

100 years – Faculty of Medicine, University of Ljubljana

100 let Medicinske fakultete Univerze v Ljubljani (1919–2019)

Zvonka Zupanič Slavec

Institute of History of Medicine, Faculty of medicine, University of Ljubljana, Ljubljana, Slovenia

Korespondenca/ Correspondence:

Zvonka Zupanič Slavec,
e: zvonka.zupanic-slavec@mf.uni-lj.si

Ključne besede:

Medicinska fakulteta Univerza Ljubljana; 100. obletnica; zgodovina medicine; študij medicine; študij stomatologije/ dentalne medicine; pedagoško delo; znanstveno-raziskovalno delo

Key words:

Faculty of Medicine University of Ljubljana; 100th anniversary; history of medicine; curriculum of medicine; curriculum of dental medicine; teaching; scientific research work

Prispelo: 5. 12. 2019

Sprejeto: 8. 12. 2019

Izvleček

Slovenska medicina ima svoje zgodnje predhodnike v prosvetljenski Akademiji delovnih (1693–1725) z njeno medicinsko sekcijo in z dr. Markom Gerbcem, četudi je že Jezuitski kolegij leta 1619 v Ljubljani vpeljal visoko šolstvo. Leta 1782 ustanovljeni Mediko-kirurški učni zavod v Ljubljani je izobraževal srednje zdravstvene kadre, v času Ilirskih provinc (1809–1813) pa je napredoval na raven medicinske fakultete, ki pa zaradi restavracije avstrijske oblasti ni uspela izobraziti niti prve generacije diplomantov. Leta 1848 smo na Slovenskem ostali celo brez prej imenovane medicinske srednje šole, ker so jo oblasti zaprle, ohranile so se le babiške šole.

Šele razpad avstro-ogrske monarhije je leta 1919 omogočil nastanek prve slovenske Univerze in znotraj nje nepopolne Medicinske fakultete s štirimi predkliničnimi semestri. Leta 1940 je fakulteta po napornih prizadevanjih pridobila še 5. in 6. semester. Povojni elan je pripeljal v juliju 1945 do ustanovitve popolne Medicinske fakultete z 10. semestri. Na pionirski način je skromna kadrovska zasedba uspela vpeljati redni študij. V študijskem letu 1949/1950 se je Medicinska fakulteta odcepila od Univerze in kot Medicinska visoka šola vzgojila le eno generacijo zdravnikov, leta 1954 pa se je morala ponovno priključiti k Univerzi. V času odcepa so jeseni 1949 ustanovili Stomatološko fakulteto, ki se je kmalu povezala s fakulteto, kjer sta nastala odseka za splošno medicino in stomatologijo. Leta 1968/1969 je fakulteta vpeljala magistrski študij in leta 1995 enoviti doktorski študij, v študijskem letu 1989/1990 pa je študij podaljšala na 12 semestrov.

Leta 1975 je fakulteta z izgradnjo nove stavbe Kliničnega centra v Ljubljani pridobila potrebne predavalnice, seminarske prostore in prostore za klinične vaje. Desetletje za tem, leta 1987, so se osrednji predklinični inštituti preselili v novo fakultetno stavbo na Korytkovi ulici v kompleksu ljubljanskih bolnišnic, študenti pa so končno pridobili sodobne vajalnice, študijske prostore in drugo. Leta 2015 je fakulteta južni trakt Šentpeterske kasarne nadomestila z novo stavbo predkliničnih inštitutov za biokemijo in biologijo celice. Študij se je vsa leta spreminjal in posodabljal, leta 2009/2010 je stekel po bolonjski reformi.

Odkar je Medicinska fakulteta popolna, je vzgojila okoli 9000 zdravnikov in 2000 zobozdravnikov ter izsolala na podiplomskem študiju nad 1700 doktorjev znanosti in nad 1000 magistrstov znanosti ter številne diplomante na podiplomskih kliničnih izobraževanjih. Medicinska fakulteta je usmerjena v prihodnost, k čvrstemu povezovanju teorije s prakso, interdisciplinarnemu in mednarodnemu sodelovanju, predvsem pa v vzgojo kakovostnih novih zdravniških kadrov.

Abstract

The early beginnings of Slovenian medical education take root in the Enlightenment-era with Academia operosorum (1693–1725) and its medical section with the physician Marko Gerbec, although the Jesuit College introduced higher education in Ljubljana already in 1619. In 1782, a Medico-Surgical Academy was established in Ljubljana, the first to provide a secondary level of medical education. Later on, when a part of present Slovenian lands was included in the Illyri-

an Provinces (1809–1813) as a part of Napoleon's French Empire, with Ljubljana as capital, the school advanced to the level of a medical faculty (*École Centrale*). The subsequent restoration of Austrian sovereignty prevented the school from completing even the first class of graduates' training. In 1848, Medico-Surgical Academy was dissolved and only midwifery schools remained.

It was only after disintegration of the Austro-Hungarian Monarchy, as a consequence of the World War I, that in 1919 the first Slovenian University was established in Ljubljana, and within it a incomplete medical faculty was offering four preclinical semesters. In 1940, fifth and sixth semesters were added to the Faculty. The liberation impetus led in July 1945 to the establishment of a complete medical faculty including five years course divided in ten semesters. In the 1949/1950 academic year, the Faculty of Medicine was separated from the University and trained one generation of physicians as a medical college; in 1954, it was reintegrated into the University. During that period, in autumn 1949, the Faculty of Stomatology was established, which soon joined with the Faculty of Medicine, whereupon two departments were established: one for general medicine and one for stomatology (dental medicine). In the 1968/1969 academic year, the Faculty of Medicine introduced a master's programme, and in 1995 a uniform doctoral programme; in the academic year 1989/1990 the programmes of medicine and dental medicine were extended to twelve semesters.

In 1975, the new Ljubljana Medical Centre building was finished and the Faculty thus obtained the necessary lecture halls, classrooms, and rooms for clinical practice. In the next decade, in 1987, the main preclinical institutes moved to the new building of the Faculty and students finally received state-of-the-art lab classrooms, facilities, and other infrastructure. In 2015, the Faculty also constructed a new building for preclinical institutes for biochemistry and cell biology. Throughout the years the programme has continued to improve and stay up to date, and the Bologna system of education was introduced in the academic year 2009/2010.

Ever since the Faculty is complete it has trained approximately 9,000 physicians and 2,000 dentists, and awarded more than 1,700 doctors of science degrees and more than 1,000 master of science degrees in the postgraduate programme for physicians and dentists; it has also trained many students in graduate clinical training programmes. The Faculty of Medicine is oriented towards the future, a strong connection between theory and practice, interdisciplinary and international cooperation, and especially training new high-quality medical professionals.

Citirajte kot/Cite as: Zupanič Slavec Z. 100 years –Faculty of Medicine, University of Ljubljana. *Zdrav Vestn.* 2019;88(11–12):554–75.

