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Original Research Article

Treatment procedures and referral patterns of general dentists in Lithuania

Vilija Berlin [a,*], Alina Pūrienė [a], Vytautė Pečiulienė [a], Jolanta Aleksejūnienė [b]

[a] Institute of Dentistry, Faculty of Medicine, Vilnius University, Vilnius, Lithuania
[b] Faculty of Dentistry, University of British Columbia, Vancouver, Canada

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ABSTRACT

Background and objective: The requirement for dental specialties and the number of specialists in each country depends on the content and execution of undergraduate dental education, the complex oral health care needs of the society and other factors. The aim of our study was to assess specific treatment procedures of Lithuanian general dentists and their need to refer patients to specialists.

Materials and methods: Census sampling was employed and the data collected by means of a structured questionnaire asking dentists about the frequency of specific treatment procedures they perform and the frequency of referrals they make to different dental specialists. The results are of a self-reported nature.

Results: From general dental practice, 76.3% of cases needing orthodontic treatment were referred to orthodontists. About half of patients needing specialized care were referred to periodontists (50.2%), orthopedists (46.9%) and oral surgeons (45.0). More than one-third (39%) of the cases needing specialist care were referred to endodontists. Only one-third of patients were referred to pediatric dentists. In about 60% of cases needing respective care general dentists extracted teeth and roots, made incisions in acute jaw infections and treated young children; in about half of cases general dentists performed complex endodontic manipulations and treatment with fixed and removable prostheses.

Conclusions: There is a clear need for Lithuanian dental practitioners to refer patients to all types of dental specialists. Undergraduate dental education program and postgraduate training should be more directed toward the extraction of teeth and roots, treatment of young children and provision of dental prostheses to patients.

* *Corresponding author at*: Institute of Dentistry, Faculty of Medicine, Vilnius University, Žalgirio 115, 08217 Vilnius, Lithuania.
E-mail address: vilija@berlin.com (V. Berlin).

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1. Introduction

In different countries, different types of dental specialties are recognized. According to the EU Directive on recognition of professional qualifications orthodontics and oral surgery are automatically recognized by all of the European Union countries [1]. Less common and recognized in European countries are periodontology, endodontics, dental orthopedics, pediatric dentistry, public health, dental medicine, radiology and other specialties [2]. The requirement for dental specialties and the number of specialists in each country is unique [3,4]. It depends on the content and execution of undergraduate dental education, the needs of individual citizens, the complex oral health care needs of the society, the personal and career growth needs of dentists, etc. [5–8].

In Europe, the most cost-effective model of medical care is one that emphasizes strong primary care [9]. Primary care brings promotion and prevention, cure and care together in a safe, cost-effective, high-quality and socially productive way at the interface between the population and the health care system [9–11]. As in medicine, specialized dental facilities are costly not only for the patient but for the national health care system as well; moreover, the high costs of educating dental specialists are often a burden for the national budget [5].

There have been six dental specialties introduced to the dental care system in Lithuania. They are oral surgery, periodontology, endodontics, dental orthopedics, orthodontics and pediatric dentistry. Similar educational institutions and dental care systems are found in Great Britain, Norway, Sweden, Poland, Latvia and some other countries [2]. Of all licensed dentists in Lithuania, 18.3% are dental specialists [12]. Specialists make up 2% to 32% of all dentists in other EU countries [2].

The study by Peciuliene et al. [13] showed that in Lithuania, general dentists need to make referrals to endodontists, the reasons of these referrals were also identified. However there is a lack of information about the competence of Lithuanian general dentists to perform various treatment procedures in oral surgery, periodontology, prosthodontics, orthodontics and pediatric dentistry, and also a lack of information regarding the referrals that general dentists make to specialists for these specific procedures. The aim of the present survey was to assess specific treatment procedures of Lithuanian general dentists and their need to refer patients to specialists.

