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DENTAL SPECIALIZATIONS AND SUB-SPECIALIZATIONS IN NORTH MACEDONIA: THEN AND NOW

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ABSTRACT

The development of dental specialization in the Republic of North Macedonia has evolved over the last few decades, beginning with a limited scope of specializations and progressing to a more diverse range of disciplines in recent years. Initially, the focus was on jaw orthopedics with prosthetics and maxillofacial surgery, but with the introduction of new regulations and reforms in the legal and educational framework, additional specializations emerged, including endodontics, periodontics, and pediatric dentistry. The privatization of dental services and the modernization of the legal system in recent decades have led to a significant increase in the number of specialists, with oral surgery, orthodontics, and dental prosthetics being the most frequently chosen fields. This paper provides a comprehensive analysis of the development of dental specialization in Republic of North Macedonia, comparing it to international experience, particularly those in European Union countries. The study aims to assess the current status of the dental specialization workforce and to explore the ongoing challenges and opportunities in aligning training with evolving healthcare needs.

Keywords: specializations, sub-specializations, dentistry, North Macedonia, legal regulation

INTRODUCTION

Since civilization has been conscious of its actions, dentistry has tried to take care of an area of the human body that has many functions, not only in the realm of oral health but also in the in the social realm. The recognition of dentistry was difficult and only at the beginning of the last century was it considered worthy of a university degree [1]. The history of education in dental medicine in the Balkans is similar. Initially, dentistry was introduced as a subject for medical students at medical schools. However, as the field of dentistry developed, dedicated study programs for doctors of dental medicine / stomatology were established and separate faculties of dentistry were founded [2, 3, 4].

The rapid advancement of dental technology, increasing complexity of patient needs, rising patient expectations, and continuous research and innovation have significantly transformed the field of dentistry in recent decades [5]. Also, reforms

in the organizational structure of dental health care significantly contributed towards changes in the systems for the provision of dental health services [6, 7]. These factors collectively underscore the growing importance of specialized knowledge and skills in providing optimal oral healthcare, reflecting the field's progress and the need for ongoing professional development to meet evolving challenges in patient care. Yugoslavia was not excluded from these influences. The advancement of dentistry and its specialized fields, coupled with changes in public health services and practical demands, necessitated a revision of specialist training in Yugoslavia. This revision aimed to address future needs while considering the community's economic capabilities, recognizing both the benefits and financial challenges of such developments [8].

The legal regulation of dental specializations in the former Yugoslavia, which included the territory of North Macedonia, began in 1959. This was marked by the adoption of the Rulebook on Branches of Specialization and Duration of Specialist Internship for Health Workers [9]. The following year, in 1960, the Rulebook on Specialization of Health Workers of the First Group [10] was also adopted. The rulebook outlined two specialization options for dentists who completed their formal education in dental studies at medical or dental faculties: maxillofacial surgery, which lasts four years, and jaw orthopedics with prosthetics, which lasts three years. Additionally, physicians were also permitted to specialize in maxillofacial surgery for a duration of four years [10].

Until that time, in Yugoslavia, doctors of medicine could obtain the title of doctor - specialist in dentistry after completing a three-year specialist internship and passing a specialist exam [11]. Additionally, during this period, there were doctors specializing in dentistry who had completed their education in Europe and America. However, their number was quite limited. This small group of internationally trained dental specialists contributed to the diversity of dental expertise in Yugoslavia, bringing knowledge and techniques from abroad [3].

After a longer period, in 1972, a new bylaw was adopted [12] based on the then-current Health Care Act [13], which stipulated that the branches in which dentists could specialize were: oral and dental diseases, oral surgery, jaw orthopedics with pediatric and preventive dentistry, and dental prosthetics. The duration of specialist training for all branches was set at three years. However, the regulation provided for separate curricula and programs for jaw orthopedics and pediatric and preventive dentistry. Therefore, institutes of higher education implemented distinct specializations for these fields [4]. Upon completing the specialization and passing the specialist examination, physicians in the field of surgery were eligible for further training in the subspecialty of maxillofacial surgery, while dentists in the field of oral surgery could also pursue further training in maxillofacial surgery. The training duration for each subspecialty was one year for physicians and two years for dentists [12].

