development of services and devices for telerehabilitation after stroke, where a proper activity monitoring is one key element to foster therapy outcomes.

MATERIALS AND METHODS:
Based on a user centered design approach [1], multiple workshops with occupational-, physio- and speech therapists were conducted, where the requirements of data visualization were gathered, and the developed solution was validated. Furthermore, the concept of adherence [2] in contrast to expecting compliance from the patient and its impact on intrinsic and extrinsic motivational factors was taken into account when designing the activity monitoring.

RESULTS:
The visualization of the activity monitoring comprises statistical data and graphics on conducted exercises, repetitions, training duration and parameters of robotic training. For therapists, it is important to have a comprehensive overview and still have the opportunity to gain a detailed insight into the data collection of each patient. For patients, the visualization should be easy to use, motivating and meaningful, to build awareness how to influence the own health state.

CONCLUSION:
Further validation, especially with patients is needed and planned to refine the activity monitoring visualization and to find a balance between easily accessible, transparent and motivational compilation and visualization of training data.

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Successful paths from requirements to demonstrator via User-Centered Design

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BACKGROUND:
Repetition is a crucial factor of success in neurological rehabilitation [1]. Technical assistance, like serious games, can help to raise the motivation of the patient. In the project REHA2030, a needs-oriented service model for stroke rehabilitation and a technical demonstrator to support this model are developed.

MATERIALS AND METHODS:
Based on the User-Centered Design (UCD) approach [2], technical components of the REHA2030 platform were developed and evaluated. In an iterative manner, the requirements were gathered in workshops with therapists, converted to technical solutions and evaluated with the therapists.

RESULTS:
The REHA2030 system consists of four main parts, a robotic device, a mobile device for patients, a web application for therapists and a server. The device for the patients, an Android tablet, connects with the robotic device, which is built to interact with games to train the hand, and with the server for bidirectional data transfer. In addition, the device will be used to manage the patient's exercises. The web application is used by the therapists to manage their patients' therapies and communicate with them via an integrated chat application. The data associated with the REHA2030 project, inter alia, information about patients, exercises and appointments, is stored on the server.

CONCLUSION:
The integration of the users in research allows the development of a system based on users' needs. To include users in the entire development cycle, the final system, which will include the four main parts, will be evaluated with different stakeholders and improved based on the findings.

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Smartphone-based upper limb rehabilitation system for post-stroke patients

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BACKGROUND:
Yearly, millions suffer from stroke and its consequences. Most post-stroke patients have upper extremity impairment. We developed an easy-to-use home-based rehabilitation system which consists of a mobile application, a handle and a poster. Since almost everyone owns a smartphone, the proposed system indicates a very accessible way to a better physiotherapy process available in patients' home environment.

MATERIALS AND METHODS:
The rehabilitation system's motion tracking performance was evaluated with a robot. Moreover, study group and control group were asked to perform the assessment tests and the exercises. Each participant firstly performed a warm up exercise to get to know the system, followed by three assessment tests with four repetitions. Assessment tests indicate how well the users from either group are able to use the system.

RESULTS:
The results of the system's motion tracking performance showed that it is comparable to the state-of-the-art motion tracking devices used in laboratory environments. Furthermore, we were able to calculate repeatability, which was 2.7 mm, and accuracy of 1.3 mm. The results from the assessment test show that the control group performed better than the study group.

CONCLUSION:
To the best of our knowledge, other home-based motion tracking systems currently available on the market do not enable this kind of accuracy. The results demonstrate that the system is suitable for home-based rehabilitation.

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Instrumentation opportunities in the status assessment of post-stroke patients with shoulder pain

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BACKGROUND:
The methods assessing the outcomes and effectiveness of the rehabilitation process post stroke are dominantly manual methods. Advanced technologies, however, started to contribute to instrumentation also in this field. The authors aim to present their experience with different status assessment methods applied on stroke patients during the key phases of post stroke rehabilitation.

MATERIALS AND METHODS:
20 stroke inpatients (11 male, 9 females, mean age 64.1 years) of OMINT with shoulder pain were involved in the measurements. During the course of general stroke rehabilitation treatments, with four weeks apart, the subjects underwent: 1. passive and active range of motion (shoulder abduction, flexion and external rotation) manual assessment; 2. Visual Analogue Scale for shoulder pain (on a 0 to 10 scale) manual assessment; 3. surface thermography of the shoulders; 4. instrumental measurements of force/torque at the elbow and wrist during four different isometric tasks. Thermographs were processed in MATLAB to have mean temperatures of shoulder areas; all other type of data was processed by Excel macros. Statistical analysis was made using StatSoft Statistica.

RESULTS:
In the observed 4-weeks period, the subjects did not show significant improvement in range of motion measurements, except for the active abduction ($p=0.001$). Subjective perception of shoulder pain decreased significantly ($p=0.033$), while thermography was unable to show any improvement. From the force/torque measurements, only the wrist dorsiflexion showed higher values on the second occasion.

CONCLUSION:
Even though four weeks seem to be just too short for detecting significant improvements regarding rehabilitation outcomes, selected manual and instrumental measurement methods have demonstrated considerable future diagnostic potential.

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Robotic upper-limb rehabilitation in chronic stroke patients

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BACKGROUND:
Patients with chronic stroke often have long-lasting upper extremity impairments. Robotic arm rehabilitation as a conventional therapy upgrade have improved arm movement with significant effect on motor function and activities of daily living. The exoskeleton robotic device (Armeo Power®, Hocoma, Switzerland) has been used in the Department of PRM, University Hospital Rijeka, Croatia since 09/2019.The purpose of this study was to show our experience with robotic arm rehabilitation in chronic stroke patients.

MATERIALS AND METHODS:
The study included 20 patients with moderate arm hemiparesis. The patients were recruited to a robotic intervention group(N=10) and a conventional therapy group(N=10). Patients of both groups received the same dose and length per day of conventional poststroke rehabilitation (Bobath concept and occupational therapy, 1 hour a day each; 5 times a week, for 4 weeks). The robotic intervention group received additional exoskeleton robotic-assisted training according to the same performance program. Training by robot (Armeo Power®) consisted of pasive/active-assistant 3D manipulation of the impaired limb in virtual reality. The main outcome measures were used on arrival and discharge: the Functional Independence Measure (FIM) and the Fugl-Meyer assessment for upper extremity (FM-ue).

RESULTS:
At admission, the differences in FIM1 and FM-ue1 between the groups were not statistically significant (FIM1: p=0.357; FM-ue1: p=0.182) while at discharge they were (FIM2: p=0.004; FM-ue2: p=0.043).

CONCLUSION:
Patients who received robotic therapy in addition to conventional therapy showed greater reductions in motor impairment and improvements in functional abilities. Robotic therapy may therefore effectively upgrade rehabilitation even in chronic stroke survivals.

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Structured open-source procedure for the design and validation of an arm rehabilitation device

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BACKGROUND:
The occurrence of stroke remains high, making it a global issue often accompanied by long-term disabilities such as upper limb paresis. To facilitate recovery, patients should engage in frequent and intensive rehabilitation sessions. The proposed approach is to develop an active upper limb mechatronics rehabilitation device.

MATERIALS AND METHODS:
The proposed self-aligning device rely on a 15 DOFs model of the human arm [1]. Its design is tailored to the model along the shoulder-elbow-wrist-hand interaction chain, while optimizing the distribution of active and passive joints and verifying the required ranges of motion (ROMs). The open-source frameworks Blender and Robotic Operating System are used in designing and implementing the device kinematics.

RESULTS:
The performed analyses allow developing a 14 DOFs device [2]. The 8 active joints enable following the motions of the human shoulder, elbow, forearm, wrist and hand, while the 6 passive ones compensate for patient-device misalignments and parasitic shoulder translations. The conceived device satisfies most of the ROMs, with additional 60° required for the shoulder overhead motion and 15° for the wrist flexion/extension. A thorough kinematic analysis is performed by using the Denavit-Hartenberg convention implemented in the Neurorobotics Platform.

CONCLUSIONS:
A structured open-source rehabilitation device design procedure, comprising a functional model of the rehabilitation target, aligning and distributing the DOFs, validating the ROMs and implementing its kinematics, is proposed. The developed layout will be used for detailing the device aimed at providing unconstrained and smooth rehabilitation, where the passive parts will be 3D printed to accommodate compactness and affordability. Based on these considerations, initial design concepts of the forearm, wrist and hand components are finally proposed.

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Technological platform to support REHA2030 telerehabilitation service

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BACKGROUND:
The Interreg REHA2030 project aims at creating a home telerehabilitation service for wrist and finger rehabilitation in post-stroke patients in rural environments. A technological platform to support the service that has been developed is presented.

MATERIALS AND METHODS:
The telerehabilitation platform consists of three linked solutions: a robot based portable rehabilitation device, the patient's interface and the service platform that is used by therapists.

RESULTS:
An exoskeleton robotic device designed by utilising 3D printing was developed. It is powered by two lightweight electric motors and offers three modes of operation: passive (isotonic), the robot driven, and the robot supported training of wrist movement. It uses a novel mechanism that translates one actuated degree of freedom into a coupled flexion and extension of the wrist and finger joints, mimicking the grasping motion. During the rehabilitation training the device collects data on the patient's joint movement and applied forces and forwards them to the patient's interface device to control a simple 2D game, for further analysis and for presentation to the patient. The patient's interface consists of an Android tablet with an app. It communicates with the robotic device via Bluetooth. The data generated during the training are forwarded to the backend web portal that is used by therapists involved in the telerehabilitation. The portal also serves for defining rehabilitation programmes and for reporting of the rehabilitation progress and success.

CONCLUSION:
The telerehabilitation service for home rehabilitation developed within the REHA2030 project is based on the technological solution consisting of a rehabilitation device, user interface device and the web-based portal for therapists. It enables rehabilitation planning, practicing, and reporting of the results. It still needs to be evaluated by the rehabilitation professionals and the users.

Service model REHA2030 – for post-hospital tele-rehabilitation of stroke patients

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BACKGROUND:
The aim of the REHA2030 project is to develop a therapy device and a service model (SM) for post-hospital tele-reha of stroke patients.

MATERIALS AND METHODS:
The development of the SM is carried out according to the design thinking approach. The needs of relevant target groups of tele-reha (patients, therapists, doctors, insurances, SMEs) and constant feedback of these with the developer are the focus of this process. Based on an initial problem definition, the needs of the target groups were determined in personal interviews. Based on this, ideas were generated and combined into a first overall solution for a SM. The prototyping was done with a Service Blueprint (SB): it's a descriptive procedure for visualising services and combines both the customer's and the provider's view of the service. The SB was tested through focus group workshops in Austria and Slovenia with a total of 20 participants from all relevant target groups. The SM was evaluated in the workshops, open questions were raised, also ideas for solving these questions were generated.

RESULTS:
An evaluated SM for tele-reha in the form of a Service Blueprint. It includes questions that still need to be clarified (data transfer of sensitive personal data, financing, the provider role of the service). These problems will be worked on in a further design-thinking cycle. By involving relevant target groups through interviews and workshops, their expertise was used in a targeted way and they were also sensitised to tele-reha.

CONCLUSION:
The developed Service Model is applicable in Austria and Slovenia. For the final implementation open questions still have to be clarified. Both the Designing Thinking approach and the Service Blueprint have proven to be very useful for development, visualization and communication.

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A simulation model for analysing the effects of external assistance and perturbations during gait

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BACKGROUND:
In human gait rehabilitation, almost any intervention can be seen as a set of external forces and torques acting upon the human body. In rehabilitation device development it is crucial that the effect of applying forces on the human body be understood and that the normal response of the user to this intervention be predicted. To ensure safety and assist with rapid development a simulation model can be employed [1].

MATERIALS AND METHODS:
A 2D simulation model of human bipedal walking consisting of 10 rigid segments (a head-arms-trunk segment a pelvis, two thighs, shanks, feet and toes) and connected with revolute joints is presented. Interaction with the ground is modelled at the heel, the metatarsophalangeal joint and the toe tip. A gait pattern derived from measurements of human walking was used as a basis to drive the biped. A rules-based closed loop controller is used to stabilise its gait. An external force can be applied to the biped at any time. Joint forces and torques necessary to maintain a stable gait can be observed through the model and contrasted with kinetics of normal gait. When a destabilising effect of an external force is too large, a genetic algorithm approach is used to find a new stable gait pattern.

RESULTS:
Several experiments using this simulation model were conducted. The effects of an assistive device for push off rehabilitation that is similar to a powered ankle foot orthosis were studied. The effects of a short force impulse on the pelvis, similar to ones used in perturbation training, were also studied.

CONCLUSION:
In both cases the forces and torques calculated by the simulation were in line with the authors' expectations and the relevant literature.

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Virtual versus real world in robot assisted therapy

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BACKGROUND:
A lot of new devices aim to extend the therapeutic facilities in neurorehabilitation. A benefit of advanced technology is the execution of goal-oriented, repetitive, interactive exercises. A promising opportunity for this purpose is the application of robotic devices, which are mainly used in virtual environment but sometimes with real objects. The aim of this overview is to evaluate the two types of robot-mediated therapy.

MATERIALS AND METHODS:
Evaluation of existing techniques was based on the following aspects: type of training, range of movement, muscle tone, sensory quality, moving virtual or real objects, variety of the exercises, size of the devices, workspace-requirement, grasping an object, impact for cognitive function, motivation.

RESULTS:
Common features of both types: tailored settings of movement, speed and task level. Both types can be used with Computerized Interactive Rehabilitation Exercises (CIRE) that are able to give feedback to the patient and to the specialist. Differences of the two methods: determined minimum muscle strength, tactile sensation, intensity of feed-back, motivation, daily self-care activities.

CONCLUSION:
To find the perfect type of device first of all the patients' actual stage has to be categorized. There's no good or bad type of devices. Only the capabilities of the patient are able to show the perfect device. The quality of life and activities of daily living are influenced by the responsible decisions of the specialists.

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Development and a preliminary efficacy study of Lateral Transfer Assist Robot (LTAR): effects on lower limb muscle activity during transferring

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BACKGROUND:
Wheelchair (WC) users need effective transfer skills for independent living. However, WC transfers are difficult to master. Many factors increase the difficulty of a WC transfer, such as difference in height and distance between the WC seat and other surfaces, presence of wheels and the arm support on the side of transfer, and seat inclination. To solve these problems, we are developing a Lateral Transfer Assist Robot (LTAR) to move a user laterally without standing. In the present study, we describe the development of the LTAR then compare the amount of lower limb muscle activity during a transfer task between the LTAR and a standard WC in older persons.

MATERIALS AND METHODS:
Twenty-four older persons participated. Mean age (SD) was 75.2 (4.9) years. All participants were asked to perform transfers between LTAR/WC and a treatment table. The primary outcome was signal amplitude of surface electromyography (sEMG) in lower limb muscles. The sEMG electrodes were placed over three muscles in both lower limbs: rectus femoris (RF), tibialis anterior (TA), and medial gastrocnemius (MG). All data were normalized by each maximum muscle activity. Paired t-test was used to analyze the differences between the two transfer methods.

RESULTS:
The sEMG activity of the RF on the opposite side of the transfer direction was significantly lower in the LTAR transfers compared to the WC transfers ($p<.05$). In addition, regardless of the direction of transfer, the sEMGs of the TA and the MG in both limbs were significantly lower in the LTAR transfers compared to the WC transfers ($p<0.05$).

CONCLUSION:
The results suggest that the LTAR is a useful mobility device which requires less muscle activity in both lower limbs during transfers.

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A framework for investigating recovery after stroke

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Better treatment for people living with the consequences of stroke will only come about through scientifically motivated strategies developed within rational frameworks. To that end, I will describe a framework for understanding how to investigate stroke recovery. Behavioural training approaches (combinations of INPUTS) map onto desired behavioural outcomes (combinations of OUTPUTS). This INPUT-OUTPUT mapping is likely to be modulated by patient-specific factors or STATES (including clinical, neurophysiological and brain structure/function). I will illustrate this framework with data from our upper limb neurorehabilitation programme. The results will allow us to understand different treatment approaches via their influence on a range of OUTPUTS. This work will transform stroke neurorehabilitation into an evidence-based practice where clinicians will have a clear rationale for providing individualised and optimised neurorehabilitation treatments to help each patient achieve their maximum recovery potential and personal rehabilitation goals.

