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100 Years of the Clinic for Otorhinolaryngology and Maxillofacial Surgery at the University Clinical Center of Serbia (1924–2024)

100 година Клинике за оториноларингологију и максилофацијалну хирургију Универзитетског клиничког центра Србије (1924–2024)

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SUMMARY

The Clinic for Otorhinolaryngology and Maxillofacial Surgery at the University Clinical Center of Serbia celebrates its 100th anniversary in 2024. Established in 1924, the clinic has significantly contributed to the development of otorhinolaryngology in Serbia, keeping pace with European advancements. Its origins trace back to Dr. Jovan Jovanović Zmaj, in the early 1870s, physician who pioneered laryngoscopy in the country, and Dr. Vladan Đorđević from 1871. Both were pioneers of laryngoscopy, one in Novi Sad and the other in Belgrade. The clinic initially operated from the General State Hospital in Belgrade, before expanding and relocating multiple times. It has continually grown, introducing cutting-edge treatments and technologies, including endoscopic procedures, pediatric care, and advanced head and neck surgeries. Today, the clinic has 115 beds, six operating rooms, and specialized departments, offering comprehensive care in otorhinolaryngology and maxillofacial surgery. With a strong educational focus, it trains future medical professionals and continues to lead innovations in ENT and maxillofacial surgery. The clinic's strategic goals include modernizing equipment and expanding capacities, aiming to maintain its position as a leader in the field.

Keywords: otorhinolaryngology; maxillofacial surgery; medical history; Serbia; clinical education; health facility administration

Сажетак

Klinika za otorinolaringologiju i maksilofacijalnu hirurgiju Univerzitetskog kliničkog centra Srbije obeležava svoju 100. godišnjicu 2024. godine. Osnovana 1924. godine, klinika je značajno doprinela razvoju otorinolaringologije u Srbiji, prateći evropske trendove i napredak. Njeni koreni sežu do dr Jovana Jovanovića Zmaja pocetkom 1870. godine, koji je bio pionir otorinolaringologije u zemlji i dr Vladana Đorđevića od 1871. godine. Obojica su bili pioniri laringoskopije, jedan u Novom Sadu, drugi u Beogradu. Klinika je prvobitno radila u Opštoj državnoj bolnici u Beogradu, pre nego što se više puta proširivala i preseljavala. Tokom svog postojanja konstantno je napredovala, uvodeći najsavremenije procedure i tehnologije, uključujući endoskopske procedure, pedijatrijsku negu i napredne operacije glave i vrata. Danas klinika raspolaže sa 115 kreveta, šest operacionih sala i specijalizovanim odeljenjima, pružajući sveobuhvatnu negu u oblasti otorinolaringologije i maksilofacijalne hirurgije. S jakim fokusom na obrazovanje, klinika obučava buduće medicinske stručnjake i nastavlja da predvodi inovacije u ORL i maksilofacijalnoj hirurgiji. Njeni strateški ciljevi uključuju modernizaciju opreme i proširenje kapaciteta, sa ciljem da zadrži svoju vodeću poziciju u ovoj oblasti.

Ključne reči: otorinolaringologija; maksilofacijalna hirurgija; srpska otorinolaringologija; inovacije; modernizacija; obrazovanje

INTRODUCTION

The origins of otorhinolaryngology date back to ancient Egypt, around 3500 BCE, where a physician is recorded to have "healed the king's nostrils" [1]. The first significant advancements in the field of otorhinolaryngology occurred in the 18th century, driven by an increasing understanding of anatomy, physiology, and pathology. Archaeological and textual sources examined by Bliquez indicate that specialized instruments and techniques for surgical procedures on the head and neck, such as cranial trepanation, already existed in Greco-Roman antiquity, and certain elements of these practices persisted into early medieval medical traditions [2]. The first surgical intervention in the field of ear, nose, and throat (ENT) was the catheterization of the Eustachian tube in 1724, followed shortly by the first attempts at mastoidectomy. Early in the 19th century, the first laryngoscopy was documented. The first university clinics specializing in otology and laryngology were established in Vienna in the year 1873 [3, 4]. With the merging of otology and rhinology in the early 20th century, the specialty of otorhinolaryngology was formed, giving rise to the medical branch as we know it today [3].