In 1984, in accordance with the Health Care Protection Act [14], the Republic Committee for Health and Social Policy, following the opinion of the Republic Community for Health Protection, the Faculties of Medicine, Dentistry, and Pharmacy, adopted the Rulebook on Specialization and Sub-specialization of Health Workers and Health Associates with Higher Education [15]. According to this Rulebook, health workers who graduated from a Faculty of Dentistry could specialize in the following branches of dentistry: (1) oral and periodontal diseases, (2) dental diseases and endodontics, (3) pediatric and preventive dentistry, (4) maxillofacial surgery, (5) general dentistry, (6) oral surgery, (7) jaw orthopedics, (8) dental prosthetics, and (9) social medicine with organization and economics of health care. All specializations were set to last 36 months, except for maxillofacial surgery, which had a duration of 60 months. The Rulebook did not provide for sub-specializations for health professionals with a dental degree, but it did allow specialists in otorhinolaryngology to subspecialize in maxillofacial surgery with a duration of 24 months.

Immediately prior to the independence of Macedonia, in 1991, the Health Care Act was adopted [16], which, during its period of validity until 2012, was amended and supplemented multiple times, regulating the reforms in the health care system established after the country’s independence. During the implementation of the Act, three rulebooks were adopted governing specializations and sub-specializations: (1) the Rulebook on Specialization and Sub-specialization of Health Workers and Health Associates with Higher Education, adopted in 1992 and subsequently amended and supplemented several times [17]; (2) the Rulebook on Specializations and Sub-specializations of Health Workers and Health Associates with

Higher Education, adopted in 2006 [18]; and (3) the Rulebook on Specializations and Sub-specializations of Health Workers and Health Associates with Higher Education, adopted in 2011 [19].

The 1992 Rulebook stipulated that health professionals who graduated from a Faculty of Dentistry could specialize in the following branches of dentistry: (1) oral and periodontal diseases, (2) dental diseases and endodontics, (3) pediatric and preventive dentistry, (4) maxillofacial surgery, (5) oral surgery, (6) jaw orthopedics, (7) dental prosthetics, and (8) social medicine with organization of health care services. All specializations had a duration of 36 months, except for maxillofacial surgery, which lasted 48 months. Health professionals who graduated from a Faculty of Medicine, upon completing specialist training and passing the specialist exam in the fields of otorhinolaryngology or general surgery, were allowed to subspecialize in maxillofacial surgery with a duration of 24 months [17].

With the Health Care Act of 1991 followed by amendments in 2004 and 2005, the process of privatization in dental practice began, particularly in the primary health care sector. In 2005, the privatization of dental services at the primary health care level was completed (only preventive dental services and emergency dental care continue to be provided in publicly owned health centers). Oral health care can be accessed through three types of dental offices (practices): public, private, and those under concession. The Health Insurance Fund negotiates contracts with private general dentists based on a capitation payment model, as well as with specialists in prosthodontics, oral surgery, and orthodontics [20].

The Rulebook from 2006 stipulated that health professionals with a degree from a Faculty of Dentistry could specialize in the following dental branches, with the respective durations: (1) pediatric and preventive dentistry – 36 months, (2) maxillofacial surgery – 48 months, (3) oral surgery – 36 months, (4) orthodontics – 36 months, (5) dental prosthetics – 36 months, (6) reconstructive dental dentistry – 24 months, (7) endodontics – 24 months, (8) periodontology – 24 months, (9) oral medicine and pathology – 24 months, and (10) primary dental health care – 24 months. Health professionals who graduated from a Faculty of Medicine, upon completing specialist training and passing the specialist examination in otorhinolaryngology or general surgery, were allowed to subspecialize in maxillofacial surgery for a duration of 24 months. Specialists in pediatric and preventive dentistry or dental prosthetics were eligible to subspecialize in pediatric prosthodontics; specialists in oral surgery, dental prosthetics or periodontology could subspecialize in oral implantology; and specialists in dental prosthetics could subspecialize in reconstructive maxillofacial prosthetics. The sub-specializations in pediatric prosthodontics and oral implantology were 12 months in duration, while reconstructive maxillofacial prosthetics lasted 6 months [18].