Ageing

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BACKGROUND:
The ageing of the global population is accompanied by an epidemiological transition from infectious and communicable diseases to a growing burden of chronic diseases. Health status in older persons is determined by the complex interaction of multiple factors (multiple chronic diseases, psychological, social, and environmental factors), that is not captured by traditional paradigms based on the concept of standalone diseases.

MATERIALS AND METHODS:
In this presentation a new framework of healthy ageing proposed by the World Health Organization (WHO) is presented and discussed.

RESULTS:
Over the past few years, the WHO has launched several initiatives for modifying the clinical approach to older persons in order to promote a more holistic vision of the individual, promote the personalization of care, facilitate the integration of systems, and reduce the widespread ageism. In particular, a novel framework for healthy ageing (i.e., the process of developing and maintaining the functional ability that enables wellbeing in older age) based on the concepts of functional ability (i.e., the health-related attributes that enable people to be and to do what they have reason to value) and intrinsic capacity (i.e., the composite of all the physical and mental capacities of an individual) has been proposed.

CONCLUSIONS:
The routine assessment of biological age through constructs such as intrinsic capacity allows a better understanding of the functional trajectories and vulnerabilities of the individual, supporting the modernization of healthcare systems.

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Stroke rehabilitation challenges in the Slovenian-Austrian region: novel telerehabilitation approaches to enhance service provision

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BACKGROUND:
Demographic change causes a continuously growing share of older people, an increasing urbanization and as a result of that, a depopulation in rural areas with challenges in mobility services, fast internet and adequate health care services [1]. This can lead to supply difficulties and latencies in rehabilitation what is especially problematic as repetition is a crucial factor for successful rehabilitation [2]. The project REHA2030 addresses these challenges by developing a service model and a technology platform for telerehabilitation at home.

MATERIALS AND METHODS:
The development within the project is based on a User Centered Design approach, where relevant stakeholders are involved in all phases of the project. Complementary to that, literature research was carried out to show the current state of (stroke) rehabilitation in Austria and Slovenia.

RESULTS:
Collaboratively designed Personas and REHA-stories demonstrate the (tele-) rehabilitation paths in both regions. Based on that, a service model for (tele-) rehabilitation that supports the current and potential future rehabilitation paths were derived and a modular and interoperable technology platform to facilitate multidisciplinary (tele-) therapy developed.

CONCLUSION:
Differences between Austria and Slovenia in terms of the rehabilitation paths lead to challenges in the development of the service model. The practicability and applicability of the technical prototype to smoothly support the service model will be evaluated in a real-life trial in both regions.

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Early edaravone use in acute ischemic stroke patients: the resurgence of an old promise?

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BACKGROUND:
Neuroprotective agentes for acute ischemic stroke (AIS) have been under investigation for decades. In 1988 was conducted a RCT in Japan with promising results. Edaravone is an antioxidant and hydroxyl radical scavenger and the only neuroprotective agent approved for clinical settings. In some countries, like Japan, this agent is used in nearly half of ischemic stroke patients in the acute phase. However, despite multiple examples of highly beneficial effects, some trials have been carried out under circumstances and protocols different from those currently used, namely reperfusion therapies. This review aims to sumarize the published literature about the use of edaravone in the acute treatment phase of ischemic stroke patients.

MATERIALS AND METHODS:
We made a litherature review in the follow databases: Medline (via PubMed), ISI Web of Science and CENTRAL. We included 9 RCT's published in the last 10 years.

RESULTS:
Most of the studies evaluated concluded that in patients treated with edaravone, the degree of neurological impairment was significantly reduced, with a more significant reduction in the NIHSS score and better improvement of functional independence at hospital discharge in the intervention group. The profile of adverse reactions between the group treated with edaravone and the control group, in the studies that were evaluated, had no statistically significant diferences.

CONCLUSION:
Several clinical trials have been conducted in order to evaluate the efficacy and safety of edaravone for AIS. The majority of these trials concluded that edaravone had positive effects on functional outcomes and neurological recovery in all stroke subtypes, although the difference had limited clinical significance.

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Urinary incontinence and lower urinary tract symptoms in patients after stroke during subacute rehabilitation

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BACKGROUND:
Urinary incontinence (UI) is defined as unintentional loss of urine. UI after stroke may trigger social isolation, depression, and decreased quality of life. Types of UI include stress, urge, overflow and functional incontinence [1]. Lower urinary tract symptoms (LUTS) reported by patients can include obstructive or irritative symptoms [2]. The aim of this study was to determine types of UI and LUTS in patients after stroke during rehabilitation.

MATERIALS AND METHODS:
This prospective study investigated 74 patients with UI after first ischemic or hemorrhagic stroke admitted to a postacute inpatient rehabilitation program at the University Rehabilitation Institute, Republic of Slovenia. Data about sociodemographic factors, LUTS and type of UI were collected. Descriptive statistics was used to present the data.

RESULTS:
The most common type of UI was impaired awareness (67.6%), followed by functional (41.9%), urgent (20.3%), stress (9.5%) and overflow (1.4%). A combination of different types of UI was present in 83.8%. Only 44 patients were able to report their LUTS (43.2% reported nocturia, 34.1% urge incontinence, 27.3% urgency, 11.4% frequency and 9.1% obstructive symptoms).

CONCLUSION:
UI with impaired awareness of the need to void and functional UI were the commonest types of UI and irritative LUTS were mostly present during inpatient rehabilitation after stroke. It is important to recognize the correct type of UI and LUTS, as patients with impaired awareness UI might benefit from early awareness training and for patients with functional UI, we should provide sufficient toileting assistance and reduce environmental barriers to toileting.

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Long-term functional electrical stimulation in spastic stroke patients

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BACKGROUND:
The FES effects on muscle tone reduction are still unclear, though some studies indicated a decrease in spasticity after treatment with FES. The aim of the study was to determine how much FES was prescribed for long term home use to decrease spasticity in our stroke rehabilitation department.

MATERIALS AND METHODS:
A retrospective review of medical documentation in post-stroke patients to whom the singe channel FES devices were prescribed for home use from 1.1.2009 to 31.12.2019 was performed.

RESULTS:
FES device was prescribed for home use to 402 patients in years 2009-2019, an average 36.5 stimulators per year (SD 13.6, range 22–65). Two hundred and six patients (51.2%) used FES on the paretic upper extremity, 184 (45.8%) on the hemiparetic upper and lower limb and only 12 patients (3%) on lower limb alone. Ninety-one patients (22.6 %) used FES for more than a year (avg. 1.5 years, SD 1.69, range 1-11 years). Among these FES was used to reduce muscle tone of the affected upper extremity in combination with injections of botulinum toxin (BTx) in 53 patients (58.3%).

CONCLUSION:
In the observing period of 11 years a significant share of patients used FES at home for years, especially these who used FES to reduce tone in spastic muscles of the affected upper limb. According to this finding long-term use of FES in spastic stroke patients makes sense, especially combined with BTx injections, though the indication to decrease spasticity after stroke with FES is still controversial.

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Efficacy of mindfulness-based cognitive therapy in post-stroke rehabilitation

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BACKGROUND:
Stroke often causes life-long consequences for stroke survivors, it may produce deficits in motor, perceptual, emotional and cognitive functioning. It is important to understand which strategies could help for patients to support successful adjustment. The efficacy of mindfulness-based cognitive therapy (MBCT) in post-stroke rehabilitation has not been completely established [1,2].

MATERIALS AND METHODS:
The aim of this study is to evaluate the efficacy of group-based MBCT in comparison with treatment-as-usual (TAU) during inpatient stroke rehabilitation. Participants are randomly assigned either to MBCT+TAU or to TAU control group. The MBCT intervention consist of six weekly didactic sessions. Symptoms are assessed by self-report symptom maesures (BDI, STAI, FFMQ, MSPSS) and by examining changes in physical condition (FMA, FIM) and neurocognitive functioning (Pieron). Measures are completed at pre-treatment(T1), post-treatment(T2) and 3-month follow-up(T3).

RESULTS:
According to the plan the research is going to be conducted for one more year. Cross-sectional analysis of patients' baseline data up to till now shows that between men the anxiety is higher. Mindfulness and social support represent strong negative correlation with depression and anxiety. MBCT+TAU group shows significant improvement in state anxiety, mindfulness and some indicator of physical condition between T1 and T2 in comparison with the TAU control group.

CONCLUSION:
According to the results the MBCT intervention could offer positive emotional and physical effects on stroke rehabilitation.

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A qualitative exploration of barriers and facilitators to physical activity participation among a group of Turkish patients with stroke who are community-dwelling and physically inactive

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BACKGROUND:
To explore perceptions of patients with stroke who have been proven to be physically inactive via accelerometer about barriers and facilitators to physical activity participation.

MATERIALS AND METHODS:
The study employed an exploratory qualitative design. Purposive sampling (including patients with stroke who have been previously proven to be physically inactive via accelerometer in a previous study) was used to reveal barriers and facilitators to physical activity participation. Semi-structured, in-depth interviews were conducted with two focus groups including six and four patients with stroke. Interviews were audio-recorded and transcribed verbatim. Transcripts were analyzed using thematic analysis.

RESULTS:
The identified themes which provided information regarding barriers and facilitators to physical activity were as follows: (1) Individual factors (physical impairments, psychological factors, spirituality), (2) interaction with the family (attitudes of family members/close community) (3) social and environmental factors (hobbies, lack of or presence of facilities, the use of orthosis). Some of the themes were perceived as both a barrier and facilitator on individual level.

CONCLUSION:
To increase physical activity of patients with stroke who are community ambulatory but physically inactive, identification of perceived barriers and facilitators to physical activity participation is the most important first step. Stroke services and health care providers should address all of them to for a successful rehabilitation process.

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Perceived environmental barriers of people with spinal cord injury in Germany and their impact on quality of life

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BACKGROUND:
For people with SCI, mostly data on diagnostic or therapeutic interventions have been available to date. By collecting data in 22 countries InSCI aims to develop recommendations for action for decision-makers and health care (Gross-Hemmi et al. 2017). One of the aims was to ascertain perceived environmental barriers and their influence on participation.

MATERIALS AND METHODS:
The German Spinal Cord Injury Survey (GerSCI) was conducted as part of InSCI. In 2017, patients (n=5,598) received a 22-page questionnaire.

RESULTS:
The data sets of 1,479 participants were included in the analysis. The four most prominent perceived environmental barriers were lack of accessibility in private homes, climat and a lack of accessibility in public spaces and public transport. More than half of the respondents experienced these barriers. Results show a negative correlation between an increasing number of perceived barriers and a decreasing quality of life.

CONCLUSION:
It became clear that a lack of accessibility in both private and public spaces as well as insufficiently barrier-free public transport make life difficult for people with SCI in Germany. Since these barriers affecting accessibility are usually modifiable, political commitment should start here in particular.

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Quality of life in Slovenian patients with slowly progressive neuromuscular disease

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BACKGROUND:
Slowly progressive neuromuscular diseases (NMDs) involve a progressive loss of physical condition, ranging from difficulty walking long distances to a total inability to perform essential activities of daily living (e.g., walking, eating, body washing). Since therapeutic options are limited for NMD patients, long-term preservation of health-related quality of life (HRQL) is one of the main goals of medical care. Since generic HRQL questionnaires are unable to differentiate the wide range of HRQL levels among slowly progressive NMD patients, the use of specific questionnaire could be better. The purpose of the study was to assess HRQL in Slovenian patients with slowly progressive NMDs.

MATERIALS AND METHODS:
We assessed 98 patients (65 women) with slowly progressive NMDs with generic (Short form-36, SF-36) and specific (Quality of Life Questionnaire for slowly progressive neuromuscular disease, QoL–NMD).

RESULTS:
Patients had 5 different slowly progressive NMDs; 51 were able to walk without help or medical device, 24 were using wheelchair. HRQL was lower than in general population. Correlations of both questionnaires were medium to high. On the scale of physical symptoms, on average, patients who walk with a device had the lowest results, and those who were unable to walk had the highest scores. Also on the scale of physical self-perception, patients walking with a device had the lowest scores on average; the highest were from those who walk independently. On the scale of movement and participation, on average, patients who were unable to walk had the lowest scores, while those who walked independently had the highest scores.

CONCLUSION:
We can conclude that the QoL-NMD and SF-36 questionnaires measure similar constructs but not identical ones. Patients had more to say about the quality of their environment, their social relationships and their psychological state than about their physical symptoms.

Which components of physical fitness affect the quality of life of adults with intellectual disabilities: a mixed methods study

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BACKGROUND:
The growing demand for a holistic approach in the multidimensional rehabilitation in the ageing physically inactive adult population with intellectual disabilities (ID) requires an innovative research approach [1]. By applying the sequential explanatory mixed methods research design [2], this study aimed to investigate which components of physical fitness (PF) affect the quality of life (QoL) of adults with ID included in the three different programs of the Special Olympics.

MATERIALS AND METHODS:
A stratified random sample of 150 physically inactive adults with ID (20% cerebral paralysis, 20% Down syndrome, 20% disorder of autistic spectrum, 20% Prader Willy syndrome, 20% others) were selected and randomly classified into Fun Fitness plus (N=50), Wellness (N=50) and control group (N=50). A double-blinded randomized controlled trial with pre-post-test measurement and follow up interviews were implemented during four months. Sequentially, multiple regression analysis and thematic analysis were used for data analysis.

RESULTS:
Muscular strength, flexibility, static and dynamic balance, and aerobic fitness are statistically significantly associated with the QoL of people with ID involved in various Special Olympics programs of physical activity ($R2=54\%$, $p<0.001$). The main themes and subthemes revealed in the qualitative part of the study supported and explained the quantitative findings.

CONCLUSION:
By using mixed-design methods, we have acquired a new dimension of the cause-and-effect relationship between the effectiveness of Fun Fitness plus program on improved physical fitness and QoL.

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Web-based adaptation training has a positive influence on subjective well-being – preliminary results

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BACKGROUND:
Adaptation training (AT) is developed in Finland to help people adjust to the life changes brought by an illness or impairment [1]. During the AT courses participants get information about their diagnosis, peer support, and help with how to manage daily activities. Web-based AT has increased during last years, and more information is needed about its effects and functionality. Ten Finnish health associations developed and performed in collaboration 12 thematic web-based AT courses with 4 different themes. All courses included 6–8 weekly web-based 2-hour meetings, with follow-up meeting at 5 months from the beginning. This study sought to investigate the influence of the web-based AT on subjective well-being, self-esteem, and reaching of personal goals.

MATERIALS AND METHODS:
The subjects (N = 44, age mean = 47,1 years) were mostly women (n = 39). Subjective well-being was measured with PROMIS-scales (Global health, Anxiety, Depression, Sleep disturbance) and Rosenberg self-esteem scale (RSES). Goal Attainment Scaling (GAS) was used to follow the reaching of personal goals. All scales were filled at the beginning (baseline) and end of the course (at 2 months), and at 5 months.

RESULTS:
On average, the subjects reached the target level of their personal goals (GAS T-value mean = 49,7, n = 26). The subjects assessed their well-being (Global health, Anxiety, Depression) and self-esteem (RSES) to be better after the intervention (p-values <0.001–0.025, n = 37–39). There was no statistically significant difference between these two measurement points in Sleep disturbance (p = 0.094, n = 39). Over the follow-up period (2–5 months) there were no changes in mean scores of any of the measures.

CONCLUSION:
The results suggest that thematic web-based AT supports reaching of personal goals and may have a positive influence on participants self-esteem and overall well-being.

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The possible role of animal-assisted therapy in clinical recovery and improving quality of life

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BACKGROUND:
Any neuromusculoskeletal illness means a significant burden for the patient, including the deterioration in quality of life. Animal assisted therapy may be helpful in the rehabilitation process and in the treatment of patients to alleviate the phenomenon. Nevertheless, this solution has been widely acknowledged internationally, its pivotal role in patient recovery requires further recognition and reinforcement in Hungary.

MATERIALS AND METHODS:
From October 2018 till March 2020 in the framework of a randomized, controlled trial 116 patients of the South Pest Central Hospital were assigned to experimental (n=58) and control group (n=58). The control group participated in a conventional rehabilitation program, whereas the rehabilitation program of the experimental group was complemented by a 45-minute-long dog assisted therapy a week, throughout a 3-week period. The patients were evaluated by using the Functional Independence Measure (FIM), short form Beck Depression Inventory (BDI), State-Trait Anxiety Inventory (STAI), Illness Intrusiveness Ratings Scale (IIRS), Visual Analog Scale for pain (VAS) and the WHO-5 Well-being Index (WHO-5).

