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Epidemiological Analysis of Oral Surgery Procedures

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A B S T R A C T

The epidemiological study was conducted to assess oral health of patients referred to the Department of Oral Surgery at Clinical Hospital Center in Rijeka. The distribution of particular diagnoses and surgical interventions in relation to frequency of occurrence was tested. The total of 1,268 patients aged from 5 to 89 years, both sexes, were included in the study. All the patients were treated under local anesthesia. The most common reason for referral to oral surgery was chronic periapical lesion (33.3%), followed by retained root (26.7%), impacted tooth (12.7%), and radicular cyst (8.3%). The majority of patients, residents of Rijeka city area, were treated for the diagnosis of adult periodontitis, while the radicular cysts and hypertrophy of the upper frenulum were more frequent referral diagnoses in patients coming from the areas around Rijeka. Extractions were performed more frequently in patients from Rijeka, while cystectomies with apicectomies and frenulectomies in other patients.

Introduction

Dental health care is part of general health care system and is provided through organized services coordinated by measures of promotion and improvement of oral health[1]. In order for dental health care to fulfil its purpose the services need to be well organized and include the overall population of a given area. The specific health needs of individual age groups should also be taken into consideration.

Dental health care is provided as part of the integral system of health care activities. It is achieved through specialist out-patient and in-patient health care, depending on the complexity and extent

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of treatment procedures, education level of medical staff, quality of equipment and regional characteristics.

In dental health care there are three levels of care: primary, secondary and tertiary. The basic role of primary dental health care is to ensure the implementation of health care measures that promote and maintain health of the oral cavity and prevent and control oral and dental diseases. The following activities are part of primary dental health care: early detection and treatment of all oral diseases, and rehabilitation of the overall masticatory system.

The secondary, or specialist out-patient dental health care provides for the needs of the patients who need expert opinion, advice or treatment by dental specialists such as pedodontists, orthodontist, periodontists, prosthodontists, etc.[1].

The tertiary dental health care (stationary, hospital, in-patient) refers to hospital treatment of the patient. Great number of patients are referred to the hospital by primary health care physician, while the others are in-patients from other hospital wards who need dental care.

In the integral health care system there has to exist expert link between the secondary (specialist out-patient), primary and tertiary (hospital) health care.

Subjects and Methods

The purpose of the study was to define the type and incidence of oral surgical diseases and procedures the patients from Rijeka and the surrounding areas were submitted to at Oral Surgery Department of Rijeka Clinical Hospital Center.

The study included 1,268 patients treated at the Department of Maxillofacial and Oral Surgery of Rijeka CHC during one-year period (1998/99). There were 621 male (49%) and 646 (51%) female patients. The patients' age ranged from 5 to 89 years.

The data were recorded into specially designed forms containing the following information: age, sex, place of residence, region, dental status, diagnosis, type of anaesthetic and surgical procedure.

To facilitate the presentation of data in tables numerical codes were assigned to each region and place of residence, sex, diagnosis, surgical procedure and anaesthetic agent.

The obtained values were statistically analyzed by t-test, analysis of variance and Student-Newman-Keuls post-hoc test. Categorical indicators were assessed on the basis of absolute and relative frequencies, while the frequency of events per group and comparison between the groups was made using the test of proportions. The probability level smaller or equal to 0.05 was considered as the level of statistical conclusions.

Results

The total of 1,268 patients coming from three Croatian regions were included in the study. In these patients the total of 1,308 diagnosis were made, as forty patients had two diagnoses. The surgical procedures included 1,466 teeth; there were 1,032 treatments of one tooth, 143 treatments of two teeth, 18 treatments of three teeth, 14 treatments of four teeth, five treatments of five teeth, one treatment of six teeth and one of seven teeth.