The development of Serbian otorhinolaryngology kept pace with European advancements, thanks to Jovan Jovanović Zmaj (1833–1904) [5], who, in addition to being a renowned writer, was one of the founders of otorhinolaryngology in Serbia. According to an advertisement first published in the newspaper "Zastava" on November 25, 1870, Dr. Jovan Jovanović Zmaj offered medical assistance, particularly for treating throat and larynx conditions, and promoted laryngoscopy, which he performed using a small mirror (Figure 1) [6]. Even today, indirect laryngoscopy remains a standard part of ENT examinations, performed using a small mirror. Also, in the same period Dr. Vladan Đorđević, who worked in the Principality of Serbia from 1871, applied laryngoscopy and rhinoscopy in his private practice and at the Military Hospital in Belgrade. By the end of 1872, he performed several ENT and maxillofacial surgeries, including nasal polyp removal, tonsillotomies, and excision of maxillary osteosarcoma and lower lip carcinoma. He also treated otitis, tympanic membrane perforation, deafness, congenital cleft lips, and laryngospasm with valerian tincture. In his notes, he described a rare case of curing esophageal stricture using bougies after nitric acid ingestion. Among major procedures, he highlighted the removal of cervical lymph nodes and neck phlegmon drainage [7].

DEVELOPMENT OF CLINIC FOR OTORHINOLARYNGOLOGY AND MAXILLO-FACIAL SURGERY AT THE UNIVERSITY CLINICAL CENTER OF SERBIA

The first department for ear and throat diseases was opened in 1896 at the General State Hospital in Belgrade, which was established in 1881 and initially located at the site of the former Municipal Hospital in the Palilula district. The first generation of students enrolled in the ninth semester of the fifth year of studies in 1924 also attended courses in otorhinolaryngology. Following the decision made by the Faculty of Medicine in May 1924 to initiate teaching in the subject of otorhinolaryngology, work began on forming the corresponding clinic. The Clinic for ENT began operating shortly after the first lectures in otorhinolaryngology were held at the Faculty of Medicine, and by the end of December 1924, a substantial budget was approved for acquiring professional literature. The clinic was located on the premises of the Department of Ear, Nose, and Throat Diseases of the General State Hospital, 31 Vidinska Street – now George Washington Street – where the Serbian Medical Society is headquartered today (Figure 2).

The clinic had a lecture hall, a library, an outpatient unit, a waiting room, two patient rooms, and other auxiliary facilities. Due to the limited space available for teaching, professional, and scientific work, in 1927 a prefabricated wooden barrack with supporting walls, central heating, and a total of fourteen rooms was erected in the courtyard of the General State Hospital [8, 9]. Initially, the department had a capacity of 25 hospital beds, which was expanded to 35 beds by 1938 [10].

During the early years, over 400 surgeries were performed, including adenoidectomy, tonsillectomy, maxillary sinus surgery by Caldwell-Luc, nasal septum resection, radical mastoidectomy, antrotomy, juvenile fibroma surgery, and laryngofissure. By 1928, all classical ear surgeries were being performed, including surgeries for treatment of intracranial complications, surgeries of the paranasal sinuses, and some endonasal and endolaryngeal surgeries. Subsequently, neck surgery began to develop, with laryngectomies being performed, and in ear surgery, labyrinthectomies were carried out. Endoscopy also started to develop, but at that time, bronchoscopy and esophagoscopy were performed exclusively for the extraction of foreign bodies from the esophagus and lower respiratory tracts [8, 10].

In 1947, the Clinic moved to a building on Višegradska Street expanding its capacity to 100 beds . The same year, the General State Hospital, the Clinical Hospital of the Faculty of Medicine, and the Infectious Diseases Hospital (now the Infectious Diseases Clinic) in Belgrade were merged as part of the creation of a unified clinical-hospital center during the post-World War II modernization of Serbia's healthcare system. This process was significantly accelerated after 1947 when various hospital functions were consolidated to improve the efficiency of medical services and the organization of medical education and research. Further expansion in 1955, including a pavilion previously used as a Midwifery School, increased the number of beds to 106, along with the modernization of operating rooms, increased endoscopic capabilities, and improvements to the outpatient units, pediatric department, library, and student exercise facilities [10].

After the formation of the Clinical Center, the Clinic relocated in 1983 from Višegradska Street to Pasterova Street, into the former building of the Otorhinolaryngology Clinic of the Military Hospital., which had been established in the year 1957, Figure 3 [11, 12]. The outpatient section of the Clinic moved to a building on Deligradska Street, dating back to the Balkan Wars (built for the barracks of the Seventeenth Military Regiment), where the Military Academy was previously located until it was relocated to Banjica, leaving the Military Hospital behind [13]. At the time of its construction (1904–1909), this complex received high praise from domestic and

foreign experts and was considered the most modern hospital in the Balkans. The building is now under the protection of the cultural heritage of the city of Belgrade [12].