RESULTS:
Our results confirm that both the control group and the intervention group showed statistically significant improvements in all outcome measures, but the sessions with the therapeutic dog had a significantly greater positive impact on patients' state anxiety, pain and quality of life, while their motivation to complete the program was further strengthened. Additionally, according to our observations animal assisted therapies may be adequately included in the rehabilitation program of patients enhancing the impact of other treatments.

CONCLUSION:
Animal assisted therapy as complementary therapy certainly has its place in the rehabilitation program and it is proposed that consideration should be given to the application of the method on a larger scale in health care.

The effect of telerehabilitation on quality of life, anxiety and depression levels in children with cystic fibrosis and their caregivers

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BACKGROUND:
Cystic fibrosis is a disease that shortens the life span and directly affects the quality of life. Exercise programs have become one of the focal points of CF physiotherapy. It is aimed to examine the effect of telerehabilitation on the quality of life, anxiety and depression levels of children with CF who have to stay at home due to the pandemic and to show that telerehabilitation is a usable and effective way to exercise from home.

MATERIALS AND METHODS:
A total of 30 patients were recruited. 15 of the patients were randomly distributed to the exercise group and 15 to the control group with the help of a computer-generated list. The exercise program was applied twice a week via Zoom for 8 weeks. A total of 4 questionnaires to be applied to patients before and after video telerehabilitation Cystic Fibrosis Revised Questionnaire (CFQ-R, Children's Anxiety and Depression Scale-Revised (CADS-Y), State - Trait Anxiety Inventory (STAI), Beck Depression Inventory (BDI) were used.

RESULTS:
A total of 28 patients and caregivers were included in the final analyses. The average age of the patients was 9.9 (SD 1.9) years and 9 (29%) of them were male. The average age of the caregivers was 37.0 years, 90% of them were women. The initial mean CADS-MDD score of the patients in the exercise group was 6.2 (SD 3.1), and this value decreased to 3.9 (SD 3.8) ($p<0.02$). A similar statistically significant change was observed with the decrease in the CADS-GAD score from the initial mean of 6.3 (SD 2.8) to 3.4 (SD 2.6) ($p<0.01$).

CONCLUSION:
Short-term telerehabilitation practices provided significant improvement in the anxiety scores of patients with CF.

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The development of a patient decision aid for upper limb prostheses: a co-creation process

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BACKGROUND:
The high rejection rate of upper limb (UL) prostheses emphasizes the importance of shared decision making to determine which prosthesis fits best the individual needs. Patient decision aids (PDAs) support patients to make an informed decision. This study aimed to systematically develop a digital PDA on UL prosthesis.

MATERIALS AND METHODS:
The developmental process was based on The International Patient Decision Aid Standards. We aimed at adults with major unilateral UL absence. A steering group with patients, clinicians, researchers, ICT and implementation experts was assembled. A qualitative literature meta-synthesis [1], focus groups with patients (n=11) [2] and clinicians (n=17), and a digital meeting with clinicians (n=26) were carried out to determine the patients' and clinicians' needs. Information on prosthetic features was systematically collected, ordered, and tested by clinicians. Subsequently, the PDA was drafted, alpha-tested, and improved based on feedback of clinicians, patients, and the steering group.

RESULTS:
The PDA provides information about seven prosthetic options: prostheses with accessories, cosmetic/passive hands, body-powered hooks and hands, myoelectric hooks, myoelectric hand with one or multiple grips. Based on the indicated preferences of a patient, a profile will be created. Within the PDA the patient and their next of kin can compare this profile with profiles of prosthetic options. A downloadable PDF summarizing the patient and prosthetic profiles is available for patients and clinicians. The PDA was integrated in the digital national prosthesis prescription protocol of the arm (PPP-Arm) [2].

CONCLUSION:
In a systematic co-creation process the digital PDA for UL prostheses was developed. The PDA assists persons with UL absence, their next of kin, and rehabilitation teams with shared decision making when choosing a prosthesis.

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An application of multivariate statistical process control for mixed-type data in prosthetic rehabilitation after lower-limb amputation.

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BACKGROUND:
Multivariate statistical process control (MVSPC) based on mixed-type data (MTD, i.e., when some variables are numeric and some categorical, which is common in health care) is a recent and little-known field. Several approaches have been suggested, including modifications of the Hotelling T2 statistic (which is the basis for MVSCP for numeric data) and approaches based on measuring distances between MTD-points (Gower distance, Euclidean distance) [1].

MATERIALS AND METHODS:
We tested nine methods for MVSCP – local and global Euclidean distance, local and global Gower distance, T2 using Gower distance with or without bootstrap, T2 using Gower distance with bootstrap based on PCA, and permutational implementations of global Gower distance and T2 using Gower distance. The methods were applied on a dataset on 100 patients after amputation who received a transtibial prosthesis at the University Rehabilitation Institute in Ljubljana. The data were gathered using team-based Prosthesis Fitting Protocol and included six nominal variables (e.g., sex and diagnosis), two ordinal (e.g., activity level) and three numeric variables (e.g., age and stump circumference). Out-of-control status was defined as the patient returning to our outpatient clinic because of problems with the prosthesis within one year. Data from 50 patients were used as the training set (phase I); the other 50 patients' data were used for evaluation (phase II). The results were assessed by comparing statistical-method-based and actual in-control status using ROC curves.

RESULTS:
All the methods yielded above-chance agreement with the actual in- or out-of-control status. Local Euclidean distance and local Gower distance had the highest classification accuracy and Cohen kappa values.

CONCLUSION:
The proposed methods proved to be useful and hold a potential for introduction into routine work in the field of prosthetic rehabilitation.

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Falls as an important indicator of health-care quality in patients after amputation

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BACKGROUND:
Patients after lower limb amputation tend to fall more often during all phases of rehabilitation than healthy people. The risk of a fall is increased by increasing the number of risk factors. It is very important to educate patients after amputation and to raise awareness about the dangers of falling in the home environment. We wanted to reduce the number of falls in the ward by educating patients about the causes of falls and their prevention. Our study aimed at finding out to what extent does the education of people after lower limb amputation affect the incidence of falls in the hospital and home environment, and which are the main risk factors for falls among those people.

MATERIALS AND METHODS:
The study included patients after lower limb amputation who were admitted to inpatient rehabilitation in 2016. They were divided into two groups. The patients in the test group took part in a 30-minute education about fall prevention once during their hospital stay; the patients in the control group did not take part in such education. Six months after discharge we called the patients at their home and gathered the desired information. The collected data were analysed using descriptive statistics and univariate statistical tests. The association of the occurrence of falls and other patient characteristics were checked with univariat statistical tests (Fisher's exact test for the occurrence of falls, exact format of the test and Mann Whitneja or koelracijskim Spearman coefficient for the number of falls).

RESULTS:
The study included 279 patients. In the test group, who participated in the training was included 127 patients, 83 patients were included in the control group. During hospital stay, 20 patients (9.9 %) had a fall. There was no statistically significant difference between the groups in the incidence of falls before, during or after hospital stay. Before and after hospital stay, the patients who had had a single limb amputated or were admitted to inpatient rehabilitation after the first amputation experienced falls more often. There is a very weak but statistically significant association between falls in the rehabilitation hospital and patient's age and his/her cognitive abilities (as assessed by the MoCA test). Gender was not associated with the incidence of falls before, during or after hospital stay.

CONCLUSION:
The education on fall prevention did not affect the incidence of falls in the hospital or in the home environment. Age, single lower-limb amputation and cognitive decline are risk factors for falls. It seems sensible to adapt and continue the fall-prevention education programme.

The Walking Ability Scale for lower-limb prosthesis users

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BACKGROUND:
Many people with disabilities have walking problems and use different walking aids to improve their walking ability. In spite of that, no validated tool exists to assess what walking aid lower-limb prosthesis users (LLPU) need on different terrains. Therefore, the purpose of this study was to develop and validate a Walking Aid Scale (WAS) in a cross-sectional sample of LLPU.

MATERIALS AND METHODS:
We included 144 LLPU who visited our clinic and were willing to participate. They filled in WAS, the validated Slovene version of Prosthetic Mobility Questionnaire 2.0 (PMQ 2.0) [1] and Activities-Specific Balance Confidence Scale (ABC-5) [2]. They also performed a 6-Minute Walk Test (6MWT). The WAS is a tool developed for quantifying the need for walking aids in four activities of increasing difficulty (walking indoors; walking on sidewalk and streets; walking up and down a steep hill; walking for up to 2h). Participants were asked to score the use of walking aids during each of the four activities on a five-level ordinal scale from 0 no walking aids to 4 unable to perform the activity.

RESULTS:
The WAS showed a Cronbach's alpha of 0.83, and significant moderate-to-good correlations with PMQ 2.0 (r=-0.72) and ABC-5 (r=-0.81) and also with 6MWT (r=-0.79) and age (r=0.61), i.e. participants who relied less on walking aids reported higher mobility levels and greater balance confidence, walked longer distances, and were younger.

CONCLUSION:
WAS is a valid instrument for assessing the use of walking aids in activities of increasing difficulty, and a good independent predictor of walking distance in LLPU. Further studies are needed to corroborate our results and assess the WAS performance in people with other walking disabilities.

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Automated process of making custom-made insoles

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BACKGROUND:
Orthopedic insoles are widely used in the treatment of various foot conditions. They relieve high load areas, support foot structures, prevent unwanted movements and generally promote propulsion. Current problem is the limitations in the production of a custom product. The classic production of insoles using plaster molds is a time-consuming and skill requiring process. A product made this way is expensive and the repeatability of its precise production is questionable.

MATERIALS AND METHODS:
Modern production systems are mainly based on CAD/CAM. Although more advanced than the classic ones, this procedure still requires the presence of a professional during all activities of the procedure. As such, it does not allow for mass and fast production and is still expensive. Given the above, our practical solution is affordable, easy to maintain and manage, allowing the user to conduct scan the feet surface, start the production process and within a short time get a pair of custom made insoles ready for use.

RESULTS:
Once the procedure is completed, the user easily separates the finished ready-to-use pair of insoles from the material block. In addition, its modular concept allows particular assembly units to be physically separated and put at different locations.

CONCLUSION:
Through the IPASIOU project, such automated system for the production of custom insoles has been successfully realized. The system includes a digitizing device and a specially designed CNC machine, which, with the accompanying software, enables the production of insoles extremely quickly. With its unique characteristics it represents a step forward towards those currently present in practice.

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Robot-assisted arm training after stroke: insights from the RATULS study

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BACKGROUND:
What does the future hold for robots in arm rehabilitation after stroke? The Robot Assisted Training for the Upper Limb After Stroke (RATULS) study is the largest randomised controlled study of its kind to date, comparing three intervention groups involving a total of 770 participants. This workshop, delivered by Hermano Igo Krebs (RATULS robot-assisted arm training lead) and Frederike van Wijck (RATULS enhanced upper limb therapy programme lead) will begin with an overview of the RATULS study, focussing on the principles, processes, content and dose of the study interventions. The main part of the workshop will comprise an interpretation of the findings and a discussion on insights gleaned from this study. In addition to its methodological strengths and limitations, the discussion will focus on factors that may help or hinder the process of 'transfer' (or 'carry over') from repetitive task training interventions into functional activities that are meaningful for people with stroke. Implications for practice as well as for desiging future trials involving robot-assisted training will be discussed.

AIMS:
- Explain the background to and rationale for, describe intervention protocols (rationale, principles, processes) of both RT and EULT and summarise the main findings from the RATULS study
- Interpret findings (RT, EULT), with a focus on the concept of 'transfer'
- Discuss insights gleaned, including: methodological strengths and weaknesses, factors contributing to 'transfer'
- Discuss implications for practice and designing future research on robot-assisted rehabilitation (consider SRRRT recommendations for designing future studies)

Reliability of stabilometry according to the modified clinical test of sensory interaction and balance and differences between age groups

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BACKGROUND:
Modified clinical test of sensory interaction and balance (mCTSIB) was developed for balance systems' assessment. Stabilometry is a valid measure of static balance which describes movements of the centre of pressure (CoP) while standing on a force plate.

MATERIALS AND METHODS:
60 healthy participants of four adult age groups (15 subjects each) were included. Participants of the first two age groups were assessed twice with a one-week interval, and participants of the third and fourth age groups were assessed once. The mCTSIB protocol was adapted for stabilometry, performed on a force plate (prototype of Equio, Kinestica, Slovenia). Intraclass correlation coefficient (ICC 3, k), ANOVA and post hoc independent sample t-tests with Bonferroni correction were calculated.

RESULTS:
Intratester reliability for the mCTSIB in 2-leg stance under all conditions was good to excellent (ICC 0.79-0.95). For tandem stance, the reliability was good in firm surface with eyes open (FSEO) condition (ICC 0.82-0.87), moderate to good when eyes were closed (FSEC) (ICC 0.68-0.79), and poor to moderate in both compliant surface conditions (CSEO, CSEC) (ICC 0.50-0.73). For 1-leg stance, the reliability was good to excellent in FSEO (ICC 0.78-0.97), moderate to good in FCEC and CSEO (ICC 0.55-0.83) and poor to good in CSEC condition (ICC 0.39-0.82). In each test position, the stance time decreased with increased age and aggravation of test conditions. With aging, CoP velocity, and ML and AP CoP movement changed the most.

CONCLUSION:
Stabilometry according to the mCTSIB protocol is reliable in healthy participants, aged from 20 to 49 years. Reliability decreases with aggravation of the test conditions and positions. MCTSIB in 2-leg stance is undemanding for young people. Tandem stance is feasible for 20-79 years old, but in 1-leg stance only FCEC condition is feasible for 50–79 years old. Additional studies with the mCTSIB protocol and larger sample size are needed.

Early balance training may accelerate the motor learning process of trans-tibial prosthesis users

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BACKGROUND:
People after unilateral trans-tibial amputation eligible for their first prosthesis often face with major balance [1] and gait problems at the beginning of the rehabilitation. The hypothesis was that balance training with visual feedback may speed up the motor learning process.

MATERIALS AND METHODS:
A protocol for weight shifting with visual feedback was designed for 2 groups of trans-tibial amputees. The experimental group (10 participants) was training balance and weight shifting for 14 days using a Nintendo Wii balance board with self-developed software. Both groups (the control group with 10 participants) received the conventional physiotherapy without balance training. Their balance was objectively evaluated by measuring center of pressure (COP) and clinical tests, L-Test and 10 m walk test (10-MWT) were carried out before and after the protocol.

RESULTS:
We found a significant improvement of COP control in quiet standing and promising outcomes of 10-MWT and L-Test clinical measures. 10-MWT demonstrated improvement in both groups.

CONCLUSION:
Our findings are in line with the published results [2], demonstrating the importance of targeted motor learning techniques for faster learning process and effective use of prostheses in rehabilitation.

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The effect of balance training program on postural stability in children with dyslexia

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BACKGROUND:
Dyslexia is a common disease, characterized by difficulties in recognition of words, spelling, and decoding. There is also apparent evidence of deteriorated balance in children with dyslexia.

MATERIALS AND METHODS:
Siixteen children (aged between 8-11) with clinical dyslexia and sixteen healthy childrens were included in the study. The dyslexia group were given 45 minutes of balance-coordination exercises twice a week and 20 minutes of balance training on the NeuroCom Balance Master® device once a week for six weeks. The static and dynamic balance were tested with the Modified Clinical Test of Sensory Interaction on Balance (mCTSIB) and Limits of Stability (LOS) tests, whereas reading performance with a standard text and quality of life with the Pediatric Quality of Life Inventory Scale (PedsQL).

RESULTS:
Postural sway velocities on the firm and foam surfaces with eyes opened and closed conditions of mCTSIB, the reaction time in all directions of LOS were found to be higher, whereas movement time, endpoint excursion, and maximum excursion in anterior and posterior directions of LOS, number of correct and total words were lower in the dyslexia group compared to the control group. All four conditions of the postural sway velocities were decreased, and movement time, endpoint excursion, and maximum excursion in anterior and posterior directions of LOS, the number of correct and total words, social, school and total scores of PedsQL increased in the dyslexia group after the treatment.

CONCLUSION:
The children with dyslexia have distinct alterations in static and dynamic balance compared to their peers. These alterations, along with their reading performance and quality of life, have shown to be greatly improved after a scheduled exercise program.