DOI: 10.6016/ZdravVestn.3018

1 Medicine in Slovenia before the foundation of the Faculty of Medicine

The first scientific advancements in medicine in the Duchy of Carniola were made by the Medical Section of the *Academia Operosorum*, which was founded in 1693. Its most prominent member was the physician and scientist Marko Gerbec (1658–1718), who ranks among the most important Slovenian physicians and former students of the University of Padova (1). A few excellent physicians from Ljubljana who were also members of the *Academia Operosorum* set the foundations for scientific work in medicine among Slovenes Education in Ljubljana marks a longer tradition, as the Jesuit Collegium was formed back in 1597, and in 1619 – exactly 400 years ago – it began providing some college-level programmes. Among the first teaching medical activities in the territory that is now Slovenia the following bear mentioning: surgeon and professor at the

Caesarian Hospital Filip Jakob Breclj organized anatomy classes and lectures (*Collegium publicum*) in the mid-18th century in Ljubljana (2). In 1753 the Midwifery School was founded, which counts the start of the Ljubljana medical school, where Fran Klopstein (second half of the 18th century) and Balthasar Hacquet (1739–1815) taught, with the former holding training classes for surgeons, and the latter providing significant research, both advancing general medicine (3). In 1780 the Master of Anatomy, Surgery and Obstetrics Anton Makovic (1750–1803) began teaching in Slovenian. Makovic translated the German midwifery textbook and published it as a first medical book in Slovenian under the title “Prašanja inu odgovori čez ušegarstvu” (Questions and Answers on Midwifery), performing also pioneering work in Slovenian obstetrical terminology (4).

In 1782 the lyceums in Ljubljana and Klagenfurt upgraded their curricula of philosophy and theology with medicine and surgery studies. The Medico-Surgical Academy in Ljubljana was housed in the Lyceum building at present-day Vodnikov Square. It became the precursor to the first Slovenian faculty of medicine. Its lecturers included the likes of the Europe-renowned scientist Balthasar Hacquet (1739–1815), who taught botany, chemistry, anatomy, surgery, and obstetrics. Another renowned lecturer of anatomy, obstetrics and surgery was Vincenc Kern (1760–1829), who took up his teaching post at the Vienna Military Medical Academy in 1805. Between 1787 and 1808 the students of the Medico-Surgical Academy held their practice at the Ljubljana hospital at Ajdovščina (5). During the period of Illyrian Provinces (1809–1813), the Lyceum was transformed to *École Centrale* (Central School) which had seven departments, including

medicine. Studies were supposed to last 5 years. During the first 3 years of the course the medical and surgical studies were equal, while in the last two years the medical studies focused on pathology and clinical work, whereas in the surgical course more emphasis was put on practical work in anatomy, surgery, obstetrics, and forensic medicine. The end of Napoleon's Illyria in 1813 also meant the closure of this school, and with it of the predecessor of the Ljubljana medical faculty. After the restoration of Austrian Empire the Central School was degraded to the level of a secondary school. The school reform of 1810 expanded the secondary school curriculum, attaching some new professors to the Medico-Surgical Academy (*Die Medicochirurgische Lehranstalt*). The Academy's professors were always keenly aware that a medical faculty should be founded as soon as possible (6). They received moral support from the members of the Commission for Medical Study Reforms and the lyceum's chancellor the physician Jurij Matija Šporer (1795–1884). The curriculum changed over time, the conditions for enrolment continued to become more demanding, as medical-surgical studies adapted to the growing demands, and after the educational reform of 1833 the conditions were set to transform the school into a faculty. The Ljubljana Medico-Surgical Academy successfully completed its educational reforms, but nonetheless, and in spite of the demands for establishing a full university in Ljubljana, a part of which would also be the medical, the authorities decided to close the Ljubljana school during the political unrest of 1848 (7). The Medico-Surgical Academy was dissolved only in Ljubljana, while similar schools in Graz, Salzburg, and Innsbruck remained and advanced into Faculties of Medicine. During the Spring of Nations

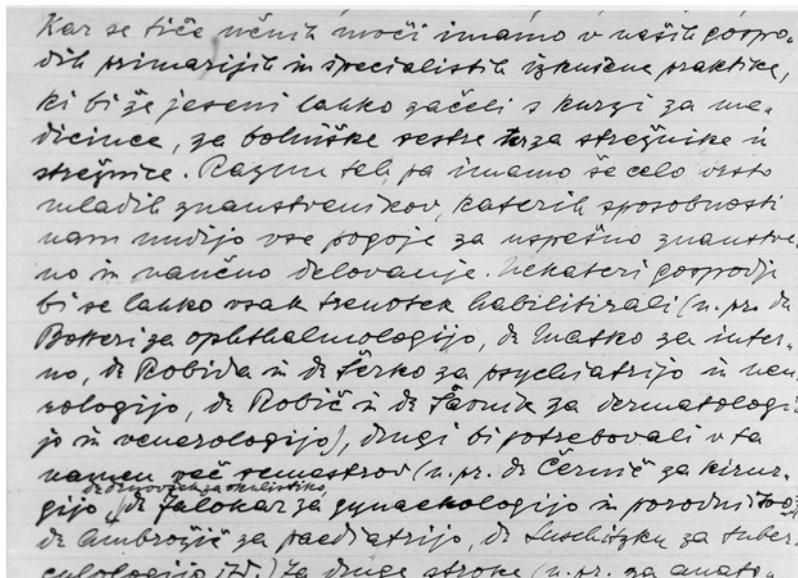


Figure 1: The manuscript of Lojz Kraigher on the potential of Slovenian physicians to establish their own medical faculty after World War I. Source: Photo archive of Institute of History of Medicine MF UL.

of 1848 the advancement of medicine in Slovenia was stifled. After that there was no longer much talk of a medical faculty in Slovenia. Medical doctors orga-



Figure 2: The first building of the incomplete Faculty of Medicine on Zaloška Road 4 in Ljubljana, the work of the architect Ivan Vurnik. Source: The National Museum of Contemporary History Ljubljana.

nized into the Medical Reading Society in 1861, in the Medical Association of Carniola in 1863 (8), in the Association of Physicians in Styria in 1876. Until the end of World War I, Slovenian doctors of medicine did not repeat their demands for a medical faculty (9). In 1919 the Medical Association of Carniola was renamed Slovenian Medical Association.

2 The development of a incomplete Faculty of Medicine

After the disintegration of the Austro-Hungarian Empire, the Subcommittee for Faculty of Medicine at the University Committee was founded in Ljubljana in 1918. In February 1919 the resolution with the request for immediate foundation of a medical faculty at the University of Ljubljana was adopted nearly unanimously at the annual general meeting of the Slovenian Medical Association. The Subcommittee for the Faculty of Medicine, which was composed of the physicians Lojz Kraigher (1877–1959), Ivan Oražen (1869–1921) and Alojz Zalokar (1887–1944), drafted a report in which it recommended the classes for the first year starting in the autumn of 1919, announced the preparations for the curriculum for the higher classes, and submitted a plan for the faculty's departments as well as a draft curriculum (10). (Figure 1) The faculty's institutes were to receive facilities at what was then brand new military barracks on Poljanska Road, and the new Institute of Anatomy was to be constructed as one of the University's first new buildings on the plot on Zaloška Road near the Ljubljanica River. The plans were drawn up in the academic year 1919/20, and construction was set to be completed by autumn 1921; Ivan Vurnik, the founder of

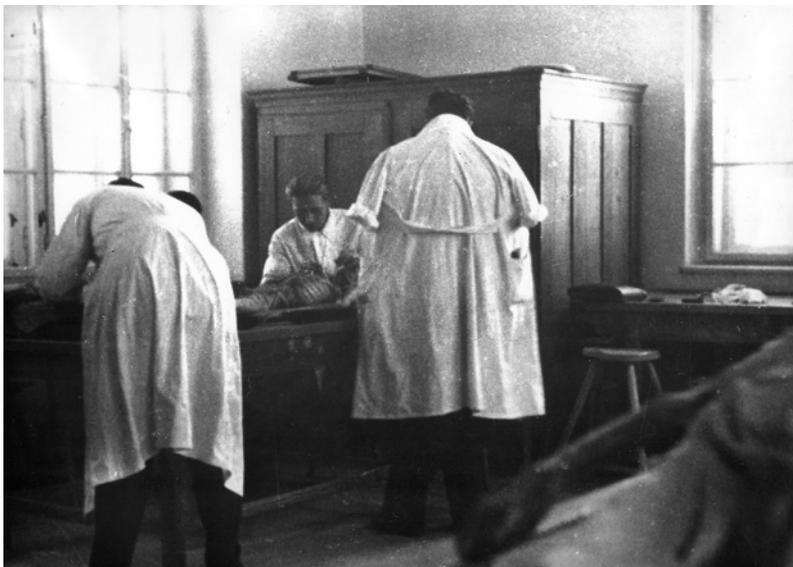


Figure 3: Practical work at the Faculty of Medicine's Institute of Anatomy during the interwar period. Source: Private archive of Živa Držaj Bonač.