The 2011 Rulebook stipulated the following specializations for health professionals with a degree from a Faculty of Dentistry: (1) pediatric and preventive dentistry – 36 months, (2) maxillofacial surgery – 48 months, (3) oral surgery – 36 months, (4) orthodontics – 36 months, (5) dental prosthetics – 36 months, (6) endodontics and restorative dentistry – 36 months, (7) periodontology – 36 months, (8) oral medicine – 36 months, and (9) primary dental health care – 24 months. Dental specialists were allowed to subspecialize in the following narrower fields, with the corresponding durations: (1) oral implantology – 24 months, (2) pediatric prosthodontics – 12 months, and (3) reconstructive maxillofacial prosthetics – 12 months. Health professionals with a degree from a Faculty of Medicine, upon completing specialist training and passing the specialist examination in otorhinolaryngology or general surgery, were allowed to subspecialize in maxillofacial surgery for a duration of 24 months [19].

In 2012, a new Health Care Act was passed, amended and supplemented several times, and is still in force [21]. Based on this law, the same year, the Rulebook on Specializations and Sub-specializations for Health Workers and Health Associates with Higher Education was passed [22], which envisaged the same specializations and sub-specializations as the rulebook passed in 2011.

In 2019, a new Rulebook was passed [23]. This regulated only the specializations for health workers with higher education in the field of dentistry and pharmacy, and health associates with higher education, since in 2015, a Rulebook was passed that regulated specializations and sub-specializations for health workers with higher education in the field of medicine [24]. The same specializations and sub-specializations as in the previous two rulebooks [22, 23] were provided in the Rulebook. This Rulebook was amended and supplemented the same year, with the amendment concerning the duration of the specialization in

maxillofacial surgery, which was 48 months but, with the amendment, became 60 months.

Two years later, in 2021, a new Rulebook on Specializations and sub-specializations for Health Workers and Health Associates with Higher Education in the fields of Dentistry and Pharmacy was passed [25], which is still in force. According to the valid rulebook, dentists can specialize in the following branches of dentistry: dental prosthetics, orthodontics, oral surgery, maxillofacial surgery, periodontology, oral medicine, endodontics with restorative dentistry, and pediatric and preventive dentistry. Dentists with completed specialization in oral surgery, dental prosthetics, periodontology, or maxillofacial surgery can subspecialize in oral implantology, and those with completed specialization in the field of endodontics and restorative dentistry or oral surgery can subspecialize in endodontics with endodontic surgery.

The aim of this paper is to present the number of specialists and sub-specialists in the Republic of North Macedonia from various fields of dentistry in the period from 1959 to 2024.

MATERIAL AND METHODS

To achieve the stated goal, we sent a request to the institutions of higher education that educate specialist dental personnel, according to the Law on Public Information, to provide the number of individuals who obtained the professional title of specialist in various fields of dentistry, by year. The results received from the two higher education institutions, the Faculty of Dentistry – Skopje, University "St. Cyril and Methodius" in Skopje, and the Faculty of Medical Sciences at the University "Goce Delchev" in Shtip, are presented in tabular form.

RESULTS

Table 1 shows the number of dental specialists in North Macedonia from 1959 to 2025. In the earliest period (1959–1971), specialization was rare, with only 25 dentists completing training, mainly in jaw orthopedics and maxillofacial surgery. Between 1972 and 1991, the number of specialists increased steadily, particularly in dental prosthetics, pediatric and preventive dentistry, and oral surgery. In the period from 1992 to 2004, there was further diversification, including the emergence of endodontics and periodontology. The most recent period (2005–2025) is marked by rapid growth, with oral surgery, orthodontics, and dental prosthetics being the most frequently chosen fields.

At the Faculty of Dentistry - Skopje, part of the University "St. Cyril and Methodius" in Skopje, in 2009, 5 people completed a sub-specialization in oral implantology lasting 24 months, of which 4 were doctors of dentistry - specialists in dental prosthetics and 1 doctor of dentistry - specialist in oral surgery.