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Integration of HMD-based immersive virtual reality in a Lokomat gait rehabilitation robot

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BACKGROUND:
Recently, Immersive Virtual Reality (IVR) technologies, especially Head Mounted Displays, have evolved to affordable user-friendly consumer products and have potential to motivate and instruct patients in relearning movements in (neuro-)rehabilitation. Apart from increasing motivation, IVR may enhance training effectivity by creating a realistic, integrated environment that can be modulated to needs to elicit specific targeted, personalized training effects [1,2].

MATERIALS AND METHODS:
Immersion increases e.g., when visual flow during treadmill walking is consistent with the actual speed of walking as perceived through proprioception. A controlled gait environment, such as a gait rehabilitation robot, may be an excellent tool to create an immersive environment when connected to a Head Mounted Display [3].
In the DIH-Hero project "Loko-VR", Hocoma AG teamed up with SneakyBox, focusing on immersive application development, in order to introduce IVR into Hocoma's Lokomat®, that supports the patients' legs robotically during BWSTT. The goal is to create an integrated training environment, where both robotic interaction features and the virtual environment created on a HMD, are mutually coupled.

RESULTS:
The project has started in April 2021.

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Implementation of robotics in rehabilitation: does it make sense?

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INTRODUCTION:
Rehabilitation robots are mainly used for improving functions post stroke. During the past two decades the acute stroke treatment made progress due to thrombolysis and thrombectomy, but the number of people requiring rehabilitation post stroke is still high. So as to improve rehabilitation facilities, application of robotics is a spreading method. But can this technology fulfil our expectations?

METHODS:
S.W.O.T (Strengths, Weaknesses, Opportunities, Threats) analysis of present application of rehabilitation robots was made from the aspect of the health care provider.

RESULTS:
The main Strengths of use of rehabilitation robots were the interactivity, the high repetition number, the individualized therapy, the good motivation of the patient, the improvement of different functions, the combinations of the devices. As for Weaknesses the high price (unsatisfactory cost/benefit ratio), the lack of complex devices (a set of robots is necessary so as to provide complex treatment). The results of the reviews [1,2] suggest that there are Opportunities to improve outcome of rehabilitation using this technology. Threats are based on the several open questions regarding rehabilitation robotics (indications, usage, comparing with additional traditional therapy). Nevertheless, due to the technical development risks can be overcome [3].

CONCLUSIONS: Rehabilitation of patients post stroke may benefit from the application of robots, but it would be reasonable, if these devices could provide more complex therapy so as to improve cost/benefit ratio. Additional traditional physiotherapy is still a competitive alternative this time. Nevertheless, new technologies are always expensive initially – author expects that rehabilitation robots will be more and more useful elements of rehabilitation.

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Dynamic balancing responses in unilateral transtibial amputees following perturbation in anteroposterior direction during slow treadmill walking

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BACKGROUND:
When persons with unilateral transtibial amputation are subjected to perturbation while walking moderately fast they use stepping strategy. However recent studies in persons without amputation showed that balance responses during perturbed walking depend greatly on speed of walking [1]. The aim of this study was to explore dynamic balance responses in persons with amputation after perturbations in anteroposterior direction during slow walking.

MATERIALS AND METHODS:
Fourteen subjects with unilateral transtibial amputation and nine persons without amputation participated were subjected to perturbations in forward and backward directions at the level of the pelvis while walking slowly. Averaged COM, COP, GRF and duration of in-stance and stepping periods were obtained and analysed for perturbations in anteroposterior direction and for unperturbed walking.

RESULTS:
If perturbation in forward or backward direction was delivered upon entering the stance phase on non-amputated side persons with transtibial amputation used similar in-stance balance strategies as persons without amputation. On the other hand, a complete lack of in-stance response was noticed when perturbations were delivered upon entering the stance phase with amputated leg. Instead, proper modulation of COP and GRF took place only when the nonamputated leg entered the ensuing stance.

CONCLUSION:
The results of this study show the importance of calf muscles for negotiating anteroposterior perturbations at the slow walking speed efficiently. Because dynamic balancing response after perturbation on the amputated side begins with a substantial delay stepping response is much less efficient compared to the in-stance response after perturbation on the nonamputated side.

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Perturbation-based gait training may require subject-specific approach: results of an exploratory study

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BACKGROUND:
Stroke may reduce abilities for dynamic balancing during walking, which may potentially lead to a fall after the unexpected push, slip or trip. Perturbation-based gait balance training (PGBT) is increasingly used to regain reactive dynamic balance abilities during post-stroke rehabilitation [1]. The objective of this exploratory study was to investigate balance strategies following direction-specific perturbations assessed before and after PGBT.

MATERIALS AND METHODS:
Five hemiparetic patients underwent fifteen PGBT sessions by responding to unexpected mechanical perturbations applied to pelvis with a Balance Assessment Robot for Treadmill walking (BART) [1]. Before and after PGBT patients were assessed with selected clinical tests and biomechanical measurements following forward, backward, inward and outward perturbations on BART.

RESULTS:
After PGBT clinical outcome measures showed improvements in all patients, while the assessed reactive balancing responses showed improvements mostly in backward and inward directions. The improvements following perturbations in forward and outward directions were subject specific.

CONCLUSION:
The results suggest that during PGBT the perturbation parameters should be modified for each patient individually according to their missing reactive balance capabilities by periodically observing the objective biomechanical measurements with a comparison of healthy normative. To overcome stroke-related reactive balance strategies future PGBT should be personalized by progressively adjusting perturbation intensity as well as frequency of perturbations in different directions [2].

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Who returns to work partially after mild traumatic brain injury?

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BACKGROUND:
A significant number of patients with mild traumatic brain injury (mTBI) have delayed return to work (RTW). In our cohort study, we investigated the characteristics of patients with mTBI who return to work partially.

MATERIALS AND METHODS:
113 prospectively collected patients with mTBI were evaluated in the TBI Outpatient Clinic during 2015-2018. We included 36 control patients with ankle fracture. All patients underwent a brain MRI at 3-17 days after the trauma. Symptoms were determined by Rivermead Post-Concussion Symptom Questionnaire (RPQ) one month after injury. Extracranial injuries were evaluated using Injury Severity Score (ISS). Partial and full RTW was continuously measured with one-day accuracy up to one year after injury.

RESULTS:
Median full RTW was 9.0 days (IQR 4-30) after mTBI and full RTW after one year was 98%, and for controls, 55.5 days (IQR 43-78) and 94%, respectively. 12 patients with mTBI (11%, median 38.5 days) and 13 control patients (36%, median 45.0 days) had a partial labor period. mTBI patients with a partial labour period were older (48 vs. 38 yo, p=0.009) and more likely to have intracranial lesions (75% vs. 29%, p<0.001) and extracranial injuries (median ISS 2.0 vs. 1.0, p=0.015) compared to those returned immediately to full-time work. They did not report more post-concussion symptoms (median RPQ 15.0 vs. 7.5, p=0.056).

CONCLUSION: Partial RTW after mTBI is probably multifactorial. Extracranial injuries and intracranial lesions delay RTW, but post-concussion symptoms and occupational factors, such as flexibility at the workplace most likely play a role. Partial RTW remains underinvestigated, although progressive RTW after mTBI may be beneficial. Further research is needed for more accurate RTW parameters.

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Possible factors influencing participation in working life for persons with spinal cord injury

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BACKGROUND:
For most of the people with physical impairments it ist still difficult to be and remain integrated into the labour market. For this reason, the status of occupational activity has been examined by the German Spinal Cord Injury Survey (GerSCI). The aim was to identify barriers and facilitators for labour market participation.

MATERIALS AND METHODS:
Cross-sectional explorative observational study. The GerSCI survey is the German part of the International Spinal Cord Injury Survey (InSCI). 1.479 persons with Spinal Cord Injury (SCI) aged 18 years and older were recruited at eight specialised SCI-centres in Germany.

RESULTS:
In a self-disclosure questionnaire, most of the participants show themselves as a professionally well-educated and highly motivated group. The majority of them aspired to gainful employment and considered themselves fit for work. Many changeable and non-changeable factors were found in the analysis, which showed high correlations with the return to work after acquired SCI.

CONCLUSION:
Education and pain seem to be the most critical factors and thereby possible approaches to increase the level of employment. Working is essential and highly relevant not only for earning money but also for self-confidence and social integration. Asking for the view of people with SCI contains great options for improving conditions. Living with acquired SCI has many dimensions in itself; support also should be multidimensional.

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Work participation after multimodal rehabilitation due to respiratory diseases: representative analyses using routine data of the German Pension Insurance

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BACKGROUND:
For persons with a rehabilitation due to a respiratory disease, it is needed to determine how well persons were able to participate in working life after rehabilitation, and what conditions determine this.

MATERIAL AND METHODS:
Included were all persons with medical rehabilitation in 2016 due to a diagnosis from chapter J of the ICD-10. The analyses were carried out for the sample and for the the two main diseases bronchial asthma and COPD. Work participation was operationalized both via a monthly status variable until 24 months after rehabilitation and as a rate of all employed persons at the 12 and 24 months follow up and in the three months before, respectively. To analyze the factors influencing work participation at 12 month follow up, multiple logistic regression models with stepwise inclusion were calculated.

RESULTS:
A total of 19,287 data sets were included (bronchial asthma: n = 9,108, 47%; COPD: n = 6,215, 32%). Patients were 53 years old on average, both genders were equally distributed. Mental and cardiovascular comorbidity was documented in 39 % and 38 % of the cases, respectively. Overall, patients with COPD had higher socio-medical risks before rehabilitation than asthma patients. Accordingly, only about half of the COPD patients remained in active employment, while about 80% of the asthma patients succeeded in this. The strongest predictors on work participation were the time of sick leave as well as income prior to rehabilitation.

CONCLUSION:
About two thirds of all persons with respiratory diseases are in stable employment after medical rehabilitation in Germany, with large differences between asthma bronchiale and COPD. In par-ticular, the absenteeism as well as the wage before rehabilitation determine this. The analysis provides representative data on occupational reintegration after medical rehabilitation due to a respiratory disease for the first time.

People with intellectual disabilities in the general labor market? A qualitative interview study from the perspective of parents

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BACKGROUND:
To fulfill the mandate of the UN-CRPD for the participation of persons with disabilities in working life, many federal programs aim to enable work in the first labor market for people with disabilities. Nevertheless, the transition to the first labor market succeeds only in isolated cases and many adolescents – especially with intellectual disabilities – move seamlessly from school to a sheltered workshop [1]. A key role in this process has their parents, who are confronted with the task of deciding in the best interests of their children. This qualitative study aims to explore the issues and motives that parents of children with intellectual disabilities face in the transition from school to work.

MATERIALS AND METHODS:
N=20 semi-structured interviews were conducted with parents of children with intellectual disabilities who are either currently in the process of making a career choice decision or whose career choice process has already been completed. The interviews (45-90 minutes) were analyzed using the method of qualitative content analysis.

RESULTS:
Results show that parents are ambivalent about their children working in the first labor market. They experience the decision-making process as a permanent field of tension in which there is the desire to enable the children to lead a self-determined life and to participate and the concern of a possible excessive demand and the uncertainty of the first labor market. While the parents feel very well informed about the services offered by the sheltered workshops, it is apparent that they have received less information about options for employment in the first labor market.

CONCLUSION:
The results can provide valuable implications for the work of federal programs and model projects, but also for career guidance to provide informative and addressable parental work.

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The effectiveness of rehabilitation interventions on the employment and functioning of people with intellectual disabilities: a systematic review

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BACKGROUND:
This systematic review analyzed the effectiveness of rehabilitation interventions on the employment and functioning, and the barriers to and facilitators of employment among people with intellectual disabilities (ID).

MATERIALS AND METHODS:
This was a quantitative and qualitative meta-analysis. The outcomes were employment, transition to the open labor market and functioning. The review included qualitative studies of employment barriers and facilitators. The population comprised people with ID aged 16–68 years. Peer-reviewed articles published in English between January 1990 and February 2019 were obtained from 14 databases.

RESULTS:
Ten quantitative, six qualitative studies, one multimethod study, and 21 case studies met the inclusion criteria. The quantitative studies showed that secondary education increases employment among people with ID when it includes work experience and personal support services. Supported employment also increased employment in the open labor market, which sheltered work did not. The barriers to employment were the use of sheltered work, discrimination in vocational experience, the use of class teaching, and deficient work experience while still at school. The facilitators of employment were one's own activity, the support of one's family, job coaching, a well-designed work environment, appreciation of one's work, support form one's employer and work organization, knowledge and experience of employment during secondary education.

CONCLUSION:
These results can be utilized in the development of rehabilitation, education, and the employment of people with ID, to allow them the opportunity to work in the open labor market.

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Guidelines for the employment of people with autism spectrum disorders

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BACKGROUND:
Adults with autism spectrum disorder (ASD) experience exclusion from the labor market. They lack the support to gain and maintain employment. A need for specific knowledge is developing among employment specialists and among employers.

MATERIALS AND METHODS:
The study included employed people with ASD, employers and employment specialists. Three semi-structured not standardized questionnaires for each target group were developed and the interviews were conducted. In the analysis mixed method design was used. The main categories, subcategories and codes were identified.

RESULTS:
The findings highlight the importance of knowing and understanding the characteristics of ASD and the employment needs. This knowledge is useful in the process of vocational guidance and in the workplace with the aim of achieving sustainable employment. Participants reported the benefits of the expert support, most notably: continuous and individualized support and adjustments; support in communicating; integrated multidisciplinary, multi-institutional treatment; focus on interests; gradual on-the-job training; working in a small group; and clearly and precisely defined tasks.

CONCLUSION:
Appropriate support and workplace adjustments can be essential for job retention, promotion and improvement in job performance and characteristics. Raising employer's awareness and knowledge and providing relevant information to management and coworkers is the key to sustainable employment. The role of the professionals, as a bridge between the person with ASD and the employer, is crucial. Active involvement of the person with ASD, particularly individual planning and empowerment can lead to successful work and social inclusion.

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Evaluation of vocational rehabilitation for 2018: satisfaction with the process of vocational rehabilitation and quality of life of service users

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BACKGROUND:
The evaluation of occupational rehabilitation (VR) for 2018 was conducted following the provisions of the Standards of Vocational Rehabilitation Services. The annual evaluation aims to systematically collect information on the operation, characteristics, trends, and outcomes of the program to improve the implementation of VR services. Among others, service users evaluate satisfaction with the VR process and assess the change in the quality of life (QoL) after completing the VR process.

MATERIALS AND METHODS:
Two questionnaires were used; one for the evaluation of satisfaction with the process of VR (designed by us) and the other for evaluation of (QoL) of service users (based on the model QOLIS [1]). The first one was completed by 393 and the second by 279 service users. The questionnaire was completed at the end of the VR process; completion was voluntary and anonymous; it took place from January to December 2018.

RESULTS:
The evaluation at the level of VR service users showed that almost all users are satisfied with the overall VR. High average satisfaction ratings with the content, participation and professionals in the VR process indicate user satisfaction with all indicators. They showed the highest satisfaction with the respectful and correct attitude of the professionals and the time they devoted to them or the availability during the VR. Service users have assessed that the process of VR has had a positive impact on their QoL. They believe that their employability and emotional well-being have increased the most and that their ability to self-determination has improved.

CONCLUSION:
The users of VR seem to be very satisfied with VR, which is also displayed through the positive impact that the process of VR has on their QoL.

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Audit on the use of benzodiazepines and Z-drug hypnotics (BZRA) in acquired brain injury (ABI) inpatients in a rehabilitation hospital

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BACKGROUND:
Use of BZRA interferes with neuronal plasticity and functional recovery in the ABI patients. They can cause cognitive impairment and impede recovery [1]. Our aim was assessment of the prevalence of prescribed BZRA, whether they were prescribed pre or post admission, and documentation of discontinuation, review or tapering plan.

MATERIALS AND METHODS:
A cross-sectional audit of all ABI inpatients at our hospital was undertaken against guidelines [2,3]. Data from MPAR (Medicines Prescriptions and Administration Record) was collected on a proforma and analysed manually.