the Faculty of Architecture and a student of Vienna professor Otto Wagner, was selected as the architect (11). (Figure 2)

The Faculty of Medicine was established upon the foundation of the University of Ljubljana on 23rd of July 1919; however, to the great disappointment of those involved, it offered only the first two years of studies. Classes started in November 1919, with 66 stu-



Figure 4: Laboratory practical work in chemistry. Source: Private archive of Breda Stucin.

dents enrolling. By the end of 1938 the first finals were completed by 543 candidates, who then continued their studies in Zagreb, Belgrade or abroad, mostly in Prague. The curriculum leaned on that from the Zagreb Faculty of Medicine, which was founded in 1917 (12). The Official Gazette of the Kingdom of SHS published the required legislation on 23 August 1919. On the final day of August of that year the first professors were appointed: most of anatomy classes were taken over by the physician Janez Plečnik (1875–1940), anatomy and physiology of the nervous system by the physician Alfred Šerko (1879–1938), and anatomy and histology of the eye by the physician Albert Botteri, who departed for Zagreb the next year; Ljubljana subsequently struggled in finding professors for this field and for physiology (13). This was the start of the Ljubljana Faculty of Medicine's (MF) quarter-century long and rocky road. Classes in anatomy and forensic medicine (for law students) were conducted in the classroom that was a lecture hall in the morning, then transformed into an autopsy room in the afternoon, while the lecture hall for the Institute of Anatomy was being built at a snail's pace. (Figure 3, Figure 4) Between 1919 and 1939 the incomplete MF and all of its institutes were housed in the building of the Institute of Anatomy on Zaloška Road 4. The tight quarters brought together the professors and the students in their constant struggle to improve working conditions and obtain a full faculty, and at the end of World War II in 1945 the foundations were laid for a full medical faculty. These difficulties with a lack of premises were partially eased by the exceptional gift of Ivan Oražen (1869–1921), who in his will in 1921 endowed the Faculty of Medicine and its students with two houses on Wolfova Street and on Dolenjska Road



Figure 5: After World War 2 St. Peter's Barracks in Ljubljana became the seat of the full Faculty of Medicine. Source: Photo archive of Institute of History of Medicine MF UL.

in Ljubljana, which were then refitted as the Oražen Student Housing. Since 1925 and until today over 1000 students of the University of Ljubljana lived there free of charge, mostly medical students after the full faculty of medicine was established (14).

Just before World War II the demands for a new hospital in Ljubljana and a complete faculty of medicine became so loud and ubiquitous in the public media that they could no longer be stifled (15). In 1940 the government in Belgrade finally approved the addition of the 5th and 6th semesters to the Faculty. The curriculum now included three new classes: pathology, surgery, and internal medicine. The faculty also got three new full-time professors: Franc Hribar (1895–1967) for pathology, Božidar Lavrič (1899–1961) for surgery, and Karl Lušicky (1892–1958) for internal medicine. The ice was broken and there was no lack of enthusiasm. Both were opened in the summer of 1941. During the war the faculty was more or less running on fumes. Classes continued, as did the pra-

ctical exercises, but an increasing number of professors, assistants, and students were working with the resistance movement, joined the partisans, or were jailed, interred, or taken off to forced labour. Because of the war, classes were halted in June 1943 (16). During the war a total of 100 doctors and medical students were killed, which represented 10 % of the total number of doctors and students at the time (17). 38 medical students were killed, and 19 died in camps or were shot as hostages (18,19).

3 The establishment of the full Faculty of Medicine

The full Faculty of Medicine in Ljubljana, offering a full 10 semesters of studies, was established by a governmental decree in 31 July 1945 (20). The faculty took over the medical institutions of the Ljubljana General Hospital to house its divisions and institutes there. The administration of the MF, the Central Medical Library, and some preclinical institutes were granted makeshift premises in the old and weathered building of the army barracks of St. Peter in 1945, and some have remained there to this very day. (Figure 5) The firm commitment and the resolute will of the Faculty's employees at the time made it possible for the Faculty to commence with lectures and practice in the winter semester of 1945/1946 for all the grades, despite a severe lack of any equipment, and especially textbooks. The faculty had 27 professors and 566 students, of which 302 were attending first year (165 men and 137 women), facing 10 semesters of studies. The first professors at the full MF included Božidar Lavrič, Igor Tavčar, Pavel Lunaček, Janez Milčinski, Bogdan Breclj, Franc Derganc, Jože Rant, Valentina Kobe, Milica Petrović Valentinčič, and others. (Figure 6)



Figure 6: The first professors of the full Faculty of Medicine in 1945. Sitting (from left): Bogdan Breclj, Milica Valentinčič Petrovič, Božidar Lavrič, Marjan Ahčin (Minister of health), Bogdan Derč, Janez Milčinski; standing (from left): Dušan Stucin, Martin Benedik, Mirko Derganc, Josip Hebein, Igor Tavčar, Hubert Pehani, Sabina Praprotnik, Branko Volavšek, Valentina Kobe, Milan Žumer, Albin Seliškar, Leopold Ješe, Ivan Marinčič, Jože Rant. Missing from this photograph: Franc Hribar, Pavel Lunaček, Ivan Marinčič, Jernej Demšar, Ivan Pintar. Source: Photo archive of Institute of History of Medicine MF UL.

Another new addition was the establishment of the Division of Stomatology, the learning base for the stomatology class. This class was elective at first, but soon became compulsory. The first full professor for dental medicine and the chancellor of the Dental Medicine Division was Jože Rant (1896–1972).

The next few years MF faced the fastest growth in its history. During the year 1950/1951 the number of students was the highest at 817, with 32 professors. Since its foundation in 1945 the complete MF was an integral part of medical services, just like the other two Yugoslav

Faculties of Medicine in Belgrade and Zagreb. When the faculty took over the Ljubljana hospitals it also became responsible for all hospital treatment. The connection with the university was maintained through pedagogical work.

4 The Medical College and the Faculty of Stomatology

The 1949–1954 period was a special era in the development of the Faculty of Medicine, when it was excluded from the University. It became the independent Medical College with all the



Figure 7: The first professors of dental medicine in the 1950s. From left: Branko Palčič, Vladimir Volavšek, Valter Krušič, Vera Lenart, Dušana Lavrič, Jože Rant, Lojze Brenčič, Franc Čelešnik, Anton Logar, Milan Perušek, dentist Vekoslav Šmid. Source: Photo archive of Institute of History of Medicine MF UL.

authority that the University held before. This most likely significantly shortened the time needed for the creation of the Faculty of Stomatology – established on 25 October 1949 as a successor of the Division of Stomatology (Figure 7). Besides Prof Rant, who was now also lecturing orthodontics alongside dental medicine, the faculty also employed a few more lecturers and assistants. The situation with the general lack of space available to the Faculty of Stomatology improved in 1954, when the Faculty of Stomatology was relocated to the new building of the Department of Stomatology. During the time of the Medical College, in the academic year of 1952/1953 the six-year study was implemented, however, it did not last for even a whole generation; from 1957 onward it was once again limited to five years. The

Faculties of Medicine and Stomatology changed their curricula to accommodate this. In 1952 the divisions were removed from the authority of the Medical College, and given the status of medical institutes. The University Act of 1954 brought an end to the Medical College. The Faculty for General Medicine and Stomatology was once again consolidated into the University. In 1960 the shortage of dentists spurred changes in dental medicine studies. This led to the introduction of the levelled studies, however, it only lasted one generation. In 1960 the construction of the Division of Stomatology continued, and the extension along the Lipičeva Street was completed in 1963 (21).