DISCUSSION

Historically, in academic and professional circles in the Republic of North Macedonia, there is a lack of analyses regarding the production of specialist and sub-specialist personnel in dental healthcare. From the beginning of the legal regulation of dental specializations until today, only a small number of publications have been published analyzing the development of the specialist dental service. Tavchiovski et al. believe that the specialist service in our country began to strengthen hesitantly and later than in other developed countries. However, this positive trend has been disrupted by the fact that the real needs for specific specialist branches at the local level were not adequately considered, and the produced specialist staff continue to perform general dental care rather than practicing their acquired specialty [26]. From the beginnings of specialization development up to the 1980s, acquiring specialized knowledge and skills in our country was more a result of personal interest than a planned response to societal needs [5]. It is important to note that, in the early stages of developing the specialist dental service, dentists working in differentiated dental offices were credited with one year of specialist internship in the field of oral diseases and teeth, or orthodontics, or pediatric and preventive dentistry. Meanwhile, dental assistants at the Faculty of Medicine – Dental Department with at least three years of assistant experience were credited with 22 to 30 months of specialist internship, depending on the approved specialization [12]. We believe that the intention of

Table 1. *Overview of specialists in various fields of dentistry by year*

	Diseases of the Teeth and Endodontics	Diseases of the Mouth and Teeth	Diseases of the Mouth and Periodontium	Pediatric and Preventive Dentistry	Endodontics	Endodontics and Restorative Dentistry	Maxillofacial Surgery	General Dentistry	Oral Medicine and Pathology	Oral Surgery	Orthodontics	Jaw Orthopedics with Prosthetics	Jaw Orthopedics	Periodontology	Primary Dental Health Care	Dental Prosthetics	Total
1960							1										**1**
1966												2					**2**
1968												4					**4**
1969							3					1					**4**
1970												8					**8**
1971												6					**6**
1972		2		1			3			1		5					**12**
1973		5		3						4		6					**18**
1974		8		2			3			1		9					**23**
1975		4		2						4			1			2	**13**
1976		4		6			1			4			3			7	**25**
1977		4		3						1			6			2	**16**
1978		4		2						2			1			9	**18**
1979		1		2									1				**4**
1980		6		4									6			3	**19**
1981		2		3			2			2			3			1	**13**
1982		1		2						2						1	**6**
1983		6		5						5			1			5	**22**
1984				3			3						5			2	**13**
1985				5			1			2			2			7	**17**
1986	3			6									1			6	**16**
1987				5						1			2			10	**18**
1988	1			5						3			4			5	**18**
1989	3		1	10			4	5		4			5			10	**42**
1990	2	1	3	7				2		2			1			4	**22**
1991	7		3	3				8		2			1			8	**32**
1992	1		4	12			2	2		4			4			4	**33**
1993				3				4		1			3			4	**15**
1994	9		7	11			2	1		4			9			14	**57**
1995	5		4	7						3			5			10	**34**
1996			2	6			1			6			12			12	**39**
1997	1		3	1			1			2			8			6	**22**
1998	3		3	2			1			5			3			7	**24**
1999	2		5	1			2			7			2			10	**29**
2000			4	7			2			8			11			11	**43**
2001	2		1	6			1			3			6			3	**22**
2002			1				1			4			4			4	**14**
2003			3	3						6			20			8	**40**

2004			4	3			5			6			20			14	**52**
2005	3			7			2			12			18			11	**53**
2006	2			4			1			6			3			6	**22**
2007	1			2			2			10			7			7	**29**
2008							1			5			2			7	**15**
2009	1		2	3						2			4		7	4	**23**
2010				1			1			5	8		1		2	6	**24**
2011				5	2					10	14		1		1	13	**46**
2012				5	1				1	12	15			2	1	19	**56**
2013				3						11	20			1	2	7	**44**
2014				2						19	21				1	12	**55**
2015							1			9	7					1	**18**
2016							2			2	1					2	**7**
2017				4		1	3		1	3	12					11	**35**
2018				3		1	1			12	5			2		3	**27**
2019				3		4	1			21	25			4	3	20	**81**
2020				3		2	1		1	5	6			2	1	5	**26**
2021				6		3	1			11	3			4	1		**29**
2022				7		7			2	12	18			2		11	**59**
2023				5		2				17	22			11		15	**72**
2024				1		1	1			16	5			1			**25**
Total	**46**	**48**	**50**	**204**	**3**	**21**	**57**	**22**	**5**	**283**	**177**	**41**	**186**	**28**	**19**	**349**	**1562**

the health authorities at the time was to provide quality dental healthcare, particularly at the secondary and tertiary levels. The most recent analyses available in our country, which refer to the period between 1971 and 1990, show that the number of non-specialist dentists increased by 416.93%, while the number of specialist dentists increased by 660.83%. However, there was a notable shortage of personnel in specialties such as pediatric and preventive dentistry, orthodontics, oral and periodontal diseases, as well as oral surgery [27].