2. Materials and methods

The study was approved by the National Data Protection Inspection (No. 2R-3247). The present survey used census sampling targeting all licensed Lithuanian dentists and dental specialists, with the exception of maxillofacial surgeons who were excluded as they have a mainly medical orientation. Names, addresses and contact information of dentists were acquired from the License Register of the Lithuanian Dental Chamber in October 2012. The data were collected from December 2012 until June 2013.

All dentists were contacted three times. Firstly, questionnaires were sent either electronically or by post; then for non-responders, copies of the same questionnaires were mailed again after 6 weeks, and nonresponders were contacted again by phone after another 6 weeks. For those who were willing to take part in the study, the questionnaires were sent by their preferred mode. After three contacts the final response rate was 67.6%. Table 1 presents sociodemographic characteristics of the study respondents. A total of 1645 general dentists, 58 oral surgeons, 45 periodontologists, 33 endodontists, 136 prosthodontists, 56 orthodontists, and 35 pediatric dentists answered the questionnaire.

The reliability of original study questionnaire was tested by asking 10 randomly chosen dentists to complete the questionnaire twice. A 2-month period was chosen in between these recordings in order to avoid memory bias. The questionnaire items were structured on nominal, ordinal and interval scales. The reliability of questions structured on nominal or ordinal scales was tested employing Cohen's kappa and interval scale responses were tested by intraclass correlation. Overall, the reliability was high as reliability for different repeated questionnaire items was within range 0.7–1.0. The questionnaire included questions about general dentists' demographic characteristics and the frequency of specific treatment procedures performed (from 0% as ''never''

Table 1 – Comparison of sociodemographic characteristics between general dentists and specialists.

Demographic characteristic	General practitioners		Specialists		*P* values[a]
	N	(%)	*N*	(%)	
Age					
35 years or younger	589	35.7	109	31.6	
36–55 years	592	35.9	141	40.9	0.183
56 years or more	470	28.5	95	27.5	
Gender					
Males	198	12.0	103	29.9	
Females	1453	88.0	242	70.1	<0.001
Residence					
Big cities	1082	65.7	284	82.3	
Suburban or rural	565	34.3	61	17.7	<0.001

[a] Chi-square test.

to 100% as ''always''). They were also asked about how often they make referrals to different dental specialists. All the results of the study are of a self-reported nature.

The SPSS statistical program version 21.0 was employed for all statistical analyses. Univariate analyses were used to describe the study sample of general and specialist dentists regarding demographic characteristics, specific treatment procedures performed, and in the case of general dentists, the referral frequency to different dental specialists. Bivariate analyses were done for the following purposes: non-response analyses, comparisons between general dentists and dental specialists (Chi-square test/Fisher test and independent sample *t* test, Mann–Whitney *U* test). Exploratory Factor Analysis (EFA) with Varimax Rotation was performed in a cohort of general dentists to examine common trends or patterns in the provision of different treatment procedures. Four clear patterns emerged. The first one relates to complex surgeries, the third – to the provision of diverse orthodontic procedures. In these patterns, general dentists tended to refer their patients to specialists. A second pattern was seen in the provision of endodontic treatment. There was variation among general dentists – some provided treatments themselves, while others referred their patients to specialists. The fourth pattern related to the provision of simple surgical procedures – the majority of general dentists felt competent enough to provide these treatments themselves.

The threshold for significance for all tests was set at $P < 0.05$. Due to some missing answers for individual questions of the questionnaire, the statistics for each question are based on a varying number of study subjects.

3. Results

Of 2971 general and specialist dentists whose contact information was available, 2008 questionnaires were returned giving a final response rate of 67.6%. The analyses showed no significant differences between responders and non-responders regarding the number of different dental specialists (oral surgeons, periodontologists, endodontists, prosthodontists, orthodontists and pediatric dentists) ($P = 0.252$). However, there were significantly fewer younger dentists ($P = 0.001$), males ($P < 0.001$) and dentists from big cities ($P < 0.001$) among the responders compared to the nonresponders (results are not presented).