Basic characteristics of study participants and their sex and age are presented in Table 1. There were 621 male and 647 female patients. The age range for male patients is from 8 to 88 years, the average age being 37 years. In female patients the age ranged from 5 to 85 years, the average age being 31 years. The comparison

TABLE 1
BASIC CHARACTERISTICS OF 1,268 PATIENTS (PRESENTED BY ABSOLUTE AND RELATIVE FREQUENCIES)

Parametar		Region				Total		Statistics
		Rijeka		Other				
		N	(%)	N	(%)	N	(%)	
Sex	Males	321	(25.3)	300	(23.7)	621	(49.0)	$\chi^2 = 0.02$ p = 0.892
	Females	338	(26.7)	309	(24.3)	647	(51.0)	
Age (yrs.)[a]		38	(19–67)	30	(14–59)	33	(16–65)	t = 7.84 p < 0.001
No. of diagnoses	One	640	(50.5)	588	(46.3)	1,228	(96.8)	$\chi^2 = 0.17$ p = 0.681
	Two	19	(1.5)	21	(1.7)	40	(3.2)	
Total		659	(52.0)	609	(48.0)	1,268	(100.0)	– –

[a] Median (10–90 percentile)

of measurement results shows statistically significant difference between the male and female patients with regard to their age (t = 4.67, p < 0.001).

Comparison of results with regard to individual regions shows that the patients of Goransko-Primorska County are significantly older than the patients from other regions (f = 11.5, p < 0.001). The results of age and place of residence data show that the study participants from Rijeka city area are statistically significantly older than the residents of other study areas.

The analysis of the frequency of diagnoses with regard to the place of residence as presented in Table 2 shows that the diagnoses of radicular cysts and frenulum breve labii superior occurred more frequently in the surrounding regions, while in the Rijeka city area parodontitis was the most frequently reported diagnosis.

The distribution of oral surgical procedures with regard to the place of residence is presented in Table 3. It may also be seen that extractions were more often performed in Rijeka city area, while cystectomies with apicotomies and frenulotomies were surgical procedures performed more frequently in patients from other areas.

Discussion

It is interesting to compare our study results with the data reported in available reference literature, both foreign and Croatian. For example, Amšel and Knežević[2] in their analyzing the 10-year activity of oral surgery department indicate that the fractured teeth and the residual teeth roots make 25% of all surgeries, followed by chronic periapical processes (19.0%), impacted and retained lower molars (12%) and other impacted teeth (8%), jaw cysts (10%), preprosthetic surgical procedures (5%), and epulis surgeries (6%).

Our study results differ significantly only with regard to chronic periapical processes, which make 33.3% of all procedures.

Amšel and Grgurević[3] have analyzed surgeries performed at Department of Oral Surgery during five years. Chronic periapical processes account for 24.9%, fractured teeth and retained roots 10.9%,