With the privatization of dentistry in 2004 and the introduction of a new financing model for dental healthcare in 2005, according to the Health Insurance Fund Act, services in prosthetics, orthodontics, and oral surgery are now considered as specialist-consultative dental services. Based on this, the Health Insurance Fund signs contracts within the specialist dental sector only with dentists specialized in orthodontics, prosthetics, and oral surgery. In June 2012, the Government of the Republic of Macedonia adopted a Regulation on the network of healthcare institutions, which also outlined criteria for the number of specialists in oral pathology and endodontics [7]. Although the health care system in Macedonia has undergone numerous reforms, more than 20 years after the privatization of dental healthcare, the Fund still only contracts services in the aforementioned three dental specialties. This significantly affects the interest of dental graduates to pursue specialization, as they may not later be able to join the network of healthcare providers or sign a contract with the strategic purchaser of healthcare services.

In contrast, the history of dental specialty recognition in the United States reflects the evolving landscape of oral healthcare and the need for specialized training to address complex patient needs. According to the National Commission on Recognition of Dental Specialties and Certifying Boards (NCRDSCB), the process of recognizing dental specialties began before World War II, when the American Dental Association (ADA) Council on Dental Education sought to establish criteria for defining and regulating specialties. In 1947, the ADA formally recognized five specialties - oral and maxillofacial surgery, orthodontics (now known as orthodontics and dentofacial orthopedics), pedodontics (now pediatric dentistry), periodontics, and prosthodontics - and granted

the Council on Dental Education the authority to approve examining boards. Over the following decades, additional specialties were incorporated, including oral and maxillofacial pathology (1949), dental public health (1950), endodontics (1963), and oral and maxillofacial radiology (1999). In 2017, the ADA established the National Commission to oversee the specialty recognition process, aiming to reduce conflicts of interest and align dentistry with the recognition standards of other health professions. More recently, the Commission granted specialty status to dental anesthesiology (2019), oral medicine (2020), and orofacial pain (2020), reflecting the profession's ongoing commitment to scientific advancement and evolving patient care demands. Today, the ADA recognizes 12 dental specialties: dental anesthesiology; dental public health; endodontics; oral and maxillofacial pathology, radiology, and surgery; oral medicine; orofacial pain; orthodontics and dentofacial orthopedics; pediatric dentistry; periodontics; and prosthodontics [28-31].

Dental specialty recognition in the U.S. has remained largely static, with only one new specialty recognized between 1963 and 2019—oral and maxillofacial radiology in 1999—in contrast to medicine's rapid expansion. Saxen et al. [32] argue for a dynamic, evidence-based model that integrates scientific advancements, interdisciplinary collaboration, and structured residency training into a stepwise recognition process. They highlight legal challenges, including the 2017 Fifth Circuit ruling, which allowed non-ADA-recognized dentists to advertise as specialists. With emerging fields like implantology and cosmetic dentistry seeking recognition, the authors advocate for a modernized system that balances scientific rigor, public protection, and professional autonomy, ensuring that specialty development keeps pace with healthcare advancements [32]. Ziebert and Norman [33] counter Saxen et al. [32] arguing that the current specialty recognition system is already adaptive and does not require major changes. They emphasize that the ADA's 10-year specialty reviews and the 2017 establishment of the NCRDSCB ensure an unbiased, evolving process. Unlike medicine, they contend that dentistry does not need formal sub-specialties, as existing specialties incorporate advancements through education, accreditation, and research. Additionally, accredited fellowships in areas like maxillofacial prosthodontics and craniofacial surgery already offer advanced training within specialties. Thus, they conclude that the current system is effective and requires no major restructuring [33].