General dentists reported about the referral patterns to different dental specialists. The referral patterns are presented as the percentage of referrals from all inspected patients who were diagnosed to require specialized care. Biggest proportion of those needing respective care was referred to orthodontists. Of the patients needing orthodontic treatment, 76.3% were referred to orthodontists. Of the patients needing specialized care, 50.2% were referred to periodontists, 46.9% were referred to orthopedists and 45.0% were referred to oral surgeons. Of the patients needing specialized care, 39.0% were referred to endodontists. Only one-third of patients were referred to pediatric dentists.

Table 2 compares how frequently specific treatment procedures were performed by general dentists compared with different types of specialists. The frequency of performed specific treatment procedures is presented as the percentage

Table 2 – Provision of different treatment procedures – comparison between reports of general dentists and specialists.

Treatment procedures	General dentists		Specialists		*P* value
	N	Mean ± SD[a]	*N*	Mean ± SD[a]	
Comparison between general dentists and oral surgeons[b]					
Extraction of teeth and roots	1373	64.5 ± 35.6	47	96.2 ± 11.9	<0.001
Incisions in acute jaw infections	1365	62.3 ± 41.5	47	89.6 ± 28.0	<0.001
Apicoectomy	1342	5.2 ± 19.9	47	73.5 ± 39.7	<0.001
Implant placement	1328	3.5 ± 16.8	47	48.0 ± 48.4	<0.001
Sinus lift operations	1324	1.9 ± 12.6	47	41.1 ± 48.3	<0.001
Comparison between general dentists and periodontists[b]					
Severe periodontal pathologies	1334	13.1 ± 26.0	36	96.0 ± 13.6	<0.001
Periodontal surgeries	1325	4.1 ± 17.5	36	94.1 ± 22.0	<0.001
Comparison between general dentists and endodontists[b]					
Root canal retreatments	1355	50.9 ± 32.7	24	89.3 ± 28.1	<0.001
Complex endodontic treatments	1345	31.7 ± 33.0	24	92.1 ± 21.9	<0.001
Dental traumas	1351	34.0 ± 34.4	24	77.8 ± 37.4	<0.001
Apexification and pulpotomy	1347	44.0 ± 39.2	23	87.9 ± 28.8	<0.001
Comparison between general dentists and prosthodontists[b]					
Fixed and removable prostheses	1351	41.5 ± 43.2	96	88.3 ± 30.3	<0.001
Implant prosthetics	1337	16.3 ± 34.1	94	58.7 ± 47.5	<0.001
Comparison between general dentists and orthodontists[b]					
Preventive orthodontic devices	1330	4.1 ± 16.7	29	77.8 ± 40.8	<0.001
Removable orthodontic appliances	1324	2.2 ± 12.1	30	90.4 ± 29.4	<0.001
Fixed orthodontic appliances (braces)	1327	1.6 ± 11.6	30	70.3 ± 40.5	<0.001
Comparison between general dentists and pediatric specialists[b]					
Treatment of young children	1362	60.9 ± 37.2	25	89.3 ± 27.7	<0.001
Premedication and sedation	1332	10.3 ± 26.1	25	33.8 ± 39.8	0.008

[a] Means are calculated from a theoretical range, where ''0'' is never and ''100'' is providing a treatment modality to all patients.
[b] Independent sample *t* test/Mann–Whitney *U* test.

Table 3 – General dentists' reports about the frequency of treatment procedures and referral patterns to specialists.

Treatment procedures	Mean ± SD[a]	Treatment or referral patterns with factor loadings[b]			
		Pattern 1	Pattern 2	Pattern 3	Pattern 4
Complex surgeries					
Implant placement	3.5 ± 16.8	0.874			
Sinus lift operations	1.9 ± 12.6	0.850			
Apicoectomy	5.2 ± 19.9	0.772			
Periodontal surgeries	4.1 ± 17.5	0.697			
Severe periodontal pathologies	13.1 ± 26.0	0.496			
Complex endodontic treatments					
Complex endodontic treatments	31.7 ± 33.0		0.807		
Root canal retreatments	50.9 ± 32.7		0.767		
Apexification and pulpotomy	44.0 ± 39.2		0.730		
Dental traumas	34.0 ± 34.4		0.722		
Orthodontic treatments					
Removable orthodontic appliances	2.2 ± 12.1			0.846	
Fixed orthodontic appliances (braces)	1.6 ± 11.6			0.735	
Preventive orthodontic devices	4.1 ± 16.7			0.727	
Simple surgical procedures					
Extraction of teeth and roots	64.5 ± 35.6				0.892
Incisions in acute jaw infections	62.3 ± 41.5				0.878