TABLE 2
INCIDENCE OF 1,308 DIAGNOSES ACCORDING TO THE INVESTIGATED AREA

Diagnoses	Region				Total		Statistics	
	Rijeka		Other					
	N	(%)	N	(%)	N	(%)	χ^2	p
Ostitis periapicalis	213	(31.3)	223	(35.6)	436	(33.3)	2.53	0.117
Radix relicta	188	(27.6)	161	(25.6)	349	(26.7)	0.57	0.455
Dens impactus	88	(13.0)	78	(12.4)	166	(12.7)	0.06	0.811
Cysta radicularis	44	(6.4)	65	(10.3)	109	(8.3)	6.04	0.016
Dentitio difficilis	25	(3.7)	16	(2.5)	41	(3.1)	1.18	0.281
Caries profunda	24	(3.6)	15	(2.4)	39	(3.0)	1.22	0.274
Frenulum breve labii superior	11	(1.6)	27	(4.3)	38	(2.9)	7.53	0.006
Paradontitis adulta	31	(4.6)	5	(0.8)	36	(2.8)	16.9	<0.001
Status post apicotomiam	9	(1.3)	7	(1.1)	16	(1.2)	0.01	0.941
Communicatio antrooralis	8	(1.2)	7	(1.1)	15	(1.1)	0.01	0.932
Dens retentus	6	(0.9)	6	(0.9)	12	(0.9)	0.09	0.925
Hyperplasio gingivae	6	(0.9)	4	(0.6)	10	(0.8)	0.09	0.765
Exostosis processus alveolaris	5	(0.7)	2	(0.3)	7	(0.6)	0.39	0.534
Epulis gigantocellularis	4	(0.6)	2	(0.3)	6	(0.5)	0.16	0.694
Mesiodens	2	(0.3)	4	(0.6)	6	(0.5)	0.16	0.691
Abcessus peridentalis	3	(0.4)	2	(0.3)	5	(0.4)	0.03	0.878
Fractura dentis	4	(0.6)	1	(0.2)	5	(0.4)	0.49	0.486
Fibroma palati duri	4	(0.6)	0	(0.0)	4	(0.3)	–	
Lingua acreta	2	(0.3)	1	(0.2)	3	(0.2)	0.04	0.857
Dens dystopica	2	(0.3)	1	(0.2)	3	(0.2)	0.04	0.857
Haemorrhagio post ex dentis	1	(0.1)	1	(0.2)	2	(0.1)	0.06	0.804
Total	680	(100.0)	628	(100.0)	1,308	(100.0)	–	

impacted teeth 10.8%, hypertrophies of the frenulum 7.9%, alveolar ridge modelling 5.9%, epulis 2.3%, and plastic repair of antro-oral communication 0.8%.

Our study results are significantly different. For example, periapical processes account for 33.3%, fractured teeth and retained roots for 26.7%, impacted teeth 15.4%, hypertrophies of the frenulum 3.1%, alveolar ridge modeling 0.5%, epulis 0.5%, and plastic repair of antro-oral communication make 1.1%.

Kobler et al.[3] report about the type and number of surgeries performed in 1990 stating that apicotomy was performed in 40.1% of patients, alveotomy in 33.1%, cystectomy in 10.9%, frenulectomy in 2.4%, alveolar ridge modeling in 2.3%, epulis excision in 1.3%, and plastic repair of antro-oral communication in 1.1% of patients. These finding almost entirely coincide with our study results.

It is important to point out that the findings reported by foreign authors are significantly different from ours, which may to a certain extent be explained as a result of the existing organization of health care services. Foreign authors usually report about the total number of patients admitted to hospital, regardless of whether they are treated as hospital or ambulatory patients[5-12]. For example, the

TABLE 3
FREQUENCY OF 1,308 ORAL SURGERY PROCEDURES ACCORDING TO THE INVESTIGATED AREA

Oral surgery procedures	Region				Total		Statistics	
	Rijeka		Other					
	N	(%)	N	(%)	N	(%)	χ^2	p
Apicotomia	195	(28.7)	205	(32.6)	400	(30.6)	2.16	0.151
Extractio dentis	215	(31.6)	145	(23.1)	360	(27.5)	11.40	<0.001
Alveolotomia	179	(26.3)	160	(25.5)	339	(25.9)	0.07	0.792
Cystectomia	39	(5.7)	63	(10.0)	102	(7.8)	7.48	0.005
Frenulectomia	13	(1.9)	28	(4.5)	41	(3.1)	6.41	0.012
Excisio	15	(2.2)	6	(1.0)	21	(1.6)	2.24	0.144
Revisio apicotomiae	8	(1.2)	9	(1.4)	17	(1.3)	0.01	0.943
Occlusio communicatio antrooralis	8	(1.2)	7	(1.1)	15	(1.1)	0.01	0.932
Modelatio processus alveolaris	5	(0.7)	2	(0.3)	7	(0.5)	0.39	0.534
Incisio	2	(0.3)	2	(0.3)	4	(0.3)	0.26	0.883
Suturae post extractio dentis	1	(0.2)	1	(0.2)	2	(0.2)	0.38	0.804
Total	680	(100.0)	628	(100.0)	1,308	(100.0)	–	

analysis of surgical procedures for impacted, semi-impacted and retained teeth shows that they make the total of 15.4% of all surgical procedures. The lower molars make 10.4%, the upper molars 2.5%, cuspids 1.8%, mesiodentes 0.4%, and other impacted teeth 0.3%.