RESULTS:
Seven out of 37 inpatients (19%) were either on a benzodiazepine or a Z hypnotic. Three (43%) of those prescribed were on regular Lorazepam, Diazepam and Clobazam respectively, of which two (29%) were commenced post-admission. Two (29%) patients were on regular Zopiclone and Zolpidem pre-admission. Two (29%) patients had Lorazepam commenced in the PRN section post-admission. One (14%) patient was continuing Zopiclone in the PRN section as per pre-admission prescription and one (14%) was prescribed PRN Zolpidem post-admission. Two patients (29%) had review dates documented. Hypnotic dose was weaned down for one (14%) and increased for another (14%) patient during admission.

CONCLUSION:
A moderate number of ABI patients were on BZRA. Documentation of review plan for these medicines can be improved. Prescriber education on these medicines and on non-pharmacological interventions will be enhanced and re-audited.

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Improvement of care for families of people after traumatic brain injury in Czech Republic

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BACKGROUND:

Our Department of Rehabilitation Medicine provides rehabilitation for people after traumatic brain injuries (TBI). We work not only with patients but also with family members who are sometimes more affected by long and exhausting care than patients themselves. We have heard about Family Needs Questionnaire (FNQ) which seemed to be very good tool for assessment of special needs of families

MATERIALS AND METHODS:

Getting the agreement for translation of the document we have done reverse translation to Czech language and tried to verify its comprehensibility in Czech families. We used a combination of qualitative data processing including 8 respondents' casuistics, as well as quantitative data processing using the categorial data analysis.

RESULTS:

Qualitative data were analysed from 8 families. Respondents were 6 women and 2 men, average age 61 years. Patients were 6 men and 2 women, average age 34 years. Functional Independence measures (FIM) scores of patients were between 19 and 118. Most of patients (5) had in cognitive domain modified dependence. Half of the respondents answered that the questions were easy for them. Difficult questions were determined by three people, but they were different. The needs asked were mostly evaluated as very important (48%) and important (32%).

CONCLUSION:

We hope that we can improve the care for people after TBI using FNQ. The synthesis of data analysis of FNQ offers the most important needs and the level of the fulfilment according to the respondents as well as suggestions for adjusting. The data are important for our plans concerning implementation of FNQ into everyday practice.

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Neurorehabilitation of multiple sclerosis in the British military

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BACKGROUND:
Multiple Sclerosis (MS) is a progressive neurological disorder, classically presenting in working age adults, including those in the Armed Forces. The Defence Medical Rehabilitation Centre (DMRC) Stanford Hall offers vocationally focused consultant-led multi-disciplinary team neuro-rehabilitation services for Service Personnel (SP) with acquired or progressive neurological conditions, including MS, with the goal to minimise disability, maximize independence and remain able to work, in line with National recommendations [1,2].

MATERIALS AND METHODS:
In 2017, and 2019, a service evaluation via retrospective notes review of electronic records was carried out of all SP admitted to DMRC with a diagnosis of MS. A telephone survey was performed with six UK Military medical centres during the first review in 2017 to explore awareness of DMRC services in Primary Care.

RESULTS:
Over the 11-year period, there were 26 patients with 39 admissions (24 with MS, two with Clinically Isolated Syndrome). 10 patients had a subtype diagnosis, nine were Relapsing Remitting MS and one was Primary Progressive. Four of those with RRMS developed Secondary Progressive MS. Time between first symptom and diagnosis varied (36.5 months, range 1- 185, ave. three symptomatic episodes), and a similar variation in time between diagnosis and referral to DMRC (24.4 months, range 1-124). Common presenting symptoms were paraesthesia, numbness and visual disturbance. Over 40% (11/26) remained in military service, 12-18 months post diagnosis.

CONCLUSION:
Not all SP with MS are being referred to DMRC, those who do have significant delays, potentially impacting on patient support, symptom management and occupational outcomes.

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[2] Wilkins D, et al. Neurological rehabilitation following heat illness in the UK Armed Forces. BMJ Mil Health Oct 2020

Alternative and augmentative communication for adults in Slovenia

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BACKGROUND:
Communication is an integral part of our daily lives, as humans are social beings. People who cannot use their voice due to illness, injury or similar, have a possibility to use technology instead. Until 2019, technology for alternative and augmented communication (AAC) was delivered to customers into permanent ownership, funded by the health insurance every four years. People with progressive diseases or the ones that improved their health status could not get replacement until the period of four years was over. Also, there was too little training for AAC technology use for users and their caregivers and thus technology abundance.

METHODS:
The members of team for AAC (a speech therapist, an occupational therapist, a specialist in PRM, a psychologist and an engineer), researched practices in foreign countries and held many meetings for improvement of our AAC practice.

RESULTS:
We proposed an advanced user-centered protocol for AAC prescription that enables better assessment within all members of the AAC team, more training with the device for the users and their caregivers (when needed) and most of all, the borrowing the AAC device, which must be tailored to each individual and his or her environment (wheelchair, other assistive technologies). We also included post-assessment to check the usage and appropriateness of the AAC device.

CONCLUSION:
The new AAC protocol has been practiced since October 2019 and we have expected positive outcome. However, with the COVID-19 situation, there were many limitations with production and delivery of the ordered AAC devices which caused delays of the devices to the users.

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BoNT-A therapy in the early acute phase following stroke to avoid disabling spasticity

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BACKGROUND:
Botulinumtoxin (BoNT) therapy has become the first choice for treatment of focal post-stroke spasticity (PSS). BoNT therapy is introduced mostly in the late subacute or chronic phase in rehabilitation centres and chronic outpatient care. In this phase, incorrect movement patterns have long been learned cerebrally and secondary tissue changes are no longer reversible. In recent years a few studies tried the earlier BoNT treatment for PSS, although it was injected in subacute phase (less than three months after stroke event), however there has been no report on BoNT therapy applying in the acute phase following stroke.

MATERIALS AND METHODS:
At the Charité University Hospital Berlin (Campus Benjamin Franklin) in Germany, the combination of a Stroke Unit and Early Stroke Rehabilitation Unit is implemented and included a multidisciplinary team of stroke experts. Using a decision matrix BoNT A therapy was delivered -in individual patients- in the early subacute phase. The current report retrospectively evaluates 12-months data. Baseline and follow-up assessment included stroke severity, activities of daily living and sensory-motor functioning. The primary outcome measure was the clinical assessment on muscle tone of the upper limb muscles using the modified Ashworth Scale (MAS).

RESULTS:
Totally 16 patients with disabling spasticity persisting for at least 5 days were suggested for BoNT therapy. Nine patients were treated using a conservative dose protocol of Incobotulinumtoxin A (Xeomin®) (median 16, SD 5 days after stroke event). 7 were untreated due to relative contraindications or decline of BoNT A-therapy. Pre- and post-treatment changes were not significantly different between groups. Within-Group analysis revealed a statistically significant increase in elbow MAS from baseline to follow-up for the control group only. Whereas untreated patients evidenced a significant increase in muscle tone, the MAS score remained stable for the treatment group despite the relatively low treatment dosage (mean 77.9, SD 24.6 IU of Incobotulinumtoxin A). Any serious adverse event due to BoNT therapy was not reported in them.

CONCLUSION:
Using a multidisciplinary team of experts and a decision matrix allows BoNT A therapy in individual patients in the acute stroke care routine. The BoNT A injection introduced (so) early, even in the early subacute phase following stroke was safe and effective to prevent the aggravation of PSS so that its complications will be avoid or minimized and the prognosis in them will be improved.

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CONFLICT OF INTEREST:
Jörg Wissel was a speaker and advisory board member with honorarium for Allergan, Ipsen, Merz, Sintetica and Medtronic. Other authors declare no conflict of interest.

Long-term compliance of botulinum toxin A injection in a patient with spasticity

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BACKGROUND:
The aim of this study is to evaluate the continuation of spasticity treatment with BTX-A injections and to investigate the factors that cause the cessation of treatment.

MATERIALS AND METHODS:
Our study is an observational and longitudinal data of 100 patients with neurological diseases. After the injection, it was recorded whether patients came to the 2nd week, 3rd month, 6th month and 12th month controls. The Modify Ashworth Scale (MAS) values for spasticity severity assessment and Barthell index (BI) values for daily life activity were recorded.

RESULTS:
64 patients had stroke, 16 patients had cerebral palsy, 12 patients had spinal cord injury, 6 patients had traumatic brain injury, and 2 patients had multiple sclerosis. The BI of patients who did not come to follow-up at least once was compared with those who came to all follow-ups and a statistically significant difference was found between them ($p<0.001$). Considering the reasons why the patients did not come to the follow-ups, 1 of the patients did not benefit from the procedure, and 2 of them experienced side effects in the form of weakness. 37 patients did not come to their follow-up appointment at least once because of transportation difficulties.

CONCLUSION:
Our study may constitute a new perspective in terms of the concept of injection treatment adherence and in determining factors that affect it.

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Intra- and interrater reliability of the Modified Ashworth Scale for twelve muscle groups in patients after stroke

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BACKGROUND:
Modified Ashworth scale (MAS) is the most used measure for muscle tone. Different degrees of reliability were reported previously, and mainly individual muscle groups were assessed. Inconsistency of results [1] may be due to the lack of a standardized testing protocol.

MATERIALS AND METHODS:
30 subjects (aged 25–81 years), 1–19 months after stroke and evenly distributed according to functional ambulation classification were included in the study. Six upper limb and six lower limb muscle groups were assessed with MAS by the protocol based on previous studies. One rater repeated the assessment after two days. Interrater reliability was assessed between three raters (two physiotherapists and one specialist of physical and rehabilitation medicine). Intraclass correlation coefficients (ICC 3, 1 or ICC 2, 1) were calculated.

RESULTS:
The most commonly rated grade was 0 and the least frequently rated grade was 4. Agreement was the highest for grade 0; 49% within the rater and 32% between raters. Intrarater reliability of MAS was good to excellent for the upper limb- (ICC 0.78–0.99) and moderate to excellent for the lower limb muscles (ICC 0.60–0.99). Intrarater reliability was the lowest for the hip flexors. Interrater reliability of MAS was poor to good for the upper limb- (ICC 0.32–0.86) and poor to moderate for the lower limb muscles (ICC 0.41–0.65). It was the highest for shoulder adductors and the lowest for elbow extensors and hip flexors.

CONCLUSION:
Most results are in accordance with the previous studies [1]. Reliability of the MAS differs among muscle groups. It is a reliable measure when used by a single rater, whereas it is less reliable when used between raters. We recommend that muscle tone is assessed by the same rater before and after therapeutic interventions.

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From annoyances to fatal flaws: what IJRR editors do not want to see in submitted manuscripts?

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In this session dedicated to publishing in the International Journal of Rehabilitation Research, the official journal of the EFRR, the Editor and three Associate Editors will provide their perspectives on issues encountered while handling submitted manuscripts. As the title of this session states, these issues range from minor annoyances to fatal flaws and are pertinent to both original research manuscripts and systematic reviews. The points raised have been selected at the presenters' discretion.

The Editor, Crt Marincek, will open a session by providing the latest facts and figures about the number of manuscripts submitted, reviewed, and published for the period 2018-2020. This will be followed by pointing out the importance of following closely both the Instructions for the Authors and the mandatory checklist appropriate for the manuscript type (CONSORT, STROBE, etc).

The Associate Editor, Dobrivoje Stokic, will bring to attention several points of relevance for original research manuscripts, such as the importance of presenting a sound study rationale, correctly stating the research question, carefully designing a study on the efficacy of combination therapies, and finally how not to get lost in the Discussion.

The Associate Editor, Lajos Kullmann, will discuss common problems with the submitted systematic reviews. He will address the relevance of goal setting and the selection of a review type, highlight the commonly overlooked value of platforms that provide a useful framework through stages of planning, conducting, and writing systematic reviews (PROSPERO registration, PRISMA guideline), and point out the need for more rigorous quality assessment of selected primary research articles, including evaluation of risks of bias.

Gaj Vidmar, the Associate Editor who is a statistician and psychometrician, will highlight some undesired practices that may be eliminated with sufficient attention and effort. They range from inadequate reporting of descriptive statistics (e.g., meaningless decimals) to misunderstanding p-values and failing to recognise and mitigate the problem of multiple testing. Some advice on improving data visualisation (design of illustrations) will also be offered.

Caregiver burden in disabilities

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An informal caregiver provides unpaid care to someone with whom they have a personal relationship. Caregivers start to dedicate more time, energy, and logistics to assisting patients with their activities of daily living, nutritional support, and medication. These can end up affecting their employment status, socioeconomic conditions, and overall well-being, with severe impacts on the economy and well-being of the society.

Post-stroke complications such as dysarthria, dysphagia, aphasia have been found to affect caregiver burden. Children with disabilities also require an immense amount of support both for their regular treatments and for the continuation of regular rehabilitation. In pediatric rehabilitation settings, caregivers are also primary decision-makers, and decreasing their burden is an important target. Cardiopulmonary diseases that require continuous rehabilitation such as cystic fibrosis and pulmonary hypertension have also been shown to affect caregiver burden negatively. Establishing the patients' independence and ensuring their involvement in regular treatments are key factors in rehabilitation to decrease caregiver burden.

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Norway and the right to respect family life from the perspective of the European Court of Human Rights

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BACKGROUND:
Norway regularly ranks very high in reports for best countries to raise children and is by many considered a leader in the field of human rights. On the other hand, there is a strong international criticism for the actions of its Child welfare service (CWS). It is called Barnevernet, and it is blamed for taking children away from families for controversial reasons and placing them in unnecessary foster care with minimal contact rights for the biological parents (4 times 60 minutes per year under supervision and less). The supreme authority that decides whether this is a human rights violation or not is the European Court of Human Rights (ECHR).

MATERIALS AND METHODS:
Qualitative analysis of 72 ECHR cases and judgements and other relevant statistics and documents.

RESULTS:
There are 55 ECHR judgements for Norway between 1959 and 08/2020. At least one violation was found in 36 of them, which is, per capita, one of the worst ratios among considered member states of Council of Europe – 26 cases were related to Article 8, its violation was confirmed in 15 of them. From these 26 cases, 13 are connected directly to the actions of Barnevernet, a violation was found in 9 of them. In addition to this, there are another 46 cases related to Article 8, which have been pending for the last 5 years with the status "communicated to Norwegian government", 30 are concerning Barnevernet. Another case is awaiting the Grand chamber decision. Further observation is therefore necessary.

CONCLUSION:
Article 8 concerns 47 % (26 out of 55) of the ECHR decisions against Norway and 92 % of the cases communicated in the last 5 years (46 out of 50). There is also a significant increase of new ECHR cases involving precisely Barnevernet (+30), which may indicate a systematic problem in Norway in the field of action of its child welfare service.

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The efficiency of selective dorsal rhizotomy and intensive physiotherapy program for non-walking children with cerebral palsy

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BACKGROUND:
Selective dorsal rhizotomy (SDR) is a surgical procedure, performed on the lower spinal cord to reduce spasticity in children with cerebral palsy. It is advised for children in Gross Motor Function Classification System (GMFCS) levels I to III, but there are also reports of SDR for children in level IV. We wanted to evaluate results of gross motor function in children two years after the SDR and intensive physiotherapy program.

MATERIALS AND METHODS:
We analysed data of 31 children with spastic CP (mean age 8.2 years) who underwent SDR in the time from July 2013 to December 2017 and were subsequently enrolled in 4-5 hours/week of inpatient and/or outpatient physiotherapy. When evaluating the progress of children, the criteria for the minimal clinically significant difference (MICD) for the Gross Motor Function Measure (GMFM) were considered. Further, we used a paired t-test, one-way ANOVA, and Tukey contrast test.

RESULTS:
The average total GMFM score improvement was at the margin of statistical significance ($p=0.0762$). Nevertheless, vast majority of children exceeded the MICD level for the great effect of the combination of SDR and physiotherapy. Improvement was significantly better for children in GMFCS levels III and IV in comparison with children in levels I and II ($p<0.001$). Six children improved by one level of GMFCS (five older than 6 years); in two cases from level IV to level III, in three cases from level III to level II.

CONCLUSION:
The follow-up two years after the SDR and intensive physiotherapy program showed that children improved their gross motor function, not just those, who are able to walk independently or with aids, but also non-walking children in GMFCS level IV.

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Long-term results of pelvic floor animated biofeedback in children with different types of lower urinary tract symptoms

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BACKGROUND:
Pelvic Floor Animated Biofeedback Therapy (PFABT) is an established treatment for pediatric lower urinary tract symptoms (LUTS) [1] but standardized pediatric protocols are lacking. We retrospectively review data of children with LUTS who underwent our pelvic floor training program with PFABT.