The new social saying also made its way into the medical domain. From 1963 the graduates of MF were no longer cal-

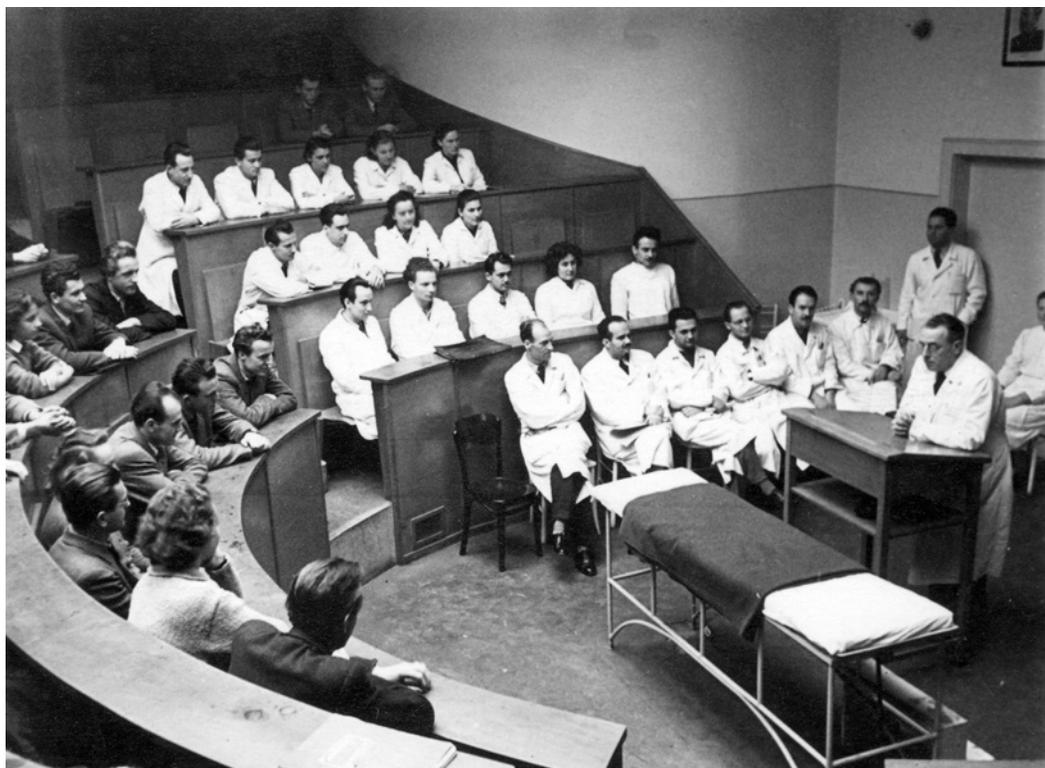


Figure 8: Lectures – a basic part of the study of medicine: the internal medicine professor Igor Tavčar in the lecture hall of the Division of Internal Medicine of the Clinical Hospitals in Ljubljana in 1952 (today the C building of the Institute of Oncology). Source: Photo archive of Institute of History of Medicine UL MF.

led doctors of medicine or doctors of stomatology, as these terms were replaced with physician and dentist (22), and only after a lot of struggle of the Slovenian Medical Association and mostly its president Prof Anton Dolenc (1930–2013) these titles again were conferred upon graduates in 1986. During this nearly 25-year period, MF graduates mostly did not pick up their diplomas, only certificates of the completion of their studies (9). Private medical practise was also discontinued, and the Slovenian Medical Association could no longer continue operating under this name, so medical doctors convened in the scope of the Medical Science Section of the Unified Union, and the *Zdravniški vestnik* (Journal of Medicine) was renamed as *Zdravstveni vestnik* (Medical Journal).

The period after 1960 brought the fastest growth of MF: in 1961 the Faculty

had 17 institutes, 19 divisions and 3 independent institutes. During the next 15 years the curriculum was often on the agenda of the Faculty Council. The faculty's main concern was to strengthen its ranks and provide healthcare services with enough doctors, especially practitioners of general medicine and dentists, as there was a shortage all across Slovenia. The curriculum was adapting to local and global developments in medicine, so that the number of courses doubled between 1945 and 1960. A proper reform of the curriculum was required, with work on this beginning in 1960 and continuing in the following years. The reform's core emphasised practical work and individual studies. It was desired that MF graduates have a foundation in general medicine that would allow them to take up any medical activity after they completed their studies. It was



Figure 9: The long-awaited new building of the Faculty of Medicine on Korytkova Street, completed in 1987. Source: Photo archive of Institute of History of Medicine UL MF.

the faculty's duty to make sure that the students received in-depth knowledge across all the professions. For students these classes were elective. The condition for comprehensive study was for a candidate to first complete their basic obligations, and there was a contest for students to join the in-depth studies. Each institution opened a certain number of positions every year and every profession had to prepare a curriculum for in-depth studies. The faculty took the same initiative to introduce the one-year residency (23). (Figure 8)

The desire to stabilize the conditions reached its height in 1965 at the adoption of Yugoslav norms for study at faculties of medicine. The faculty had to focus on consolidating student conditions, make its classes more effective, and draft new curricula. MF also had to address its lack of available facilities. Practical work took place in numerous groups, regularly lasting until late in the evening, and the explosion of global medical knowledge demanded further extensions of the curriculum, the education of new experts, the opening of new positions, and consequently for even bigger premises. The

construction of preclinical institutes was inevitable, and was supported not only by MF and its students, but also the Slovenian Medical Association, with Prof Anton Dolenc at its head. Construction was also required at the Ljubljana Medical Centre, as it lacked its own medical examiner's office, and the one at the faculty has long since not sufficed modern needs and requirements. It was the faculty's idea to build the new facilities in two phases, as it lacked the funds. The construction of the first building started in 1973 and was mostly completed in 1984, with the staff occupying it by 1987. It was designed by the architect Vladimir Ažman. The new MF building was located at Korytkova street as part of the Ljubljana hospital complex to sensibly connect with the main hospital where students had clinical practice (24). The construction of the new MF building has yet to take place; however, a substitute building was erected at the south wing of the Barracks of St. Peter and handed over to MF in 2015. It houses the Institutes for Biochemistry (partly) and Cell Biology, while the Institute for Biophysics remained in the northern wing of the Barracks of St. Peter. Construction for a substitute of the eastern wing of the Barracks of St. Peter is planned. It will house some other preclinical institutes of MF that still operate in unsuitable premises.

The construction of the new building of the Ljubljana University Medical Centre (UKC) was of exceptional importance for the advancement of Slovenian undergraduate and graduate medical studies. After 1975 it gave MF new lecture halls, facilities for practical exercise and uninterrupted clinical part of their studies. This was one of the major milestones in the development of Slovenian medical research and education. (Figure 9)

In 1985 MF had 17 institutes and 24 chairs, and was collaborating with



Figure 10: An important part of the study of medicine is clinical practical work on patients. Source: Photo archive of Institute of History of Medicine UL MF (1999, photo: Jelka Simončič).