According to ADA workforce data (2001–2023), the distribution of dental specialists in the U.S. has demonstrated notable trends over the past two decades, reflecting shifts in professional interest and workforce demands. General practice has maintained its dominance, growing from 130,775 practitioners in 2001 to 159,265 in 2023, highlighting the continued preference for non-specialized dentistry. Among specialties, orthodontics and dentofacial orthopedics (9,265 in 2001 to 10,904 in 2023) and pediatric dentistry (4,213 to 9,183) have shown sustained growth, suggesting consistent demand in these fields. In contrast, prosthodontics (3,199 to 3,584), periodontics (4,977 to 5,542), as well as oral and maxillofacial pathology (416 to 428) have exhibited minimal growth, indicating potential workforce shortages. Endodontics (4,045 to 5,759) and oral and maxillofacial surgery (6,358 to 7,440) have also expanded modestly, reflecting continued but limited specialization interest. The number of public health dentistry specialists has decreased (958 to 782), while oral and maxillofacial radiology has seen growth (12 to 204). The recognition of newer specialties such as dental anesthesiology (44 specialists in 2019 to 141 in 2023), orofacial pain (11 in 2020 to 53 in 2023), and oral medicine (3 in 2020 to 30 in 2023) suggests emerging areas of demand. These trends underscore the need for targeted workforce policies, educational incentives, and recruitment efforts to address disparities in specialist distribution and ensure access to comprehensive dental care [34].

In the European Economic Area (EEA), although the member states share common European legal acts such as Directive 2005/36/EC and 2013/55/EU, each country develops its own healthcare system responsible for regulating dental practice and education. There are significant differences between the number of dentists produced by each country's educational system and the number and types of dental specialties officially recognized in those countries. This discrepancy can sometimes even occur within individual countries. For example, different provinces or regions within the same country may apply different regulations [35]. Most EEA member states accept and have long since im-

plemented the existing rules in accordance with European legal acts concerning the regulation of specialties. The EEA does, of course, allow a certain degree of sovereignty to countries regarding the organization of their healthcare and educational systems. Therefore, differences exist in how specialization branches are regulated across countries. Nevertheless, most European Union countries recognize specialties in oral surgery and orthodontics [36].

In our research, orthodontics and oral surgery have been the most represented specialties in recent years. However, historically, prosthodontics has been the most common dental specialization. Other specialties that are legally regulated and officially recognized across European countries include periodontology, pediatric dentistry, prosthodontics, endodontics, restorative dentistry, oral radiology, oral medicine, maxillofacial surgery, special care dentistry, public health, oral microbiology, oral pathology, and stomatognathic physiology. Some specialties are less commonly represented across healthcare systems, such as oral microbiology, oral pathology, and public health, which are recognized as specialties in the United Kingdom. Maxillofacial surgery, as a distinct branch separate from oral surgery, is officially recognized only in the Netherlands and Lithuania [37]. Some dental specialties exist in only a few countries - for example, oral pathology and public health are represented in just 5% of European countries. The United Kingdom has the highest number of officially recognized specialties, totaling 13. An interesting fact is that in Germany, as in most of Europe, dentists can officially specialize in oral surgery or orthodontics, but the types of recognized specialties vary across different German regions. Some of these regions allow specialization in a broader range of dental fields. In France, in addition to orthodontics and oral surgery, oral medicine is also recognized as a third separate specialty, while in Italy, in addition to the two primary specialties, dentists can also specialize in pediatric dentistry. Among other EU member states, the Scandinavian countries stand out—Sweden with 8 different specialties and Norway with 7. Similarly, Poland (7), Lithuania (7), and Romania (6) are countries where specialization programs cover a broader range of fields in which dentists can obtain advanced qualifications. When analyzing Europe as a continent, besides orthodontics and oral surgery, periodontology ranks third in terms of availability as a specialization across different countries, followed by pediatric dentistry, prosthodontics, and endodontics [37].

Regarding the ratio of specialists to the total number of dental doctors in each country, this percentage varies depending on the country and averages 8.7%. The lowest ratio of specialists compared to the number of dentists in Europe is found in the Czech Republic (5%) and Denmark (5.2%), while the highest is in Lithuania, where 20.4% of dentists also complete a specialization [35].