MATERIALS AND METHODS:
From January 2020, PFABT was proposed in all children with non-neurogenic LUTS. The program included 3 sessions (at least 1 hour/session; 1 session/month). In the first session, anatomy, LUT function, drinking and voiding regimen were explained. During second and third sessions, PFABT was performed, using external sensors to record activity of the pelvic floor muscles and to produces a muscle activity representation in form of animated videogames. Between sessions, pelvic floor training for 30 minutes at least 3 times a week was prescribed at home. Adherence to home PFABT was assessed. Efficacy of PFABT was evaluated considering LUTS improvement at the end of treatment and at follow-up, for four symptoms: day and/or night urinary incontinence, nocturnal enuresis, giggle incontinence and urinary retention. Satisfaction with treatment was evaluated using Likert-type scale (from 1=very unsatisfied to 5=very satisfied).

RESULTS:
67 children with LUTS were enrolled. Thirty-eight out of the 67 patients (average age 10, SD 4 years) were considered, having at least 6 months of follow-up (average 10, SD 4 months) after PFABT. Home training was performed by 11/38 (29%) patients. Improvement of LUTS was recorded at the end of treatment in 27/38 (71%) patients. At follow-up, recurrence of LUTS was found in 4/27 (14%) cases; 37/38 (71%) were satisfed; 18 (66%) were very satisfied.

CONCLUSION:
The study shows the importance of physical therapy, particularly biofeedback, to treat LUTS and its long-term effects. Satisfaction and home therapy adherence confirm how important is to involve and engage children in the rehabilitation training

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Rehabilitation outcome of comprehensive approach to new-borns and infants with brachial plexus impairment

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BACKGROUND:
Neonatal brachial plexus palsy (NBPP) is a nerve injury that occurs before or during birth. Infants with brachial plexus impairment requiring surgical reconstruction are referred to University clinical centre Ljubljana since 2010. The proposal for Slovenian guidelines of comprehensive approach to new-borns and infants with NBPP was published in 2015. According to the report of National Institute of Public Health, there were 57 new-borns with NBPP in the period from 2009 to 2019. The aim of our study was to evaluate the process of guidelines implementation and asses the outcome of comprehensive approach to new-borns and infants with NBPP.

MATERIALS AND METHODS:
We retrospectively analysed data of 31 new-borns and infants (15 girls) with NBPP, that were referred to University Rehabilitation Institute of Slovenia in the period from 2009 to 2020. All were born around the term, 15 with reported difficulties at delivery. Initial hand function was evaluated by Toronto scale. After the brachial plexus reconstruction children were referred to intensive rehabilitation program and the outcome was assessed by Mallet scale.

RESULTS:
28 of included children were assessed before the age of 6 months (on average at 3 months). Due to absent elbow flexion due to NBPP 8 children needed surgical reconstruction (at the age from 7 to 13 months). The outcome at the age of 3 years or older was clinically satisfactory, with the average Mallet score of 19.5.

CONCLUSION:
Close to half of infants with NBPP in the observed period were referred to the University Rehabilitation Institute in Ljubljana. We are assuming that others had spontaneous recovery. In average less than one child per year needed surgical reconstruction; the outcome was favourable. We lack follow-up of children in domains of activity and participation.

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A pilot study of effectiveness of interdisciplinary treatment in children and adolescent with chronic non-malignant pain

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BACKGROUND:
Chronic non-malignant pain is defined as pain lasting at least three months, with comprehensive consequences in terms of thinking, feeling, behaving, daily life activities. It is experienced by 3% to 5% of children and adolescents, which is why early detection and therapeutic treatment are crucial. We were interested in how effective the interdisciplinary treatment was for a group of children and adolescents, who were referred to the University Rehabilitation Institute of the Republic of Slovenia (URI-Soča) due to chronic non-malignant pain.

MATERIALS AND METHODS:
We included 15 children and adolescents who were referred to the Department for rehabilitation of Children at URI-Soča in the period from July 2017 to February 2020. At the beginning, they assessed the intensity of the pain in the last week, how they experience it and what their mood is. Psychological treatment included identifying and being aware of situations that trigger a pain response, understanding and developing the ability to change pain responses. At the end of the treatment, we repeated the assessment of the intensity of pain and its experience.

RESULTS:
Analysis of pain intensity assessments as well as assessments of symptom experience (fear of pain, catastrophic experience) showed a statistically significant decrease ($p<0.05$). A significant association was also found between the assessment of the strongest pain before treatment and mood assessments (panic, obsessive compulsive symptoms, depression, and fear of pain).

CONCLUSION:
The sensation of chronic non-malignant pain and the associated negative feelings decreased significantly in the children and adolescents who were included in the psychological treatment, so we estimate that the program was effective.

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Modern technology for assessment and functional independence

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In the coming decades, there will be a growing need for care for the aging society and people with chronic diseases. At the same time, people coping with disabilities strive for autonomy and social participation. These challenges will have impact on costs of our healthcare system.

New technologies are becoming more prevalent in health care, enabled by a wide range of sensors and increased connectivity available through the Internet of Things. New technical innovations such as active training devices (robotics, gaming, virtual reality), active assistive devices (prostheses, exoskeletons, orthoses), monitoring and tele rehabilitation will actually improve the person's abilities to remain independent. Technical improvements in sensors, actuators and artificial intelligence in these devices make them more and more functional when augmenting the human body. The interaction between the adaptive capabilities of a person and the adaptive capacities of the device will define the level of functional capability. The number of medical technologies used in home settings has increased substantially over the last decades. Many of these technologies can be very empowering, allowing older adults to remain in their homes longer, or enabling patients with chronic disease or mild cognitive impairment to both understand their illness better and adopt strategies to improve their quality of life.

The following topics will be addressed in the lecture:
- Mission driven policy in Healthcare in the Netherlands
- Assessment of human movements in their home environment
- Novel and revolutionary solutions developed in Rehabilitation
- Integration of technology in home training and care (de-hospitalization),

Virtual reality

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RESEARCH OBJECTIVES:
More knowledge is required about the neural mechanisms of recovery of spatial neglect. In this fMRI study, we present data on changes in resting state functional connectivity within the dorsal attention network (DAN) in a sample of chronic neglect after scanning training in a virtual reality (VR) environment that improved left side awareness.

MATERIALS AND METHODS:
The participants were 13 subjects with spatial neglect (>6 months) after right-sided ischemic stroke. A multiple baseline design was employed to established the chronic state. RehAtt, enriched rehabilitation, is a new concept designed to stimulate top-down combined with bottom-up neuronal activity. It comprises a computer, monitor, 3D glasses and a robotic pen (Phantom Omni), in-house developed software based on the Tetris game that includes visuo-spatial scanning tasks with sound, visual cues and force feedback. FMRI scans were collected at baseline and after VR-training; the analysis examined resting state functional connectivity within the DAN. In addition, using spatial concordance correlation, we compared changes in spatial topology of the DAN to other networks. The outcomes were training-related changes in fMRI BOLD-signal intensity, connectivity means (SD) before and following rehabilitation between regions of interest within the dorsal attention network.

RESULTS:
We found a longitudinal increase in interhemispheric functional connectivity between the right frontal eye field and the left intraparietal sulcus following training (pre: 0.33, 0.17 [mean, SD]; post: 0.45, 0.13; p=0.004). The spatial concordance analyses indicated that training had stronger influence on the DAN compared to other networks.

CONCLUSION:
Intense VR training that improved spatial neglect in chronic stroke patients also increased interhemispheric functional connectivity within the DAN. Specifically, a region responsible for saccadic eye movement to the left became more integrated with the left posterior parietal cortex highlighting a mechanism that can be exploited in the rehabilitation of chronic spatial neglect. These promising results merit further studies, now updated to RehAtt in Mixed Reality-Smart Glasses.

AUTHOR DISCLOSURES:
Fordell is founder of a start-up company Brain Stimulation AB, partly owned by Umeå University.

Assessing fitness to drive of neurological patients using a driving simulator

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BACKGROUND:
Medical driving fitness evaluation is performed by several methods, which differ among countries and clinical institutions. A combination of neuropsychological, functional limb tests and on-road assessment is seen as gold standard, however due its time and cost inefficiency is not commonly practiced. Consequently, driving simulators are emerging as an alternative, as they can combine all three tests and provide a faster yet ecologically valid assessment.

MATERIALS AND METHODS:
We investigated the potential of using a driving simulator for driving fitness assessment of neurological patients [1]. The study included 95 patients with various neurological diseases. After their standard driving assessment procedure, they drove through three high-risk scenarios, simulating rural, highway, and urban environments. Various descriptive variables were calculated from the driving data, such as reaction times, vehicle control and traffic rule compliance.

RESULTS:
In all scenarios significant differences were found in reaction times between the fit and unfit drivers. On the highway, significant differences were found in the variability of steering wheel angle, the use of turn signal and the right side-view mirror. In the city, there were differences in the lane deviation, speeding rate, and the number of accidents. The driving parameters were used to train support vector machine classifiers, which correctly classified 59% of drivers into fit, conditionally and unfit to drive, and 82% of drivers when classified only into fit and unfit to drive.

CONCLUSION:
The results show that driving simulators can capture the differences in driving characteristics of neurological patients with different driving abilities.

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SimFit2Drive – a screening tool for holistic assessment of driver's fitness to drive

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BACKGROUND:
In their latest 2021 PIN report, the European Transport Safety Council asks for a revision of Annex III of the currently in force EU Driving License Directive to increase consistency in assessing driver's medical fitness to drive across the EU and develop an effective and transparent screening protocol based on international good practices to help medical professionals to identify unfit drivers and detect potential medical conditions that affect their fitness to drive. It has been shown that use of general questionnaires or computer-based tests for drawing conclusions for fitness to drive can be confusing and frustrating for the elderly and neuropsychological patients as they often cannot see the correlation between them and their fitness to drive.

MATERIALS AND METHODS:
Using the power of digital technologies and advanced data processing algorithms, we have developed a single device screening tool for gathering and processing all motoric, sensory and cognitive abilities needed for a reliable and accurate assessment of capabilities necessary to safely and efficiently operate a motor vehicle. This device, called SimFit2Drive, combines high-fidelity driving simulator, measuring cells and Hall effect sensors, and advanced data processing algorithms, which can assist medical practitioners in the decision-making when approving or denying renewal of driving licences of elderly drivers and drivers with neurological disorders.

RESULTS:
Preliminary validation results show that SimFit2Drive can used for reliable sensory-motoric and, to some extent, neuropsychological assessment of driver's functional abilities. Using a driving simulator further provides a comprehensive assessment, which that takes into consideration all functional abilities in an actual dynamic yet safe driving environment.

CONCLUSION:
The ultimate goal of SimFit2Drive is to significantly improve the process of driver fitness assessment for the end users and medical practitioners.

Functional differences between lower limbs in drivers with right transtibial amputation and fitted prosthesis

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BACKGROUND:
Comprehensive rehabilitation for amputated patients includes driving assessment. In general, driving with lower limb prosthesis is not recommended, which makes it necessary to modify the vehicle. The most common modification after right transtibial amputation is driving with an automatic transmission and accelerator pedal on the left. In the study, we wanted to examine if there exist functional differences between lower limbs in patients with a right transtibial amputation and prosthesis.

MATERIALS AND METHODS:
Cross-sectional study was performed in which all patients were tested on a diagnostic simulator. Three tests were performed with both lower limbs, which we compared with each other in the analysis. We measured the force of pressure on the brake pedal, the correctness of the response and the speed of the reaction.

RESULTS:
33 patients with right transtibial amputation were included. The age ranged from 24 to 81. We found that patients with the left limb showed greater force of pressure on the brake pedal (p=0.001), however, all patients with prosthesis showed enough strength for activation of the ABS. In the reaction adequacy test, we did not find a statistically significant difference between the time required for response (p=0.501). However, we found a statistically significant difference between the number of given correct answers with the left and right limb (p=0.001). When comparing the shortest and average reaction times, no statistically significant results were found (p=0.435 and p=0.228, respectively).

CONCLUSION:
We have found that in certain drivers, there were no functional differences between the lower limbs, despite the use of a prosthesis. Another finding is that certain drivers with fitted prosthesis do not need vehicle modifications for driving. Results even suggest that driving without vehicle modifications for selected drivers may be even safer without modifications.

REFERENCES:
[1] Meikle B. Arch Phys Med Rehabil, 2006.

Abilities of patients after stroke to drive an electric scooter or powered wheelchair

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BACKGROUND:
Many patients after stroke need to be equipped with electric scooters (ES) or powered wheelchairs (PW) due to impaired walking function. In order to prescribe PW/ES, patients must retain certain functional abilities, including satisfactory cognitive abilities (attention, visual-spatial and executive functions). As part of a clinical examination, patients perform a practical test of driving a PW/ES. The aim of this study was to investigate which abilities of stroke patients are needed to prescribe a PW/ES.

MATERIALS AND METHODS:
A retrospective study included data from the medical documentation of 36 patients after stroke that were assessed at University Rehabilitation Institute, Republic of Slovenia (URI-Soča) from January 2019 to April 2021. Data for the statistical analysis included general sample characteristics, neuropsychological assessment results and practical test of driving. Differences between patients based on their cognitive profile were compared regarding the prescription and practical test outcome (using chi-squared test).

RESULTS:
The sample included 31 male and 5 female patients with an average age of 66 (SD 16) years and average time since stroke of 9 (SD 10) years. ES/PW were prescribed to 61% of the patients. There were statistically significant differences between patients who had no/mild impairment and patients who had moderate/severe impairment on visuospatial and executive functions ($p<0.05$) regarding the practical test outcome, with the patients with less cognitive impairment being more frequently efficient. All cognitive measures were similarly statistically significantly different regarding the prescription outcome ($p<0.05$).

CONCLUSION:
Patients who had more severe cognitive long-term impairments after stroke more frequently performed worse at the practical test and were less likely to be prescribed an ES/PW. There is a need to develop an exact interdisciplinary testing protocol that would include defined prescription criteria.

Evaluation of management and driving skills of wheelchair: a pilot study

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BACKGROUND:
Efficient use of wheelchair is important for child's functioning and participation. In case of children with severe developmental delay, it is very important to evaluate skills of management of wheelchair, driving skills and ability to participate in traffic. We decided to develop a test to evaluate these domains in order to use it in goal setting process to improve skills that might be insufficient.

MATERIALS AND METHODS:
Based on literature review and our own clinical experience we designed a comprehensive wheelchair test with four subscales for active wheelchair (AW) users and additional one for electric-powered wheelchair (EPW) users; scoring criteria were (in points) 3 – independent, 2 – needs supervision, 1 – has difficulties, 0 – not able/doesn't complete). In the pilot testing protocol, we invited children, who were referred to the University Rehabilitation Institute in Ljubljana in the period from July 2019 to April 2021. In order to improve the test properties, we held several meetings.

RESULTS:
38 children (26 boys), with average age 9,5 years were included in pilot study (3rd version. of test); 17 used AW, 17 EPW, 4 AW with additional assistance. Children using EPW scored significantly lower than those using AW or assisted AW in all four subscales. On average, the children scored lower in management of wheelchair and advanced driving skills, achieving up to 42.2% and 47.6% of AW maximal score; and 15.6% and 46.3% of EPW maximal score, respectively.

CONCLUSION:
Based on the results of this pilot study we are able to differentiate between children with different gross motor function levels (having AW or EPW). Vast majority of children would need further training program to improve their management of AW/EPW driving skills and by that improve their mobility function and participation.

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Assessment of fitness-to-drive after stroke: a neuropsychological perspective

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BACKGROUND:
the assessment of driving abilities following a stroke has to be a part of comprehensive rehabilitation, and neuropsychological assessment can play an important role in this process. Demand for an evidence-based and reliable off-road cognitive evaluation is high: the reason for this is low cost and relatively easy availability, particularly in a neurorehabilitation unit setting.

LITERATURE REVIEW:
The majority of systematic reviews in the field often reach the conclusion that neuropsychological testing, in itself, is not sufficient for the prediction of driving abilities for the high proportios of false judgments. For this reason, Molnar et al. propose two recommendations for future researches. First, authors should provide clinically useful cut-off points regarding cognitive tests and avoid the mere detailing of correlations and significance levels. Their second suggestion is to shift our view of fitness-to-drive from a dichotome perspective (i.e.: fit or unfit) towards a trichotome one (fit-unfit-inconclusive). They also urge the usage of a rare statistical method called serial trichotomization.