29 divisions, the Institute of Radiology, Institute for Blood Transfusion, Institute of Oncology and other. MF is also formally an integral part of the medical system and Slovenian healthcare, as its central task is to educate a sufficient number of medical doctors and dentists to treat the population (25).

5 Changes to the study programmes at the graduate level

Studies of medicine and dental medicine on MF are in two different departments, the Department of Medicine and the Department of Stomatology, later renamed into the Department of Dental Medicine. Both hold classes at the same preclinical and clinical medical chairs, while dental medicine classes are conducted at all the chairs of the Dental Medicine Division. After completed university studies in Medicine (since 2010 this is the uniform master's second-level study programme of Medicine) students obtain the title doctor of medicine, and af-

ter completed university studies in Dental Medicine (since 2010 this is the uniform masters second level study programme of Dental Medicine) they obtain the title of doctor of dental medicine (Figure 10).

In the study year 1989/1990, MF introduced the six-year study of medicine and dental medicine, with classes taught in blocks. The preclinical part of the curriculum has not changed much since. The number of hours of study also has not risen significantly, as the previous medical programme had 4725 hours, with 945 on average per year, and in 1994 this became 5190 hours and in 1999 5500 hours, and in 2018 it stood at 5371 hours. Students of medicine and dental medicine have 30 weeks of study obligations per year, of which approximately 30 % are spent on lectures, 60 % on practical exercises, and 10 % on elective classes (6 to 60 credit points) (26). During the full study curriculum they attend 40 or 48 classes. In the 2009/2010 academic year MF launched the overhauled programme in line with the Bologna process. This unified a significant share of the content in the spirit of the European guidelines, also allowing students to more easily move between different medical faculties. Students are also more frequently taught basic medical practice, where they learn the day-to-day work of a practising medical doctor. This option is provided by family medicine, with doctors acting as mentors in class, taking students into their outpatient clinics under the supervision of the Chair for Family Medicine. (Figure 11)

6 Bologna process

In the past two decades new, integrated teaching methods have cropped up, aimed at motivating students for independent work and contributing to faster and more effective studying. Integrated



Figure 11: Practical work of dental medicine students. Source: Photo archive of Institute of History of Medicine UL MF (1999, photo: Jelka Simončič).

coursework means establishing connections between clinical cases and preclinical theoretical knowledge (vertical connectivity) and vice-versa. This introduces clinical cases already in the first year of studies. The second approach is problem-based learning (PBL), which focuses on students' knowledge of the most frequent clinical signs that lead a patient to see a doctor. The essence of this approach is that students meet their professor in smaller groups, come to class with a certain knowledge they obtained from books, and professors then present clinical cases. This method of learning is much more strenuous for both professors and students than the traditional formats, but brings better results in the long-term memorization of professional knowledge and in connecting it to cases. Modern trends of medical teaching also include an early contact with patients, as this allows students to learn about medical ethics sooner, establish a better quality relationship with a patient and communicate with them. In practice this means that when a student first approaches a patient (for example during introduction

to internal medicine) they also know the basis of communicating with a patient, etc. Nowadays MF is facing an additional issue in teaching clinical medicine: patients are increasingly aware of their rights, and it is not rare that they decline an examination by a student. For this reason special learning models are being introduced, so-called skill labs, where students can learn on dummies and volunteers; MF has established a simulation centre that focuses on this approach.

The Bologna process does not fully apply to regulated professions such as medicine and dental medicine, as most countries opt for a uniform six-year study. The Ljubljana MF has revamped both of its study programmes, which will facilitate better student exchange and bring the programme in line with those of other top medical faculties across Europe. The guidelines state: "The objective of the study of medicine is to educate graduates who are able to integrate themselves into the further process of independent and guided education in medicine in any medical specialisation, and their core basic knowledge are the foundation on which they can build through scientific and research work." The new study programme provides: a high level of connections between classes, an increased scope of elective courses, active student roles in teaching, contact with the actual medical profession and patients from the first year of studies, and the ability to move between different faculties and European countries, in line with the Bologna Declaration. The course list of the university study programme includes the following types of classes: preclinical, clinical, public healthcare, and elective. The credit system is based on a student's 40-hour week. Changes to the curriculum with regard to the previous programme are mainly in that clinical studies and patient contact

are moved to earlier years, while special areas of preclinical or theoretical subjects are moved to clinical blocks in higher years. These are organized into organic systems (classwork is interdisciplinary), and in the sixth year, which is focused on integrating the knowledge and a comprehensive overview of the patient, paediatric studies are also included (27).

7 Post-graduate education

MF also had a leading role in the development of post-graduate programmes at the Ljubljana University. It was among the first at the University of Ljubljana to introduce master's study in the academic year 1968/1969; it lasted 5 semesters until 1978/1979, and was then shortened to four. Between 1976 and 1980 it organized academic specialization studies which lasted four semesters and were completed by 67 candidates. In the 1990s, MF also developed one and two-semester post-graduate education in various clinical professions, which was completed by 2000 Slovenian medical doctors and dentists, and numerous shorter post-graduate educations for practitioners of general medicine.

In 1989, MF attempted to connect its studies with some other university post-graduate programmes (the post-graduate programme of Prof Janez Peklenik). Even though these connections died down after a year, the experiment yielded some new starting points that accelerated later mergers of post-graduate studies at the University of Ljubljana. A large number of post-graduate students and collaborating faculty professors, especially those at MF, demanded formally organized individual research work. In 1989, MF formalized the studies, assigning credit scores to courses. It introduced individual research subjects and public presentations of proposed

master's thesis, which are still a core element of doctoral programmes (10).

In 1995, MF introduced uniform master's and doctoral studies, in line with the legislation, and a credit system that allowed for direct transition to the doctoral studies. This system was adapted to the European credit system for post-graduate programmes. The same year MF teamed up with the Biotechnical Faculty, the Faculty of Pharmacy, and the Faculty of Chemistry and Chemical Technology, and in cooperation with the Jožef Stefan Institute and the National Institute of Chemistry, to design the interdisciplinary study programme of Biochemistry and Molecular Biology, coordinated by MF, with students being able to enrol at any of the participating faculties. The programme allowed the students to obtain a doctorate without first completing a master's course, if they submitted a published article in their field in a publication with a Science Citation Index (SCI). A similar approach was taken by the interdepartmental study of Microbiology, which was coordinated by MF and the Biotechnical Faculty in alternating two-year terms. In 1999 all three programmes joined the four-year university post-graduate study of Biomedicine, which developed into the three-year doctoral programme.

Modern post-graduate studies at MF are integrated in the scope of the university research study of biomedicine, with cooperation in studies of environmental protection and statistics. MF conducts post-graduate studies in scientific areas that include medical topics, dental medicine, biochemistry and molecular biology, microbiology, environmental protection, and statistics; these courses provide credits towards obtaining a doctorate. In collaboration with the Medical Chamber of Slovenia and the Ministry of Health MF also holds

specializations in medical examination, pathology, and microbiology with immunology.

The biomedicine doctoral study programme lasts three years, requires 180 credit points, and is a third-cycle study programme according to the Bologna qualifications framework. An emphasis of doctoral study is on research work, interdisciplinary approaches and on cooperation among internationally established local and foreign experts. The doctoral programme leads to the title of doctor of science in numerous scientific areas: clinical medicine, basic medicine, social medicine, microbiology, biochemistry and molecular biology, pharmacy, genetics, clinical biochemistry and laboratory biomedicine, toxicology, and veterinary medicine. In the 2008/2009 academic year 338 students were enrolled in post-graduate studies.