[a] Means are calculated from a theoretical range, where "0" is never and "100" is providing a treatment modality to all patients.
[b] Exploratory Factor analyses with Varimax Rotation, factors extracted with Eigen value >1.0.

of performed procedures from all cases when they were required. The comparison of oral surgeons' and general dentists' self-reports indicate that general dentists relatively frequently provided simple surgeries such as extractions and incisions. More complex surgeries such as apicoectomies, implant placements or sinus lift operations were usually performed only by oral surgeons. Regarding the provision of complex periodontal treatments, these were performed mostly by periodontists. General dentists reported performing root canal retreatments, apexification and pulpotomy procedures only in about half of cases. They performed complex endodontic treatments or treated dental traumas in only one third of cases. General dentists relatively infrequently provided fixed and removable prosthodontics (41.5% ± 43.2%). The comparison between orthodontists' and general dentists' reports revealed that general dentists seldom treat orthodontic patients, i.e., they mainly refer such patients. Young children were treated relatively frequently by both professional cohorts but premedication and sedation were a more frequent choice among pediatric specialists than among general dentists.

Table 3 presents results of the Exploratory Factor Analysis (EFA) performed on a cohort of general dentists. Four clear common trends in the reports of the frequency in provision of different treatment procedures emerged. They showed that few general dentists reported providing varying numbers of complex surgical procedures such as implant placements ($N = 64$, 4.8%), sinus lift operations ($N = 33$, 2.5%), apicoectomies ($N = 110$, 7.2%), treatment of severe periodontal problems ($N = 397$, 19.7%) and periodontal surgeries ($N = 95$, 7.2%). General dentists tended to refer their patients for these procedures. Most general dentists also referred their patients for orthodontic treatments. A few general dentists did provide treatments themselves, and of this group, 77 (5.8%) general dentists treated their patients with removable appliances, 33 (2.5%) of them sometimes treated with fixed orthodontics and 113 (8.5%) provided preventive orthodontic appliances. The variation among general dentists regarding the provision of endodontic treatment and treatment of traumas was observed; some provided treatments themselves, while others referred their patients to specialists. General dentists felt competent enough to provide simple surgical procedures such as extractions and incisions themselves in a significant part of cases when procedures were required (Figure).

4. Discussion

Legislation regulating dental practice in Lithuania permits general dentists to perform a broad range of complex procedures that are also performed by dental specialists. A general dentist's decision to perform treatment or to refer a patient to a specialist depends on the competence of the general dentist, the available specialists in the same dental office, the accessibility of specialized dental treatment in the region, the time involved, cost of treatment, motivation of the patient, etc. [14–17].

In Lithuania, the need for general dentists to make referrals to dental specialists and the need for dental specialists as a whole is an important and timely topic. The dentist-to-population ratio is relatively high (1.2 dentists per 1000 citizens) in Lithuania when compared to other countries and to the mean for the EU [12,18]. A general oversupply of dental professionals has been reported in Lithuania, and many dental school graduates report an intent to emigrate [19,20]. In Lithuania, the increased quality of dental education found in Lithuanian universities since Lithuania regained its independence and the numerous theoretical and practical dental courses available may have resulted in general dentists having a widened range of competencies and thus a decreased need to refer patients to dental specialists. Furthermore, intense competition among professionals working in the dental field