CONCLUSION:
after reviewing the relevant literature, we can state that many neuropsychological tools have the potential to correctly predict driving skills. Still, if our aim is the development of an off-road assessment protocol of cognitive fitness to drive, we do need to analyse these test results in a different way.

STUDY PLAN:
In our ongoing study we are conducting neuropsychological assessments and a standardised on-road test in the group of at least one hundred stroke patients. Thus far, serial trichotomization has not been conducted in a propesctive manner, recruiting only stroke patients. As a result, we are expecting a reliable test battery that is suitable for the off-road assessment of fitness-to-drive among stroke patients in a quick, safe and economical way. In our poster we present the details of the research setup and the statistical analysis.

Comparison of neuropsychological assessment and driving-simulation variables in a sample of neurological patients

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BACKGROUND:
Decreased cognitive and physical ability in combination with other symptoms appear more common in neurological patients and may result in a decreased fitness to drive. Studies show mixed results in relation to the consistency of neuropsychological and driving simulator assessment. The aim of this study was to investigate the consistency of both types of assessment.

MATERIALS AND METHODS:
We included 99 patients with various neurological impairments. Most participants were survivors of traumatic brain injuries (38%), followed by ischemic strokes survivors (15%), multiple sclerosis (14%), brain tumors (11%) or other neurological diagnoses. The subjects performed a 30-minute drive in a driving simulation in three different road settings and underwent neuropsychological assessment.

RESULTS:
We found weak but statistically significant correlations between neuropsychological measures of attention and executive function and driving simulator variables. Participants who were better at maintaining attention, eliminating irrelevant information and suppressing inappropriate responses, were less likely to produce a jerky ride, drive above the speed limit, and used the rearview mirror more regularly. Less distractible subjects drove more efficient in all three simulated road setting.

CONCLUSION:
A lack of moderate or strong significant correlations between more variables may indicate that the two types of assessments don't evaluate the same cognitive processes. While neuropsychological tests give information about a specific cognitive function, driving simulator output variables most likely require mobilization of multiple cognitive resources. In the assessment of fitness to drive, we recommend including both.

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Adaptation of vehicles for physically handicapped in Slovenia

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BACKGROUND:
The Slovenian government can cover up to 85% of the cost of vehicle adaptation for physically handicapped drivers or passengers who are citizens or foreigners with permanent residence in the Republic of Slovenia. They must enforce their rights in accordance with the rules on disability and health insurance with the ability to operate the adapted vehicle themselves, or passengers must adapt to safe entry into the vehicle and driving.

MATERIALS AND METHODS:
At the Vehicle Adaptation Clinic, the expert opinion for demanding adaptation for the estimated value up to 500 euros is done by an individual expert. For more demanding adaptations, where the estimated values can reach up to 60,000 euros, the expert opinion is prepared by an expert group consisting of a specialist in physical and rehabilitation medicine, a graduate occupational therapist and a technical engineer or technician.

RESULTS:
In the period 2014-2020, we made 1,384 plans for the adaptation of the vehicles, 369 (27%) were simple and 1,015 (73%) more demanding. All together, there were 2,837 adaptations approved out of 52 options from the list. The largest number of claims was for eligibility for portable folding ramps (326) and hand operation devices for accelerator and brake (318). Followed were requests for eligibility for the wheelchair ramps and tail lifts (286), a special child car seat (179) and an automatic transmission (181). Since November 2014, the Ministry has earmarked over 3,200,000 € for vehicle adaptations.

CONCLUSION:
The existing regulation is a great benefit for people with disabilities in Slovenia, as it enables them to cover up to 85% of the costs of adaptation of the vehicle and even fully to socially weaker beneficiaries and allows them to fully integrate into the wider social environment, assuming they provide the vehicle themselves.

"Be silent and carry on": normalising injuries and lack of rehabilitation in the elite women's artistic gymnastics

Joca Zurc[1]

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BACKGROUND:
Overuse sports injuries may occur in every sport. Still, young gymnasts at a high competitive level are particularly vulnerable due to long hours of training, pre-adolescence age, and life stress [1]. This study aimed to explain the occurrence of injuries and their rehabilitation in elite women's artistic gymnasts from the perspective of gymnasts and their coaches.

MATERIALS AND METHODS:
A qualitative study design was implemented involving 37 female gymnasts (11 retired – mean age 35 years, 26 active – mean age 14 years) and 4 gymnastics' coaches from the Slovenian national team. Semi-structured interviews, prior tested in a pilot study, were conducted by using a snowball sampling approach and analysed by grounded theory.

RESULTS:
High competitive gymnastics is marked with a variety of health issues and long-term rehabilitation. Interviews with retired gymnasts revealed premature returns to the training before an injury was fully recovered. In many cases, that caused a long rehabilitation or even permanent damages on gymnasts' health after ending sports' career. Additionally, participating in elite gymnastics resulted in the abuse of painkillers and negative behavioural patterns. Verbal and physical violence, manipulation of sports policy, and lack of professional support were influential factors associated with physical and mental health issues during and after a sports career.

CONCLUSION:
A new innovative strategy in developing talented gymnasts is needed to avoid possible risk factors and ensure a safe sports environment. Special attention in future studies, practice and technology development should be given to the professional rehabilitation support for young elite athletes.

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Effectiveness of Tulppa program on cardiovascular risk factors and emotional well-being - preliminary results of a controlled study

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BACKGROUND:
Tulppa is a Finnish group-based secondary prevention program for patients with vascular diseases. Tulppa rehabilitation is provided at the local primary health care centers, and it includes e.g., health education, peer discussions and physical exercises in 8-10 weekly 3-hour group sessions and two follow-up sessions (6 and 12 months). This study investigates the effectiveness of Tulppa program on cardiovascular disease (CVD) risk factors and emotional well-being [1].

MATERIALS AND METHODS:
Study group (Tulppa participants, n=158, mean age 71 years) and control group (CVD patients from areas not providing Tulppa program, n=142, mean age 66 years) were measured for cardiovascular risk index (RI) consisting of BMI, total cholesterol level, blood pressure, smoking and physical activity, and filled questionnaires about emotional well-being [DEPS depression scale and Maastricht Vital Exhaustion Questionnaire (MQ)]. The data was collected at baseline and at six months. All subjects had diagnosed coronary artery disease. The age and education level of the participants differed between study and control groups ($p<0.001$ and $p=0.045$, respectively), while no statistically significant differences were found in gender (61 % men in study group, 71% in control group). Changes in study outcomes were assessed with repeated-measures ANOVA.

RESULTS:
There was a statistically significant time x group interaction in DEPS ($p=0.049$) and MQ ($p=0.022$). A positive change between baseline and 6 months was found in the Tulppa rehabilitation group (DEPS $p=0.048$ and MQ $p<0.001$), but not in the control group (both measures $p>0.05$). No statistically significant change was found in RI.

CONCLUSION:
During six-month follow-up period Tulppa rehabilitation seems to have a positive impact on experienced emotional well-being, but not on cardiovascular risk factors included in RI.

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[1] ClinicalTrials.gov Identifier: NCT03437616

Evaluation of glenohumeral rotators using isokinetic testing in sitting volleyball players

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BACKGROUND:
Sitting volleyball (SV) is a dynamic overhead sport. Its specific requirements may lead to adaptive changes of the glenohumeral joint structures. The aim of the present study was to assess peak torques (PTs) of external (ER) and internal rotators (IR) of dominant and nondominant glenohumeral joints and to evaluate corresponding stability ratios.

MATERIALS AND METHODS:
Retrospective analysis of results of isokinetic testing of 10 female elite SV players, which were obtained during preparation period before international competition. Exclusion criteria were acute shoulder injury or pain resulting in inability to participate in competition/training and previous shoulder surgery. Isokinetic testing of both shoulders was performed using previously described methodology by Tonin et al. IR and ER PTs were measured at two testing velocities (60 and 150°/s) in concentric (c) and eccentric (e) mode. Spiking (eER/ cIR) and cocking (eIR/cER) dynamic stability ratios as well as conventional (cER/cIR) ratios were calculated. Numeric variables between two measurements within participants (dominant vs. nondominant side) were compared using the exact Wilcoxon matched pairs test.

RESULTS:
All 10 participants had right-hand dominance. The average duration of SV career was 10.9 years (SD 6.1) and total duration of volleyball career was 15.6 years (SD 11.0). Average PTs of IR were higher in comparison to PTs of ER in all modes. Except for cER at 150°/s, average PTs were higher in the dominant shoulder. Conventional ratio at both velocities and spiking ratio at 60°/s were lower in the dominant shoulder. Spiking ratio and cocking ratio at 150°/s were higher in the dominant shoulder. Cocking ratio at 60°/s was the same on both sides. Differences were not statistically significant.

CONCLUSION:
SV female players have asymmetrical strength profile of glenohumeral rotators. There was a tendency towards higher strength in the dominant side, which is common in overhead sports.

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Lower-limb muscle contractile proprieties, explosive power and subjective response in Slovenian First League soccer players to COVID-19 lockdown

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BACKGROUND:
In most countries affected by the COVID -19 outbreak, athletes were confined, and had to train at home. Slovenian soccer clubs provided their players with home-based training programs prescribed by their coaches. However, the home-based training schedules could not replace sport-specific training stimuli and team training to keep the soccer players in competitive shape. The present study aimed to assess the effects of a lockdown period due to COVID-19 on basic anthropometric measures, lower limb muscle power, TMG derived skeletal muscle contractile properties, estimation of vastus lateralis (VL) myosin heavy chain I (MHC-I) of the lateral vastus (VL) from TMG parameters, injury incidence, implementation of training programs, changes in performance (technique, game tactics), self-assessed general well-being, and fitness levels with an estimate of lockdown "event" impact on elite soccer players.

MATERIALS AND METHODS:
A total of 266 players were assessed before (BDC) and 32 players were reassessed after (POST) the lockdown period.

RESULTS:
Statistically significant changes in TMG parameters were observed on POST compared to BDC: contraction time (Tc) increased on average from 5.6% (VL; $p=0.009$) to 50.2% (Biceps femoris [BF]; $p<0.001$); radial displacement (Dm) increased on BF (18.8%; $p=0.036$) and VL (16.8%; $p<0.001$), while the estimated MHC-I percentage of VL increased by 10.4%. Furthermore, jumping performance remained unchanged, while a 55% increase in injury incidence was observed in the first two months after the players returned to regular training. Athletes rated the lockdown period as a psychologically positive event, mainly because they spent more time with their families.

CONCLUSIONS:
Although there were no statistically significant differences in any of the variables describing lower limb muscle power following the two-month lockdown, the altered contractile properties of the muscles assessed suggest suboptimal conditioning of the football players, leading to an increased incidence of injury in the two months following release COVID -19 restrictions. The results of the present study highlight the relevance of monitoring individual skeletal muscle contractile properties rather than using physical performance tests alone. They should also be aware of the importance that a balanced psychological environment of elite soccer players plays in the time of similar extraordinary circumstances that we have experienced in COVID-19 pandemics.

"Let's Kick the Disease": Karate and Rehabilitation. A pilot study

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BACKGROUND:
The incidence of cognitive-relational disabilities is underestimated. A group of patients was recruited in order to be treated with karate exercises as a method of training, inclusive teaching and rehabilitation.

MATERIALS AND METHODS:
12 participants, heterogeneous for age and sex, were examined. They presented mild-moderate cognitive-relational disability (Mental retardation, Down Syndrome, etc) homogeneous in terms of clinical characteristics, who were able to sustain at least 25 min of attention. Four participants were excluded because unable to maintain sufficient compliance. In order to increase performance, optimising coordination and motor patterns, working protocols were proposed, at least 15 min sessions of six preparatory levels over seven months of observation, concerning natural and specific positions of Karate based on equilibrium, use of lower limbs, agility, praxis and postural patterns. A stabilometric platform was used to measure and improve balance. The Illinois Agility Test and the Florida Apraxia Screening test were carried out.

RESULTS:
The results confirmed an improvement in all components of the exercises, with consequent neuroplasticity phenomena, even where multiple intellectual deficits coexisted.

CONCLUSION:
The improvements were of motor and sensory-cognitive nature. Karate can be considered a means of maintaining specific skills and a rehabilitation tool in disability cases. A control group was not provided, because of poor compliance of the sample and in order to avoid creating further disadvantages.

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Remote rehabilitation that incorporates discussion of values in therapy is possible with an online card-sorting exercise

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BACKGROUND:
The Miller et al Values Card Sort task [1] is a widely used and useful tool for evoking conversation about personal values. A deck of cards is used with a person who is asked to sort cards with things we might value (eg romance, purpose, adventure) into decks of "very important", "important" "not important". We included a copy of the list of words as part of a chapter in our Brain Injury Rehabilitation Workbook [2] in a chapter about exploring identity, because it is helpful in encouraging conversations about motivation [3].

MATERIALS AND METHODS:
Well-Sorted [https://www.well-sorted.org/] is a site originally built to support preparation for meetings by encouraging people to share ideas down and sort them, perhaps with an aim of creating discussion groups at the meeting. The value cards were instantiated as digital objects for sorting on screen by brain injury survivors and clinicians.

RESULTS:
A fruitful conversation about how a patient is planning his time to include "adventurous exercise" in his routine was facilitated and made what was for him a rather abstract concept much more concrete. The sorting task can be sent to any number of friends and family members as talking about 'shared values' is likely to be a useful thing to do in building a shared rehabilitation narrative. A heat map or dendrogram showing how groups of values are interlinked can help share with key rehabilitation allies.

CONCLUSION:
A simple online technology has enabled a rich interaction that usually happens face to face.

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Does combining face-to-face treatment with telerehabilitation affect functional outcomes in chronic pain patients' rehabilitation?

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BACKGROUND:
To avoid prolongation of waiting time for chronic pain treatment due to measures preventing the spread of COVID-19, we adapted our interdisciplinary rehabilitation programs of varying intensities to partly online form. The aim of our study was to investigate whether this change affected functional outcomes – balance and forward bend.

MATERIALS AND METHODS:
We compared the Berg Balance Scale (BBS) and forward bend results of 193 pre-pandemic patients, attending the face-to-face program, and 173 pandemic-era chronic pain patients, attending the partly online program. Both scores were measured at the beginning and end of rehabilitation programs. We used an ANCOVA model to evaluate means of both functional outcomes, while controlling for effects of different program formats (completely face-to-face or partly online) and rehabilitation programs of varying intensity.

RESULTS:
There were no statistically significant differences in Berg Balance Scale means between pre-epidemic and epidemic-era patient groups or between patients from rehabilitation programs of varying intensities. There were no statistically significant differences in means of forward bend measures between pre-epidemic and epidemic-era patient groups, but the means were statistically significantly better in the group of patients attending the more intense version of the program.

CONCLUSION:
Combining face-to-face treatment of chronic pain patients with telerehabilitation, did not affect balance and forward bend, meaning partly online programs for chronic pain patients can equal face-to-face programs in functional outcomes and can be used as an adequate substitute to completely face-to-face programs in the COVID-19 pandemic era.

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From face-to-face treatment of chronic pain patients to part-telerehabilitation in time of COVID-19 – do occupational performance outcomes vary?

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BACKGROUND:
At the University Rehabilitation Institute, Republic of Slovenia, chronic pain patients participate in face-to-face rehabilitation programs of varying intensities. In order to comply with measures to stop the spread of COVID-19, the standard face-to-face programs were transformed to a part-telerehabilitation format. Patients' perception of performance and satisfaction with the performance of important daily occupations is one of the outcomes, measured by occupational therapists at the beginning and at the end of the program. The aim of our research was to establish whether the change in the format of treatment affected these outcomes.

MATERIALS AND METHODS:
In this retrospective study we reviewed information of self-perceived occupational performance from The Canadian Occupational Performance Measure (COPM) from 186 pre-epidemic patients (face-to-face) and 170 epidemic-era patients (part-telerehabilitation), which was performed at the beginning and end of the program. We used an ANCOVA model to evaluate means of COPM Performance and COPM Satisfaction, while controlling for effects of different program formats (completely face-to-face or part-telerehabilitation) and rehabilitation programs of varying intensities.

RESULTS:
There were no statistically significant differences in COPM Performance and COPM Satisfaction means between pre-epidemic and epidemic-era patient groups.