The integration with the Rehabilitation Center of the Deaf Union of Yugoslavia in 1985 marked a step towards the formation of the Institute for Otorhinolaryngology and Maxillofacial Surgery of the Clinical Center of Serbia, which occurred in 1992.

IMPORTANT FIGURES

The first doctor to specialize in ear diseases in Serbia was Dr. Sigmund-Dragoljub Šraga (1866–1915), who was appointed as a medical assistant for ear diseases at the General State hospital by the end of 1894. In 1896 he founded the Department for Ear and Throat Diseases at the General State Hospital and led it until 1906. The department was then headed by Dr. Milan Stefanović (1906-1912) and Dr. Ljubiša Vulović (1912-1924). After the department was reactivated following World War I, the Clinic for Ear, Nose, and Throat Diseases was established in 1924.Professor Dr. Ljubiša Vulović (1924-1945) was appointed as its part-time director, after being elected as a lecturer at the Medical Faculty, thus continuing his leadership. Professor Vulović was the teacher of the first generations of Serbian otorhinolaryngologists, who laid the foundations of otorhinolaryngology in Serbia by establishing departments in Niš, Kragujevac, Novi Sad, and other cities [14, 15].

After World War I, there were very few otorhinolaryngologists left in Serbia, so by 1926, there were only 12 otorhinolaryngologists working in Serbia: Prof. Dr. Ljubiša Vulović, Dr. Bukus Alkalaj, Dr. Petar Zdravković, Dr. Sergej Popov, Dr. Nega Radojičić, Dr. Dobrivoje-Ćira Maksimović, Dr. Đoka Borisavljević, Dr. Isidor Vaskler, Dr. Pavle Abelcberg, Dr. Herc Kinstler, Dr. Josif Valčić, and Dr. Đorđe Mitrović [14].

Upon the retirement of Professor Vulović in 1945, Professor Milan Fotić was appointed director. Professor Fotić in 1939 was performed the first total laryngectomy in Serbia [14], Professor Fotić in 1948 founded the Otorhinolaryngology Section of the Serbian Medical Society [16]. He was unjustly retired in 1953, due to political reasons, along with a group of professors from the Faculty of Medicine in Belgrade [14]. The development of the clinic continued through the generations. Professor Dr. Srećko Podvinec took over the leadership of the clinic in 1954, marking the beginning of its more intensive development. In 1963, the audiology, phoniatrics, and allergology departments were established [10]. From 1969 to 1978, the clinic was directed by Professor Dr. Dragoslav Savić, who received the Serbian Medical Society Award for scientific research and was also awarded the Order of Merit for the People. After him, the clinic was led by Professor Dr. Časlav Đoković from 1979 to 1983.

Professor Dr. Borivoje Krejović was the head of the Institute for ENT and MFS from 1983 to 2000, being the first to promote functional reconstructive surgery for laryngeal cancers. After Professor Krejović retired in 2000, the Institute was led by Professor Dr. Gojko Stojičić. Professor Dr. Vojko Đukić managed the Institute for ENT and MFS from 2001 to 2013. The name Institute for ENT and MFS was used until 2009, when the Institute for ENT and MFS became the Clinic for Otorhinolaryngology and Maxillofacial Surgery.

Since 2013, the Clinic for ENT and MFS has been led by Professor Dr. Nenad Arsović, who continues to hold this position today [17].

STRUCTURE OF THE CLINIC

The Clinic for ENT and MFS is currently located in three buildings and it employs 166 people. The main building, with four floors, contains six inpatient departments with 115 beds and six operating rooms.

The Endoscopy Department, with a day hospital, conducts laryngomicroscopic diagnostics and microsurgical endoscopic treatment of benign conditions and early malignant tumors of the larynx, esophagoscopy, tracheobronchoscopy, removal of foreign bodies from the esophagus and lower airways, and laser interventions. The department is equipped with a modern microscope, laser, rigid endoscope, and flexible nasopharyngolaryngoscope.

The Pediatric Department, with intensive care, provides diagnosis and treatment of congenital anomalies, injuries, foreign bodies, inflammations, tumors, and other ENT and MFS conditions. The most common surgeries performed in pediatric patients are tonsillectomy, adenoid-ectomy, and the implantation of ventilation tubes in the ear. Esophagoscopy, tracheobronchoscopy, endoscopic sinus surgery, cochlear implantation, and surgical treatment of congenital anomalies are also performed.