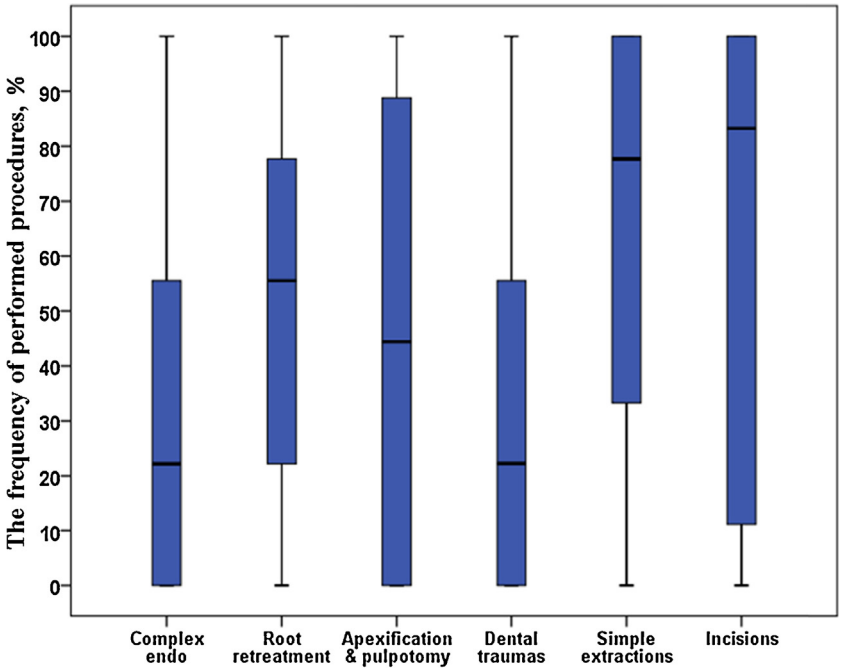

Figure – General dentists' reports about the frequency of complex endodontic treatments and simple surgical procedures (patterns 2 and 4).

in Lithuania may also result in general dentists being less inclined to refer their patients to specialists.

According to the results of this study, general dentists in Lithuania often do not provide important daily dental procedures: extract teeth and roots, treat young children and provide dental prostheses. Thus they provide only limited care to patients. They are efficient only in large dental offices where prosthodontists and oral surgeons are available or in big cities where there is an adequate access to these specialists. Therefore, primarily dental students during their undergraduate education program should be more educated and encouraged to perform these important treatment procedures.

Severe periodontal problems are another challenge for general dentists in Lithuania. The legislations allow general dentists to perform periodontal surgeries in the local pathology without additional training. However they can perform broad periodontal surgeries only if additionally qualified through postgraduate training. This postgraduate training is not popular; dentists often refer patients for specialized care (Tables 2 and 3).

General dentists also seldom treat orthodontic problems, patients are most often referred to orthodontists (Tables 2 and 3). This is in concordance with the legislation regulating dental practice in Lithuania, which does not allow general dentists to perform orthodontic treatment. However general dentists also do not generally use preventive orthodontic devices, which are in their competence. As many orthodontic problems can be avoided with them, dental students should be more educated about their use and, upon graduation be encouraged to use such devices for patient care where appropriate.

According to Peciuliene et al. [13], in 2010, 72.1% of Lithuanian dentists performed complicated root canal treatments and 19% referred patients to an endodontist. In our study, only about 40% of complex endodontic treatments were performed by a general dentist. As a shortage of endodontists was one of the main reasons which restricted the ability of general dentists to refer patients in 2010, an increase in the number of referrals to endodontists for complex endodontic treatments may occur because of the increased number of specialists as of 2013.

As the findings of the present survey are of a self-reported nature, they should be treated with some caution. They suggest that there is a need for Lithuanian dental practitioners to refer patients to all types of dental specialists recognized. They also show the competence of Lithuanian general dentists to perform specific treatment procedures and accentuate the parts in the dental curriculum of the universities and postgraduate training which deserve more attention.

5. Conclusions

There is a clear need for Lithuanian dental practitioners to refer patients to all types of dental specialists. Undergraduate dental education program and postgraduate training should be more directed toward the extraction of teeth and roots, treatment of young children and provision of dental prostheses to patients.

Conflict of interest

The authors state no conflict of interest.

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