MF awarded its first doctor of science title even before post-graduate studies were formally introduced in 1957 (to Dr Ivo Raišp). From then until the end of 2018, MF promoted 1079 masters of science and 1724 doctors of science (28).

8 Students, alumni, and employees at the Faculty of Medicine

Between 1920 and 1930 about 100 students enrolled in both years of medical studies, while between 1930 and 1940 this number was 200, and after 1940 it continued growing with about 300–400 students attending all three years. At the full MF after 1949 there were between 600 and 1000 students attending. The enrolment of freshmen kept growing between 1945 and 1962 (400+ new students per year), until it was limited with entrance exams (24). From then about 150 freshmen enrolled to general medicine

study, and about 50 to dental medicine. In spite of numerous contacts between MF and government officials to increase enrolment in line with assessments forecasting a shortage of physicians after the baby boomer generation began retiring, MF only received approval for the increase in 2002. Between 2002 and 2012 this enrolment grew to 200 students of general medicine, and between 2007 and 2012 to 60 students of dental medicine. After that period, enrolment was rolled back to 150 freshmen of general medicine and 50 student of dental medicine. The larger number of students put stress on MF due to the lack of facilities and understaffing, and classes during this period went on from early morning to late at night. The establishment of the Maribor MF in 2004 partially unburdened the Ljubljana MF, as 100 students go there each year.

The faculty's student gender demographics changed over time. When MF was founded only 9 % of enrolled students were female; by 1940 this grew to a third, between 1960 and 1970 it was at an even half, and by the 1989/1990 year the percentage of female students stood at 63 %. In 2018 a full 68 % of general medicine students were female, and 72 % of dental medicine students. The feminization of medical practice has become a fact of life, as women are more adaptable and ready to carry the heavy burdens and demands of this profession. The average time of study is seven to eight years. During this time studies are successfully completed by about 90 % of those who enrol.

Between 1946 and end of April 2019 studies at MF were completed by 8809 graduates of medicine, 2269 graduates of dental medicine, 1079 masters of science, and 1724 doctors of science. In the 2018/2019 year the uniform master's study had 1577 students, of which 1082



Figure 12: A part of the professorial staff of the Faculty of Medicine, University of Ljubljana, 2019 (photo: Špela Gobec).

were women and 495 were men, with 1206 studying medicine and 371 dental medicine. In the same year, the doctoral study had 371 students. In 2018 the Ljubljana Faculty of Medicine had 261 physicians graduating (180 women and 81 men), as well as 56 dentists (45 women and 11 men) (28).

According to data from the Dean's Office, MF had 644 employees in 1992, which included 240 faculty professors and colleagues. In 2019 the faculty employed 935 people, of which 251 were professors and 87 assistants. (Figure 12) In the same jubilee year, 1544 medical and dental students with enrollment were studying at the Faculty of Medicine, and 389 students enrolled in the Doctoral Program in Biomedicine.

Since the foundation of MF some preclinical institutes – microbiology,

pathology, and medical examination – had professional medical activities providing services for the needs of the healthcare services, especially the Ljubljana University Medical Centre.

The Computer and Information Centre (RIS) administers the central part of MF's network (MF's communication and information networks), central services and applications, and provides support to the coordinators of local (29).

9 Research

The Faculty of Medicine has been developing scientific research work throughout its history. A detailed focus would far surpass the purpose of this text. Today it cooperates in numerous international and European projects, including Horizon 2020, Erasmus+ and

COST. In 2018 the faculty had 20 research projects, 49 research ARRS programmes and projects, and two infrastructure programmes, and employed 41 young researchers. To show the scope of the most successful publications in 2018, some raw data should suffice: 279 original scientific articles (29 with an impact factor of 5–10, 10 with a factor above 10), 62 review scientific articles, 8 applications for patents, and 19 scientific publications (28).

10 International collaboration

The Faculty of Medicine has established an extensive network of partnership agreements, the majority of them under Erasmus Programme. It also actively participates in the association of European medical faculties European Credit Transfer System – Medicine Association (ECTS-MA) and the the Network of Primary Health Care (NPHC). During the past two decades the faculty has been intensively participating in the Erasmus+ programme, where it cooperated with 108 medical faculties and universities in the EU and the European Economic Area just in 2019. Foreign teachers and experts come to work at the faculty, while experts from Ljubljana go abroad (28). In September 2008 the faculty worked together with the student organizations for medicine and dental medicine to establish the system of student tutorship for visiting Erasmus+ students. The heads of chairs, the student office of the MF, student organizations and the Central Medical Library all actively participated in organizing studies for future Erasmus students.

Student exchanges according to the Erasmus programme continued expanding from year to year, and in 2018

approximately 800 foreign students came to Slovenia, while about 700 of our students went abroad. In the 2018/2019 academic year 50 students of the Faculty of Medicine went abroad through the Erasmus+ programme, 74 attended practical training, while 60 attended programmes set up through bilateral agreements with the US and Brazil. 113 Erasmus students from abroad attended the Ljubljana Faculty of Medicine in exchange programmes, 42 came for practical training, and 11 through University agreements, and 31 through the CEEPUS programme. MF also introduced the student and professor system of tutorship for visiting students (28).

11 Publishing

In its hundred years MF has published many textbooks and course materials in Slovenian. Back when other sources were not easily available, this was often the only printed study literature. Today both professionals and students have access to a plethora of books in various languages and expert resources online. The Faculty of Medicine continues to believe that publishing its own textbooks is important, as local experts can add professional aspects that are related to national practice and the medical idiosyncrasies of the local population. This also enriches Slovenian technical language and strengthens its use, which is especially important when medical staff talk to patients.

MF has been publishing the journal *Medicinski razgledi* since 1962. It was founded by a group of students of medicine and stomatology. Editorial board members are all students of medicine and dental medicine, who work on a voluntary basis. The initial objective was to publish review articles that could then be used as supplemental course mate-

rial. During its nearly half a century of existence the journal grew into a peer-reviewed journal that publishes review, expert, and research articles on biomedicine and case studies from clinical practice. The authors are mostly physicians, mainly faculty professors. Every year four issues are published. The journal also includes a supplement with other content.

12 Available premises

In 1987 phase one was completed in the construction of five preclinical institutes that were the bottleneck of the medical educational process: anatomy, histology with embryology, pathology, pharmacology and forensic medicine. The department of immunology of the Institute of Microbiology also moved into the new Ažman building on Korytkova Street 2 in Ljubljana.

These institutes were given the premises for teaching, expert, and research work, and they also complement the Ljubljana University Medical Centre. The question surrounding the construction of phase two of the new Faculty of Medicine remains open, with plans for the remaining 12 institutes, the Central Medical Library, the Dean's Office and the premises for students. MF's Science and Pedagogy Council supported the preparation of the plan for phase two along the new building already in 1970. The request for the plan to go through was repeated in 1993, when the Ministry of Health took on a feasibility study on the most sensible refit of the former military hospital along Zaloška Road, and undertook to arrange the whole complex of the University Medical Centre where the faculty's institutes are located. In 2015 MF managed to construct a replacement building for the south wing of the Dean's Office (former St. Peter's mi-

litary barracks) where the Institute for Biochemistry (partly) and Cell Biology were moved. Solutions for some more of MF's preclinical units are in preparation as either renovations or new buildings: a campus on Vrazov Square and a campus on Korytkova Street and along Zaloška Road.