The Intensive Care Department treats patients requiring constant medical supervision, continuous monitoring of vital parameters, and artificial ventilation. The department has 12 intensive care beds (level III) and six semi-intensive care beds. The operating block consists of four operating rooms equipped with two surgical microscopes and a modern endoscopic surgery system. The surgical rooms are equipped with a state-of-theart navigation system for endoscopic sinus surgery as well as neuromonitoring equipment. The block also includes the Department of Anesthesiology, which is part of the Center for Anesthesiology at the University Clinical Center of Serbia (UKCS).

The Rhinology Department deals with congenital anomalies of the nose and septum, injuries and bleeding from the nose, nasal tumors, inflammations of the nose and paranasal sinuses, inflammations and tumors of the pharynx, and congenital anomalies, injuries, and inflammations of the larynx. The most frequently performed procedures include septoplasty, septorhinoplasty, conchoplasty, endoscopic and open sinus surgery, semi-amputations, and nasal amputations. The department has a total of 22 beds.

The Otology Department deals with congenital anomalies of the ear, injuries and inflammations of the external, middle, and inner ear, facial nerve function disorders, balance center disorders, and dizziness, as well as tumors of the external, middle, and inner ear. The surgeries performed include otoplasty, myringoplasty, tympanoplasty, mastoidectomy, middle ear exploration, ossiculoplasty, facial nerve decompression, stapedotomy, petrosectomy, cochlear implantation, as well as excision of ear tumors, semi-amputations, and auricular amputations. The Otology Department has 14 semi-intensive care beds and six general care beds.

The Maxillofacial Surgery Department deals with congenital anomalies and developmental deformities of the face and facial skeleton, injuries of the soft tissues of the face, oral cavity, and facial bones and jaws, inflammations of the soft tissues of the face, oral cavity, salivary glands, and dentogenic infections (abscesses and neck phlegmons). It also deals with surgical treatment of skin tumors of the face, oral cavity, salivary glands, facial bones and jaws, plastic and reconstructive surgery of the soft tissues and bones of the face, temporomandibular joint diseases, trigeminal neuralgia, and facial cosmetic surgery. The Maxillofacial Surgery Department has a total of 12 semi-intensive care beds.

The Oncology and Laryngology Department specializes in the diagnosis and therapy of benign and malignant tumors of the larynx, palliative care, and the treatment of oncological patients in the ENT region. The most frequently performed surgical procedures include tracheotomy, cordectomy, partial and total laryngectomies, neck dissections, lymph node extirpations, drainage of neck phlegmons and abscesses, and surgeries for tumors of the parapharyngeal space and congenital anomalies. The department has 20 semi-intensive care beds. The clinic also has an emergency department that operates 24/7 to handle urgent ENT cases.

In the Polyclinic building, there are outpatient units for adults and children, an operating room for outpatient surgery, sections for audiovestibulology, phoniatrics, and rhinoallergology, a student exercise room, and an oncology consultation room. The third building is located at Slavija, housing the Center for Rehabilitation of Children with Hearing Impairments.

The Rhinoallergology Section specializes in the diagnosis and therapy of rhinological and immune-allergic pathological conditions of the upper respiratory tract and related regions. The Phoniatrics Section deals with the diagnosis, prevention, and treatment of all disorders of the spoken, sung, and professional voice, as well as all articulation disorders.

The Audiology and Vestibulology Section specializes in the diagnosis and treatment of all hearing and balance disorders. The Audiological Rehabilitation Section provides early rehabilitation for children with severe hearing impairments to facilitate hearing and speech rehabilitation and reduce psychomotor issues.

In 1954, Professor Srećko Podvinec and Professor Vladeta Popović founded the Tumor Council for Malignant Tumors of the Head and Neck, which is also the oldest council at the Faculty of Medicine. The council is still active today, comprising a multidisciplinary team of otorhinolaryngologists, maxillofacial surgeons, radiologists, oncologists, and pathologists.

Currently, the Clinic employs 24 ENT specialists, four maxillofacial surgery specialists, and one internal medicine specialist. As of August 2024, the Clinic also employs seven doctors specializing in otorhinolaryngology and maxillofacial surgery and two clinical physicians. There are a total of 101 nurses and technicians, 73 with secondary education and 28 with higher education. Additionally, 12 healthcare associates and 16 non-medical workers are employed. The Clinic for ENT and MFS serves as a teaching base for the Department of Otorhinolaryngology and Maxillofacial Surgery, with three full professors, five associate professors, four assistant professors, and four clinical assistants. As part of the Program for Employment of the Most Successful Graduates of Medical Faculties and Secondary Medical Schools, sponsored by the Ministry of Health, the Clinic has employed the best students of the Faculty of Medicine in Belgrade since 2018. Through this program, ten doctors have been employed at the Clinic to date [18].