European Directives 2005/36/EC and 2013/55/EU require that all specializations must last a minimum of three years. This is the case in many European countries (Austria, Bulgaria, Croatia, Cyprus, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden). In some countries, candidates must have at least one year of work experience to apply for a specialization (e.g. Germany and Switzerland), and in others (e.g. Denmark), a minimum of two years of experience as a dentist is required. In Belgium, specialization in periodontology lasts three years, while orthodontics lasts four years. Similarly, orthodontic specialization in the Netherlands, Switzerland, and the Czech Republic is planned to be extended from three to four years [38].

The method for determining the number and location of training positions for dental specialists also varies between countries, as European directives allow for a wide range of approaches to delivering theoretical instruction and daily clinical practice. Training may take place in a university clinical center, educational center, research institution, or, if appropriate, in a healthcare facility—such as a hospital— approved by the state to provide specialist training and equipped with adequately qualified staff for that purpose. In many European countries, specialization positions are centrally controlled by the Ministry of Health. This is the case, for example, in Poland, where the Ministry determines the number of training positions and accredits the appropriate universities and private institutions where both theoretical and practical training takes place. In Poland, specialization is completed with a state specialist examination. In France, there is an institution called the Regional Health Board (ARS), which submits re-

ports to the Ministry of Health about the needs for specialists in various regions. Based on these reports, the Ministry decides on the allocation and number of specialists across different institutions. Training of specialists concludes with a final specialist examination. In Belgium, the Ministry of Health determines how many trainees may enroll in specialist training each year and at which institution. However, the faculties themselves select their candidates for specialization. Austria has a mixed model: the Ministry of Health determines the number and location for specialist training, but faculties may also admit an additional number of trainees at their own discretion. This is generally considered an economic decision, as specialization costs in Austria are not covered by the state. Although rare, there are cases where the control over the number of specialization positions is handled by a regulatory body composed of dentists. Portugal is one such example, specifically for orthodontics, where regulation is overseen by the Ordem dos Médicos Dentistas (OMD), which sets the requirements for admission. The College of Orthodontists, composed exclusively of orthodontist specialists, proposes to the OMD the number of specialization candidates that may be admitted each year [38].

In the region, in the Republic of Bulgaria, dentists can specialize in the following branches: 1) Oral surgery – 3 years, 2) Dental, oral and maxillofacial surgery – 4 years, 3) Prosthetic dental medicine – 3 years, 4) Dental implantology – 3 years, 5) Orthodontics – 3 years, 6) Operative dentistry and endodontics – 3 years, 6) Periodontics and oral diseases – 3 years, 7) Pediatric dental medicine – 3 years, 8) Social medicine and public dental health – 3 years, 9) Dental clinical allergology – 3 years, 10) Dental imaging – 3 years, 11) General dental medicine – 3 years. For individuals with a professional qualification as "Doctor", the specialization in maxillofacial surgery lasts five years [39]. In Greece, in accordance with European regulations, dentists can pursue a three-year specialization in only two areas: orthodontics and oral surgery, similar to Cyprus, Denmark, Ireland, Germany, and Luxembourg [37].

In the former Yugoslav republics, dentists may specialize in several areas of dentistry. In the Republic of Slovenia, under current regulations, dental doctors may specialize in the following areas: maxillofacial and dental orthopedics, oral surgery, pediatric and preventive dentistry, periodontology, dental prosthodontics, and dental diseases and endodontics [40]. In the Republic of Croatia, according to the 1974 Specialization Rulebook, five dental specialties were introduced: oral surgery, orthodontics, pediatric and preventive dentistry, and dental and oral pathology with periodontology—all lasting three years. This rulebook was in effect for a full twenty years, until new plans and programs were adopted in 1994. These new programs maintained the same duration for specializations but introduced new disciplines and some renamed specialties. The number of specialization branches increased to eight, allowing dentists to specialize in family dentistry, dental prosthodontics, orthodontics, pedodontics, dental pathology and endodontics, oral pathology, periodontology, and oral surgery. In 2007, the Rulebook on Specialist Training for Dental Doctors was adopted, providing for specialization in the following eight dental disciplines: pediatric dentistry, endodontics and restorative dentistry, family dentistry, oral surgery, oral medicine, orthodontics, periodontology, and dental prosthodontics [41, 42]. In the Republic of Serbia, according to the valid Rulebook from 2013, dental doctors may specialize in the following branches of dental medicine, i.e. healthcare fields: preventive and pediatric dentistry, dental diseases and endodontics, dental prosthodontics, periodontology and oral medicine, jaw orthopedics, oral surgery, maxillofacial surgery, and medical statistics and informatics. All specializations last three years, except for maxillofacial surgery, which lasts five years [43]. Previously, under the 2010 Rulebook, seven specialization branches were defined: preventive and pediatric dentistry, dental diseases and endodontics, dental prosthodontics, periodontology and oral medicine, jaw orthopedics, oral surgery, and maxillofacial surgery [44].