13 Professional tradition

The Faculty of Medicine promotes the professional tradition. The chairs and institutes of MF have material collections of anatomical, pathological, forensic preparations, microscopes, and the national medical collection, with a rich library of old professional books and others. The faculty aims to retain the fresh memory of its predecessors and professors, of professional visionaries, and of those championing progressive ideas during particular periods. At its centenary on 16 October 2019 in front of the building of the Faculty of Medicine on Korytkova Street, the bust of the faculty's long-time dean Prof Alfred Šerko was unveiled, as he was the individual who strove hardest during the time between the 2 World Wars that the incomplete faculty was not disbanded. At this event the faculty also decided to commemorate major Slovenian physicians by naming its lecture halls by them. At professional events that are hosted by faculty chairs and institutes in collaboration with divisions and other associations (e.g. the Slovenian Medical Association and the Medical Chamber of Slovenia) physicians of different medical specialities come together to upgrade their knowledge. These events are often named after famous Slovenian physicians. Pathologists, anatomists and histologists have the Plečnik's Memorial, the doctors of internal and general medicine have Tavčar's Days, paediatric

cians have Derč's Days, while the dermatovenerologist have Kogoj's Days, infectologists hold Bedjančič's Days, orthodontists have Rant's Days, maxillofacial surgeons have Čelešnik's Days, medical historians have Pintar's Days, and clinical psychologists have Begant's Days. Forensic doctors come together at memorials dedicated to Janez Milčinski. There are also other professional associations. Most of them have international participation, and their content is published in journals.

Some chairs and institutes of MF also have editorial boards of expert journals. Numerous professors are peer reviewers for national and international expert journals. Numerous doctors who studied at the Ljubljana Faculty of Medicine are successful and renowned across the globe. Collaboration of individual MF units with other Slovenian scientific institutions is also significant: with the University Medical Centre in Ljubljana and Maribor, with the Institute of Oncology Ljubljana, the Jožef Stefan Institute, the National Institute of Chemistry, with the Biotechnical Faculty and the Faculty for Science and Technology, and from the Faculty of Electrical Engineering, with the pharmaceutical industry, and others. Interdisciplinary work across numerous areas shows that this enriches new findings and uses them for the good of mankind (30).

14 Conclusion

The Ljubljana Faculty of Medicine has proven its mettle during its 100-year journey from incomplete faculty in 1919 to full medical faculty in 1945 and beyond, showing firmness, teaching prowess, success in research, and carving out a proud reputation. It has provided 11,078 physicians and dentists for Slovenia's medical needs, as they heal patients, provide preventive and curative therapies for all segments of the population, offer professional support in general and specialised outpatient clinics, spas, and rehabilitation centres, and provide all required medical services at the primary, secondary and tertiary level. Through its post-graduate studies the Ljubljana Faculty of Medicine has ensured a supply of its own researchers, as with numerous doctors of science (1724 by mid-2019, with 1079 master's post-graduates) it continues its successful research work in preclinical and clinical areas. The faculty can also habilitate its teachers and assistants. In spite of all of its shortages in space, material assets, and human resources, MF always sought the best path towards raising and educating new physicians and dentists. Patients' satisfaction with their work is the biggest commendation in this institution.

In 2004 the University of Maribor founded its own Faculty of Medicine, which has already trained approximately 600 doctors until 2018.

Milestones of medical education in Ljubljana

1597, 1619

The Jesuit College in Ljubljana was founded in 1597 and in 1619 introduced the first higher education studies.

1693

Slovenian medicine's early predecessors came from the enlightened *Academia Operosorum* (1693–1725) with its medical section, and the physician Marko Gerbec.

Approximately 1750

In mid-18th century Filip Jakob Brecelj organized anatomy classes and lectures in the private anatomy institute *Collegium publicum*.

1753

In 1753 the Midwifery School was founded in Ljubljana, which counts as the beginning of the Ljubljana medical school.

1780, 1782

In 1780 the Master of Anatomy, Surgery and Obstetrics Anton Makovic began teaching in the Midwifery School in Slovenian. In 1782 Makovic also translated the first national medical book from German into Slovenian, the midwifery textbook “*Prašanja inu odgovori čez ušegarstvu*” (Questions and Answers on Midwifery), performing pioneering work in Slovenian obstetrical terminology.

1782, 1786

In 1782 the lyceum in Ljubljana and Klagenfurt added medical and surgery studies to their curricula of philosophy and theology, prompting the foundation of the Medico-Surgical Academy (*Die Medicochirurgische Lehranstalt*), a precursor to the medical faculty in Slovenia. In 1786 Ljubljana got its first civil hospital, where the clinical practice work for the Medico-Surgical Academy was held.

1809–1919

During the period of Illyrian Provinces (1809–1813) the Medico-Surgical Academy became *École Centrale* and advanced to the level of a medical faculty, however, because of the restoration of Austrian sovereignty not even the first generation of graduates completed their studies. In 1848 Slovenians lost the medical lyceum, with only midwifery schools remaining. Since 1861 physicians organized into the Medical Reading Society, since 1863 in the Medical Association of Carniola, since 1876 in the Association of Physicians in Styria, and after 1919 in the renamed Slovenian Medical Association. In 1918 the Slovenian Medical Association established a subcommittee for the foundation of the Faculty of Medicine at the future University of Ljubljana. The subcommittee members were physicians: Lojz Kraigher, Ivan Oražen in Alojz Zalokar.

1919–1943

In 1919 the incomplete Faculty of Medicine was founded with four preclinical semesters, and for most of the time until World War II it was headed with dedication by professors Alfred Šerko and Janez Plečnik as dean and vice dean, respectively. Studies began in November 1919, with 66 students enrolling, and after four semesters they continued with their studies at other medical faculties, at first mostly in Prague, and later also in Austria (Vienna, Graz, Innsbruck), as well as in Zagreb and Belgrade. In 1921 Ivan Oražen in his will endowed the Faculty of Medicine and its students with two houses on Wolfova Street and on Dolenjska Road in Ljubljana. Between 1919 and 1939 the incomplete Faculty of Medicine and all of its institutes were housed in the building of the Institute of Anatomy on Zaloška Road 4, one of the first new buildings of the University of Ljubljana. The plans for the building were made by the architect Ivan Vurnik, and is a listed building nowadays. In 1940 the Government of the Kingdom of Yugoslavia approved the 5th and 6th semester programmes at the faculty, with the curriculum including three new classes: pathology, surgery, and internal medicine. The tight quarters brought together professors and students in their constant struggle to obtain a full Faculty of Medicine. In June 1943 studies at the faculty were stopped because of the war.

Under the leadership of the Rector of the University, Richard Zupančič (1920–1921), the University Council decided to make the incomplete MF complete with 10 semesters. Already during his successor, Gregor Gojmir Krek (1921–1922), the then authorities tried to abolishing the MF. During the reign of Karl Hiterlechner (1924–1925), the authorities tried to abolish the entire Slovenian university, and rector Milan Vidmar (1928–1929) addressed King Alexander Karadjordjevic to name the University after him, thus guaranteeing its' integrity. During the rectorial role of doctor Alfred Šerko (1930–1932), he also protected the Faculty of Medicine in Ljubljana before its abolition. Subsequently, the University continued to develop (31).

1945

In July 1945 the complete Faculty of Medicine with a 10-semester study is established. The faculty took over the medical institutions of the Ljubljana General Hospital to house its divisions and institutes there. With pioneering dedication the small staff managed to introduce complete medical studies. The faculty had 27 professors and 566 students. Another new addition to the full Faculty of Medicine was the establishment of the Division of Stomatology.