Based on Article 199 of the Law on Healthcare Protection and Article 18 of the Rulebook on Accreditation of Healthcare Institutions, Other Legal Entities, and Private Practice, a decision

was made in December 2019 to accredit the Clinic for ENT and MFS at the UKCS for a period of seven years [14].

Table 1 presents statistical data on the work of the Clinic for ENT and MFS at the University Clinical Center of Serbia over four years as an illustration of the Clinic's capacity.

During the COVID-19 epidemic in Serbia from 2020 to 2023, the doctors and nurses of the Clinic for ENT and MFS were assigned to work in COVID departments within the UKCS and the COVID hospital in Batajnica after its opening. During those years, the Clinic operated in accordance with the decisions of the Ministry of Health, treating patients with ENT and MFS pathology who were not infected with the SARS-CoV-2 virus.

CONCLUSION

The Clinic's development strategy focuses on improving the current state through capacity expansion, equipment modernization, and quality service improvement. Through clearly defined goals that include space optimization, procurement of the most modern equipment, and implementation of enhanced procedures, we plan to achieve significant progress. The primary strategic goals are improving work quality parameters, patient satisfaction, staff motivation and education, the introduction of new technologies, and infrastructure development (Figure 4). We expect that this plan will bring visible benefits to patients and staff, thereby solidifying our position as a leader in providing top medical services in the fields of ENT and MFS.

Ethics: The authors declare that the article was written according to the ethical standards of the Serbian Archives of Medicine as well as ethical standards of institutions for each author involved.

Conflict of interest: None declared.

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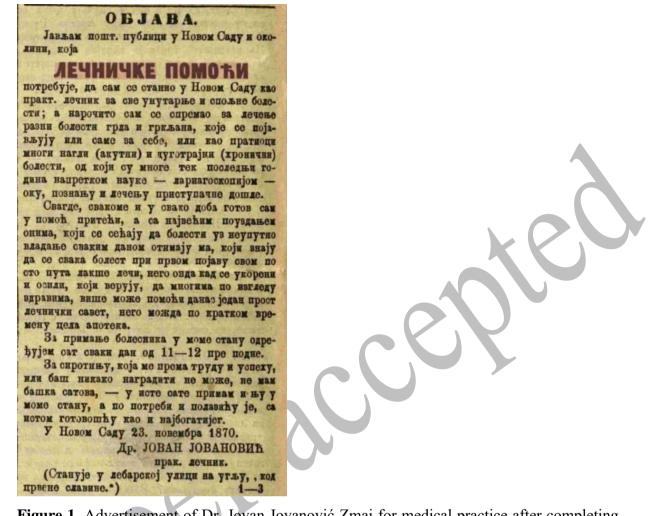


Figure 1. Advertisement of Dr. Jovan Jovanović Zmaj for medical practice after completing his medical studies; source: Jovanović Jovan Zmaj. Lečničke pomoći. Zastava, 1870, Nov 11;

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Figure 2. Current appearance of the building of the Serbian Medical Society, formerly the General State Hospital, at 19 George Washington Street; source: Korugić A, 2024, personal archive



Figure 3. The current building of the Clinic for Otorhinolaryngology and Maxillofacial Surgery on Pasterova Street; source: Arsović K, 2024, personal archive



Table 1. Report on the work of the Clinic for Otorhinolaryngology and Maxillofacial Surgeryat the University Clinical Center of Serbia for the years 2013, 2018, 2022, and 2023

Parameter	2013	2018	2022	2023
Number of hospitalized patients	2887	3320	2914	3316
Number of beds	115	115	115	115
Number of hospital days	24,265	28,034	19,250	21,041
Average length of stay (days)	8.4	8.4	6.5	6.3
Average bed occupancy (%)	58	67	52	57
Number of outpatient examinations	60,459	64,663	60,302	69,167
Number of examinations per specialist	1840	2155	2412	2766
Number of surgeries	3341	4876	3664	3948
Number of surgeries per specialist	104	162	146	158



Figure 4. Reconstruction plan for the Clinic for Otorhinolaryngology and Maxillofacial Surgery at the University Clinical Center of Serbia; source: Arsović N, Dimitrijević M. 95 godina Klinike, 65 godina Katedre za otorinolaringologiju i maksilofacijalnu hirurgija; 2019