Similar to Serbia, dental doctors in the Republic of Montenegro can specialize in the following areas: preventive and pediatric dentistry, dental diseases and endodontics, dental prosthodontics, periodontology and oral medicine, jaw orthopedics, oral surgery, maxillofacial surgery, and medical statistics and informatics [45]. In Bosnia and Herzegovina, according to the valid Rulebook from 2020, dental doctors can specialize in the following branches of dentistry: dental prosthodontics, oral medicine and

periodontology, dental pathology and endodontics, oral surgery, preventive and pediatric dentistry, maxillofacial surgery, orthodontics, and social medicine, organization, and healthcare economics [46].

CONCLUSION

In the earliest years, in the national health system, until 1972, dental specializations were rare and limited to jaw orthopedics and maxillofacial surgery, reflecting the initial legal framework and educational capacity of the period. With the introduction of new specializations in the 1970s and subsequent legal reforms, there was a steady increase in the number of specialists, particularly in dental prosthetics, pediatric and preventive dentistry, and oral surgery. The period after 1992 shows further diversification, including the emergence of specialties such as endodontics and periodontology, aligning with evolving patient needs and international trends. The most recent decades, especially following the privatization of dental services and modernization of the legal framework, are characterized by swift growth and the largest yearly increases in the number of specialists, with oral surgery, orthodontics, and dental prosthetics emerging as the most frequently chosen fields.

Overall, these results reflect the dynamic evolution of dental specialization in North Macedonia, shaped by frequent legal revisions, educational reforms, and changing healthcare demands. Continued alignment of specialist training with scientific advancements and healthcare system needs will be essential to ensure the ongoing development and effectiveness of the dental workforce.

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Резиме

СТОМАТОЛОШКИ СПЕЦИЈАЛИЗАЦИИ И СУБСПЕЦИЈАЛИЗАЦИИ ВО СЕВЕРНА МАКЕДОНИЈА: НЕКОГАШ И СЕГА

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Развојот на специјализациите од областа на стоматологијата во Република Северна Македонија Македонија еволуираше во текот на последните децении, почнувајќи со мал број гранки на специјализација, сè до воведување поголем број дисципини во последните години. Првично фокусот бил ставен на ортопедијата на вилици со протетика и максилофацијална хирургија, но со воведувањето на новите регулативи и реформи во правната и во образовната рамка, се појавија дополнителни специјализации, вклучувајќи ја ендодонцијата, пародонтологијата и детската стоматологија. Приватизацијата на стоматолошките услуги и модернизацијата на правниот систем во последните децении доведоа до значително зголемување на бројот на специјалисти, при што најмногу интерес постои за специјализациите од областа на оралната хирургија, ортодонцијата и стоматолошката протетика. Овој труд дава сеопфатна анализа на развојот на специјализациите од областа на стоматологијата во Република Северна Македонија, компарирајќи ја состојбата со меѓународните искуства, особено оние во земјите од Европската Унија. Студијата има цел да го процени моменталниот статус на работната сила на специјалистите од различни специјалности на стоматологијата и да ги истражи тековните предизвици и можности во усогласувањето на едукацијата со постојано еволуирачките потреби на здравствена заштита.

Клучни зборови: специјализации, супспецијализации, стоматологија, Северна Македонија, правна регулација