1949–1954

In the academic year 1949/1950 the Faculty of Medicine split from the University of Ljubljana, and educated one generation of physicians as School of Medicine (1949–1954), then reintegrated into the University in 1954. During its independence it founded Faculty of Stomatology. In 1954–1960 it was called the Faculty of General Medicine and Stomatology which in 1960 renamed into the

Faculty of Medicine with two departments, the department of general medicine and the department of stomatology.

1962

A group of students of medicine and stomatology founded their own journal, *Medicinski razgledi*, which is still being published. It is published by an editorial board made up of students, with MF's student researchers and professors contributing articles.

1968–1987

In the academic year 1968/1969 the Faculty of Medicine introduced master's studies and in 1995 the uniform doctoral studies. In 1989/1990 the studies were extended from ten to twelve semesters. In 1975 the construction of the new building of the Ljubljana University Medical Centre brought the much needed lecture halls, seminar rooms and clinical practice facilities to the Faculty of Medicine. A decade later, in 1987, the institutes of anatomy, histology, pathology, forensic medicine, microbiology and pharmacology were moved to the new Faculty of Medicine building on Korytkova Street, and students finally got modern lecture halls, studying spaces and other.

2009 –

In 2009/2010 the reformed study programme in line with European guidelines (Bologna Declaration) was launched in the Faculty of Medicine. Every year more exchange students arrive and more Slovenian students depart abroad as part of mobility programmes, such as Erasmus+. In 2015 the Faculty of Medicine built another new building for the preclinical institutes of biochemistry and cell biology on Vrazov Square. There are also plans for further improvements to premises and facilities. The Faculty of Medicine is developing extensively in the academic, science and research and professional fields.

By the end of April 2019, the following studies were completed at the Faculty of Medicine:

- 8809 - medical graduates,
- 2269 - dental graduates,
- 1079 - Masters of Science,
- 1724 - Ph.D.

References

1. Mušič D, Borisov P, Gerbec Marko. V: Enciklopedija Slovenije, zv. 3. Ljubljana: Mladinska knjiga, 1989:204–5.
2. Borisov P. Od ranocelništva do začetkov znanstvene kirurgije na Slovenskem. Ljubljana: SAZU; 1977. pp. 159–67.
3. Borisov P. Ginekologija na Slovenskem od začetkov do leta 1980. Ljubljana: SAZU; 1995. pp. 50–9.
4. Makovic A. Prashanja inu odgovori zhes vshegarstvu. Ljubljana: Johann Michael Promberger, 1782.
5. Rijavec L. Ljubljanske bolnišnice. Prispevek k njihovi zgodovini. Ljubljana: Uprava kliničnih bolnišnic, 1960:21–3.

6. Pintar I. Mediko-kirurški učni zavod v Ljubljani, njegov nastanek, razmah in konec. Ljubljana: samozaložba, 1939:48–54.
7. Polec J. Ljubljansko višje šolstvo v preteklosti in borba za slovensko univerzo. V: Zgodovina slovenske univerze v Ljubljani do leta 1929. Ljubljana, Rektorat univerze, 1929.
8. Smerdu F. Sto let zdravniškega društva. V: Smerdu F, ur. Poslanstvo slovenskega zdravnika. Ljubljana: Slovenska matica, 1965:21–76.
9. Zupanič Slavec Z. Iz rok v roke, iz roda v rod: Slovensko zdravniško društvo in njegovi predsedniki: ob 140-letnici ustanovitve. Ljubljana: Slovensko zdravniško društvo, Znanstveno društvo za zgodovino zdravstvene kulture Slovenije, 2001:61–6.
10. Zupanič Slavec Z. Medicinska fakulteta. V: Ciperle J (ur.), Krbavčič A (ur.). 90 let Univerze v Ljubljani: med tradicijo in izzivi časa. Ljubljana: Rektorat Univerze. 2009. P. 550–67.
11. Zalokar A. Ljubljanska Medicinska fakulteta. Misel in delo, 1934;5:5.
12. Anon. Medicinska fakulteta zagrebškega vseučilišča in Slovenci. Liječ Vijest; 1917. pp. 380–7.
13. Borisov P. Medicinska fakulteta v Ljubljani in njen razvoj med dvema svetovnima vojnama (1919–1945). V: Urlep F (ur.), Kališnik M (ur.), Borisov P (ur.). Medicinska fakulteta Univerze v Ljubljani: 1919–1943: zgodovinski zbornik. Ljubljana: Inštitut za zgodovino medicine, Zdravniška zbornica Slovenije, 20.
14. Zupanič Slavec Z, Štolfa F. Dr. Ivan Oražen (1869–1921): dobrotnik Medicinske fakultete in slovenskega naroda. Ljubljana: Medicinska fakulteta, 1998.
15. Anon. Spomenica Društva medicincev o nepopolni medicinski fakulteti in pomanjkljivi zdravstveni organizaciji v Sloveniji. Ljubljana; 1940.
16. ZAMU Fond: MF, fasc. II/148, št. 361/43.
17. Kostnapfel J. Pred pol stoletja. Zdrav Vestn. 1995;64(IV):37–8.
18. Konjajev Z, Zupanič Slavec Z (ur). Zvestoba Hipokratu. Ljubljana. Inštitut za zgodovino medicine, 1999.
19. Zupanič Slavec Z, Slavec K. Prva generacija medicincev na popolni Medicinski fakulteti v Ljubljani leta 1945 - ob 65-letnici vpisa. Zdrav Vestn 80;2011 (7/8):599–613.
20. Odlok Narodne vlade Slovenije. Uradni list SNOS in NVS, 171 (31.7.1945), 23 (1945).
21. Rant J. Razvoj zobozdravstva v Sloveniji. V: Poslanstvo slovenskega zdravnika. Ljubljana: Slovenska matica, 1965:240–51.
22. Zakon o strokovnih nazivih in akademskih stopnjah. Uradni list SFRJ, 13 (1963).
23. Medicinska fakulteta. V: Petdeset let slovenske Univerze v Ljubljani: 1919–1969. Ljubljana: Univerza, 1969:481–521.
24. Fettich J. Medicinska fakulteta. V: Enciklopedija Slovenije, zv. 7. Ljubljana: Mladinska knjiga, 1993:35–6.
25. Zupanič Slavec Z. Osem desetletij slovenskega šolanja zdravništva. V: Medicinska fakulteta v Ljubljani. Ob 80-letnici ustanovitve. Ljubljana: Medicinska fakulteta, 1999:11–29.
26. Podatki tajništva UL MF, 23.7.2009.
27. Splošni načrt posodobitve dodiplomskega pouka na Medicinski fakulteti (MF) v Ljubljani. (arhiv Medicinske fakultete UL). Sprejeto na seji senata MF, 18/12/2000.
28. Podatki podiplomskega oddelka UL MF, pridobljeni novembra 2019.
29. Enovit magistrski študij medicina UL Medicinska fakulteta. Vloga za pridobitev soglasja k študijskemu programu (članice) Univerze oziroma samostojnega visokošolskega zavoda. UL MF, 2008:2–6.
30. Zupanič Slavec Z. Devetdeset let Medicinske fakultete Univerze v Ljubljani (1919–2009). Zdrav Vestn 78;2009 (11):659–72.
31. 100 let Univerze v Ljubljani. Ljubljana: Univerza v Ljubljani, 2019:32–5. Fettich J. Medicinska fakulteta. V: Enciklopedija Slovenije, zv. 7. Ljubljana: Mladinska knjiga, 1993:35–6.