According to Kovarčik study results[12], the impacted, semi-impacted and retained teeth make 15.2, with the lower third molar and the upper cuspid being the most frequently impacted teeth. These data are in accordance with our study results.

Bishara, Dachi and Thilander[12-16] report about the incidence of impacted upper cuspid and their results range from 1.0 to 3.0%, similar to our data. Sedano, Sykaras, Stafne and Primosch[16-20] report about the incidence of mesiodens ranging from 0.15 to 1.9%, which is also similar to our study results.

Morita et al.[20] report caries in young age groups (up to 16 years) and adult parodontitis in the elderly population to be the major cause of extractions in Japan. This is different from our study data.

Punwutikorn et al.[21] report about their findings that the antro-oral fistula most commonly develops following extraction of the first upper molar in 60 to 69-year age group. Our results are similar to these.

There is a logical explanation to many of the above data. For example, the analysis of available reference literature shows that in the Anglo-Saxon population groups the problems with the third molars are much more common, which may be related to lesser incidence of caries as a result of better prevention, better availability of dental health care and treatment, and significantly smaller number of extractions, particularly of the first molars. These facts may also be explained by anthropometric indicators showing that in the Anglo-Saxon race the

dolichocephalics and leptoprosopes prevail, who are characterized by oval heads and narrow faces, and consequently narrow dental arches and teeth.

In summary the following may be concluded:

- The most common referral diagnoses in our study sample were the chronic osteitic processes, followed by retained roots and impacted teeth.
- The investigated surgical procedures follow the same sequence. The compatibility between referral diagnoses and therapeutic procedures show correct diagnoses of different independent dentists who refer their patients to dental specialists.
- Statistical significance has been found with regard to adult parodontitis in urban population when compared with the rural one, while the opposite has been found for cysts. The incidence of parodontal diseases in urban population is probably due to their way of life, nutrition, hygienic habits, stress, but is also related to higher age limit in the urban population.
- Greater incidence of chronic periapical processes in the upper jaw is the consequence of anatomical structure in which spongious tissue prevails leading to more intense reaction to bacterial, chemical and physical irritants. Also, because of thicker layer of cortical bone in the lower jaw, the fractures of dental roots and retained roots are more commonly found there.
- Greater incidence of impacted teeth in the lower jaw is constant evolutionary tendency toward the downsizing of lower jaw.
- When compared with the previous studies of our population it may be seen that the number of procedures for impacted and retained teeth has decreased and so has the number of apicotomies and cystectomies.

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EPIDEMIOLOŠKA ANALIZA ORALNOKIRURŠKIH ZAHVATA

S A Ž E T A K

Provedeno je epidemiološko istraživanje 1268 bolesnika oba spola u dobi od 5 do 89 godina upućenih iz različitih urbanih sredina. Raspodjela različitih dijagnoza i pojedinih oralno kirurških zahvata pokazala je da bolesnici najčešće boluju od kroničnog ostitičkog procesa (33.3%), zaostalog korijena (26.7%) impaktiranih zubi (12.7%) i radikularnih cisti (8.3%). Dijagnozu akutni parodontitis imalo je više stanovnika Rijeke, dok je radikularna cista, hipertrofija gornjeg frenuluma bila češća dijagnoza u bolesnika iz ostalih gradova i naselja. Ekstrakcija je bila najčešći zahvat u Rijeci, a cistektomija s apikotomijom i frenulektomija u ostalih bolesnika. U gornjoj su čeljusti češći kronični ostitički proces i radikularna cista, a u donjoj zaostali korijen, impaktirani zub, otežano nicanje i duboki karijes.