CONCLUSION:
Interdisciplinary rehabilitation program format (face-to-face or part-telerehabilitation) was not a significant factor for COPM outcomes. This means that part-telerehabilitation treatment of chronic pain can lead to comparable self-perceived occupational performance outcomes as face-to-face rehabilitation treatment.

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Ambulatory monitoring and coaching for the aftercare of occupational rehabilitants: low-threshold, discreet and practicable provision of need-oriented support

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BACKGROUND:
The project WORKCOACH evaluates a six-month-follow-up care for vocational rehabilitation graduates, combining coaching interviews with a smartphone monitoring. The project is financed by the German pension insurance Baden-Württemberg.

MATERIALS AND METHODS:
In a daily smartphone survey, the ex-rehabilitants record their current situation and well-being. These data are screened twice a week for acute need for help. Furthermore, the monitoring data provide the basis for the regular telephone coaching sessions (every two to four weeks). The focus of the coaching sessions is to promote the individual resources of the ex-rehabilitants and to support them solution-orientedly in case of difficulties. Thirty-two people participated in the first four waves of the project, while two persons cancelled their participation due to longer term hospitalization. The remaining 30 participants provided daily measurements for 2126 working days. The mean compliance rate was at 67%.

RESULTS:
Multilevel longitudinal analyses show a curvilinear decrease in depression, dissatisfaction and stress for the job searching participants. For the participants directly entering a job after the vocational retraining, a quadratic curve was found: At the beginning of the aftercare, depression and dissatisfaction increased, but in the course of the coaching, an improvement of the well-being variables could be achieved, which can be interpreted in terms of a successful adaptation process. Individual case studies illustrate the diverse use of WORKCOACH. The benefit of WORKCOACH is also supported by qualitative feedback from the participants: "WORKCOACH gives you a feeling of security in the background".

CONCLUSION: WORKCOACH represents an effective form of aftercare for vocational rehabilitants.

Assessment of coaching technology for seniors by potential users in Bulgaria – SAAM project

Zlatka Gospodinova[1], Nadejda Miteva[1], Vera Veleva[1], Yordan Dimitrov[1]
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BACKGROUND:
The Horizon 2020 project Supporting Active Ageing through Multimodal Coaching (SAAM) [1] involved the development and validation of a smart unobtrusive coaching technology for seniors, including through single testing sessions with potential users. This article presents results from single sessions with 30 users, including seniors (persons above 60 years) and caregivers in Bulgaria.

MATERIALS AND METHODS:
Participants were divided in two groups – primary users, i.e., seniors who could use the SAAM system (15), and secondary users who could use the system in social interactions and formal or informal caregiving of seniors (15). The single sessions lasted one hour and made use of the cognitive walkthrough methodology. Due to COVID-19, the sessions were conducted remotely using shared screens to observe participants' actions in the SAAM application. Users were presented with an overview of the SAAM project, hardware, and app and were asked to perform several simple tasks. Users assessed the difficulty of each task, their overall experience with the app, and the system's active ageing support potential (1-to-5 Likert scales).

RESULTS:
The time limit affected the number of tasks completed, while familiarity with modern applications influenced users' ratings. Despite their diversity, users assessed their overall experience positively and saw significant potential in the SAAM system to support them.

CONCLUSION:
SAAM is a multifaceted technology encouraging active ageing through various means. Its versatility converges into an interface that may be challenging to grasp fully in an initial interaction. Nevertheless, overall assessments showed that users are ready to partly trade-off simplicity for the sake of functionality. Moreover, the potential of SAAM to support the active ageing of seniors with varied backgrounds was recognized by most participants.

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Ethical considerations in designing and implementing AAL technologies: the SAAM case study

Nadejda Miteva[1], Zlatka Gospodinova[1], Vera Veleva[1], Yordan Dimitrov[1]
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BACKGROUND:
Setting an environment for active ageing has been among societal priorities for two decades [1]. European policy encourages active ageing in three main aspects: employment, participation in society, and independent living [2]. Within the H2020 project Supporting Active Ageing through Multimodal Coaching (SAAM) a system addressing all three aspects was designed. The system's purpose is to stimulate active ageing, especially among seniors with lower technological affinity or living in underdeveloped regions. The present article describes SAAM solutions to the practical ethics questions raised during system development.

MATERIALS AND METHODS:
This article systematically describes the way key freedoms, rights, and principles are internalized in the design and implementation of SAAM. It pragmatically discusses tensions and negotiation between ethics considerations during development. The article draws on SAAM technical documentation and consortium member experience to deliver hands-on guidance for future active ageing technologies.

RESULTS:
The SAAM system offers a balanced technological solution stimulating seniors' social lives, autonomy, and equal access without trading off their rights to private life, respect, dignity, and personal data protection (privacy-by-design), among others.

CONCLUSION:
SAAM builds on two notions: (1) each person is their own master and (2) technologies can offer support for active ageing. Thus, the system offers extreme personalization, as well as equitable access despite differences in socioeconomic conditions and daily life challenges. Active ageing technologies can build upon SAAM experience to better integrate ethics in their practice.

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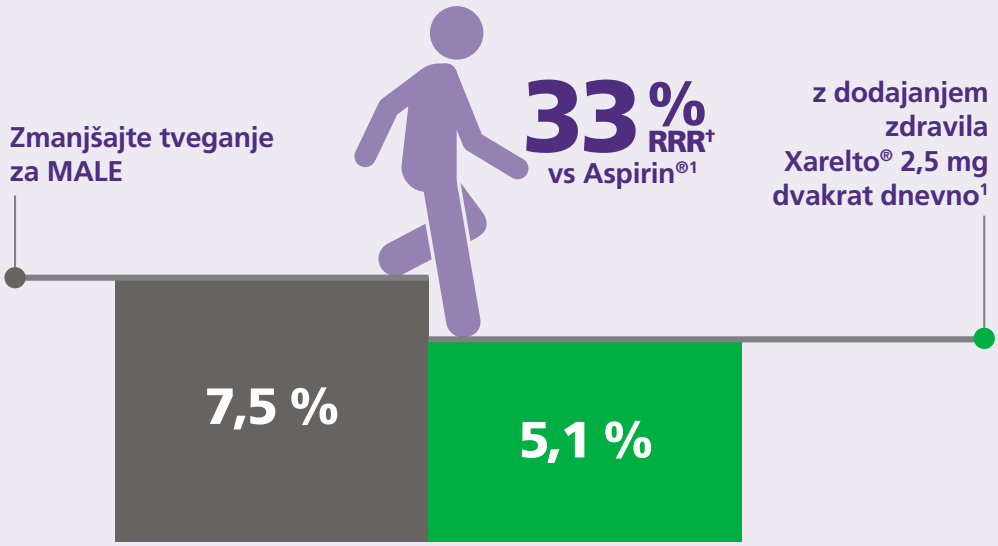

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† RRR izračunan kot 1-HR. HR: 0,67; 95 % CI: 0,52–0,87; NNT 42
‡ 3 letna kumulativna incidenca MALE (definiran kot akutna ishemija uda in velike amputacije) po endovaskularni revaskularizaciji (Kaplan Meier %)

Referenca: 1. Patel MR *et al.* Rivaroxaban plus Aspirin versus Aspirin Alone After Endovascular Revascularization for Symptomatic PAD: Insights from Voyager PAD. AHA. Virtual Scientific Session, 13–17 November 2020.

Skrajšan povzetek glavnih značilnosti zdravila
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KAKOVOSTNA IN KOLIČINSKA SESTAVA: Ena filmsko obložena tableta vsebuje 2,5 mg rivaroksabana. Pomožne snovi: mikrokristalna celuloza, premreženi natrijev karmelozat, laktoza monohidrat, hipromeloza (2910), natrijev lavrilsulfat, magnezijev stearat, makrogol (3350), hipromeloza, titanov dioksid (E 171), rumeni železov oksid (E 172). **TERAPEVTSKE INDIKACIJE:** Zdravilo Xarelto, ki se jemlje sočasno samo z acetilsalicilno kislino ali z acetilsalicilno kislino in klopidogrelom ali tiklopidinom, je indicirano za preprečevanje aterotrombotičnih dogodkov pri odraslih bolnikih po akutnem koronarnem sindromu (AKS) s povišanimi vrednostmi srčnih biokemičnih označevalcev. Zdravilo Xarelto, ki se jemlje sočasno z acetilsalicilno kislino, je indicirano za preprečevanje aterotrombotičnih dogodkov pri odraslih bolnikih s koronarno boleznijo (KB) ali simptomatsko periferno arterijsko boleznijo (PAB) z velikim tveganjem za ishemične dogodke. **ODMERJANJE IN NAČIN UPORABE:** *Akutni koronarni sindrom:* Bolniki, ki jemljejo zdravilo Xarelto 2,5 mg dvakrat na dan, naj jemljejo tudi dnevni odmerek 75–100 mg acetilsalicilne kisline ali dnevni odmerek 75–100 mg acetilsalicilne kisline poleg dnevnega odmerka 75 mg klopidogrela ali standardnega dnevnega odmerka tiklopidina. *Koronarna bolezen/simptomatska periferna arterijska bolezen:* Bolniki, ki jemljejo zdravilo Xarelto 2,5 mg dvakrat na dan, naj jemljejo tudi dnevni odmerek 75–100 mg acetilsalicilne kisline. **KONTRAINDIKACIJE:** Preobčutljivost na zdravilno učinkovino ali katerokoli pomožno snov; klinično pomembna aktivna krvavitev; poškodbe ali stanja z visokim tveganjem za velike krvavitve; sočasno zdravljenje s katerim koli drugim antikoagulantom razen v primerih zamenjave zdravljenja z rivaroksabana ali na rivaroksaban ali kadar se nefrakcionirani heparini uporabljajo v odmerkih, ki so potrebni za vzdrževanje prehodnosti centralnega venskega ali arterijskega katetra; sočasno zdravljenje AKS z antitrombotiki pri bolnikih s predhodno možgansko kapjo ali prehodnim ishemičnim napadom (TIA); sočasno zdravljenje KB/PAB z acetilsalicilno kislino pri bolnikih, ki so v zadnjem mesecu doživeli hemoragično ali lakunarno možgansko kap ali katero koli drugo možgansko kap; bolezen jeter ter hkrati motnje koagulacije in klinično pomembno tveganje za krvavitve, vključno z jetrno cirozo razreda Child-Pugh B in C; nosečnost in dojenje. **POSEBNA OPOZORILA IN PREVIDNOSTNI UKREPI:** Ves čas zdravljenja se priporoča klinično spremljanje v skladu s smernicami vodenja antikoagulacijskega zdravljenja. Zdravljenje z zdravilom Xarelto je treba prenehati, če se pojavijo hude krvavitve. S starostjo se tveganje za krvavitve lahko poveča. Zdravljenje z rivaroksabanom je treba prekiniti ob prvem pojavu hudega kožnega izpuščaja (tj. obsežen, intenziven in/ali mehurjast izpuščaj) ali katerega koli znaka probčutljivosti, ki se pojavi hkrati s spremembami na sluznicah. *Uporabe zdravila Xarelto se ne priporoča:* pri bolnikih s hudo okvaro ledvic (očistek kreatinina < 15 ml/min); pri bolnikih, ki sočasno jemljejo tudi močne zaviralce CYP3A4 in P-gp, t.j. azolne antimikotike za sistemsko zdravljenje ali zaviralce proteaz HIV; pri bolnikih s povečanim tveganjem za krvavitve; izogibati se je treba sočasni uporabi močnih induktorjev CYP3A4, razen če se bolnika skrbno spremlja glede znakov in simptomov tromboze; pri bolnikih z anamnezo tromboze in diagnozo antifosfolipidnega sindroma. Rivaroksaban se ne sme uporabljati za tromboprofilakso pri bolnikih, ki so pred kratkim prestali transkatetrsko zamenjavo aortne zaklopke (TAVR- transcatheter aortic valve replacement). *Zaradi malo podatkov se uporaba zdravila Xarelto ne priporoča:* v kombinaciji z drugimi antitrombotiki kot so samo acetilsalicilna kislina ali acetilsalicilna kislina in klopidogrel; mlajših od 18 let sočasnem zdravljenju z dronedaronom; pri bolnikih z umetnimi zaklopkami. *Previdna uporaba zdravila Xarelto:* Pri stanjih bolnikov, kjer obstaja povečano tveganje za krvavitve; pri bolnikih s hudo okvaro ledvic (očistek kreatinina 15 – 29 ml/min); pri bolnikih z okvaro ledvic (15 in 20 mg) ali pri bolnikih z zmerno okvaro ledvic (očistek kreatinina 30 – 49 ml/min) (10 mg), ki sočasno uporabljajo druga zdravila, ki povečajo plazemsko koncentracijo rivaroksabana; pri bolnikih, ki sočasno prejemajo zdravila, ki vplivajo na hemostazo; pri bstarejših od 75 let ali z nizko telesno težo, Bolniki s KB s hudim simptomatskim popuščanjem srca; pri nevraksialni anesteziji ali spinalni/epiduralni punkciji. Bolniki, ki se zdravijo z zdravilom Xarelto in acetilsalicilno kislino ali z zdravilom Xarelto in acetilsalicilno kislino in klopidogrelom/tiklopidinom, smejo sočasno prejemati NSAID samo, če koristi pretehtajo možna tveganja za krvavitve. Bolniki z aktivnim rakom: treba je pretehtati korist zdravljenja z antitrombotiki in tveganje za krvavitve. Pri bolnikih, pri katerih obstaja tveganje za pojav razjed v prebavilih, je treba razmisliti tudi o ustreznem profilaktičnem zdravljenju. V vsakdanji praksi med zdravljenjem z rivaroksabanom ni potrebno spremljanje kazalcev koagulacije. Če je klinično indicirano, se lahko vrednosti rivaroksabana izmeri s kalibriranim kvantitativnim merjenjem aktivnosti anti-FXa. Zdravilo Xarelto vsebuje laktozo. **NEŽELENI UČINKI:** *Pogosti:* anemija, omotica, glavobol (pri otrocih zelo pogosto), krvavitev v očesu, hipotenzija, hematom, epistaksa (pri otrocih zelo pogosto), hemoptiza, krvavitev iz dlesni, krvavitve v prebavilih, bolečine v prebavilih in trebuhu, dispepsija, navzea, zaprtje, driska, bruhanje (pri otrocih zelo pogosto), povečane vrednosti transaminaz, srbenje, osip, ekhimoza, krvavitve v koži in podkožju, bolečine v udih, krvavitve v urogenitalnem traktu (menoragijo so opazili zelo pogosto pri ženskah < 55 let pri zdravljenju GVT, PE ali preprečevanju ponovne GVT ali PE; pogosto pri mladostnicah po menarhi), okvara ledvic, zvišana telesna temperatura (pri otrocih zelo pogosto), periferni edem, splošna oslabelost in pomanjkanje energije, krvavitev po posegu, kontuzija, sekrecija iz rane. *Občasni:* trombocitoza, trombocitopenija (pri otrocih pogosto), alergijska reakcija, alergijski dermatitis, angioedem in alergijski edem, cerebralna in intrakranialna krvavitev, sinkopa, tahikardija (pri otrocih pogosto), suha usta, okvara jeter, povečane vrednosti bilirubina (pri otrocih pogosto), povečane vrednosti alkalne fosfataze v krvi, povečane vrednosti GGT, urtikarija, hemartroza, slabo počutje, povečane vrednosti: LDH, lipaze, amilaze. *Redki:* zlatenica, povečane vrednosti konjugiranega bilirubina (pri otrocih občasno), holestaza, hepatitis (vključno s hepatocelularno poškodbo), krvavitve v mišicah, lokaliziran edem, vaskularna pseudoanevrizma. *Zelo redki:* anafilaktične reakcije vključno z anafilaktičnim šokom, Stevens-Johnsonov sindrom/toksična epidermalna nekroliza, sindrom DRESS. *Neznana pogostnost:* utesnitveni sindrom ali akutna odpoved ledvic po krvavitvi. **Način izdajanja zdravila:** Predpisovanje in izdaja zdravila je le na recept. **Imetnik dovoljenja za promet:** Bayer AG, 51368 Leverkusen, Germany **Za nadaljnje informacije o zdravilu Xarelto, se lahko obrnete na:** Bayer d.o.o., Bravničarjeva 13, 1000 Ljubljana / mi.slovenia@bayer.com **Verzija:** EU/12 (06/2021)
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POROČANJE O DOMNEVNIH NEŽELENIH UČINKIH

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Samo za strokovno javnost.

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