

REASONS FOR TOOTH EXTRACTION IN MILITARY AND CIVILIAN POPULATION DURING THE WAR IN CROATIA

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SUMMARY – The aim of the study was to identify the reasons for tooth extraction in military personnel and civilian population during the war in Croatia. Data were obtained from dental records of a military dental clinic located on the frontline and compared with records of a dental clinic in the nearby town of Senj. Subjects were divided into three age groups (18-29, 30-39 and 40-49 years) according to the International Classification of Diseases. On statistical analysis, χ^2 -test was used. Civilians had a higher rate of tooth extraction due to decay or periodontal disease, whereas military personnel had more teeth extracted due to trauma and endodontal or periapical disease ($p < 0.05$ both). In the military population, there were no significant differences either between the left and right side of the mouth, or between the maxillary and mandibular teeth. In the military personnel, the main causes of tooth loss were negligence and lack of time for complex therapy (endodontic, periodontic or prosthodontic treatment). There is the need of appropriate education of both military personnel and military dentists.

Key words: *Tooth extraction; Periodontal diseases – complications; Military personnel; Adult; War; Croatia*

Introduction

Numerous epidemiologic studies have shown that dental caries is the main reason for tooth loss. More recent epidemiologic data seem to indicate an increasing trend of tooth loss due to periodontal reasons rather than caries. Periodontal reasons for tooth loss are mainly mobility followed by furcation involvement¹. In developing countries, dental caries is a major cause of tooth loss in all age groups. In contrast, in industrialized countries the primary cause of tooth loss in the 50+ age group is periodontitis, since the incidence of periodontitis increases with age and retention of natural teeth in these communities is prolonged. Brown found tooth retention among employed US adults to have improved by nearly 15% and edentia to have almost halved over a decade². The nondental contributors to den-

tists' extraction decisions included patient/family request, inability to care for one's teeth, and financial limitations. The disease-/condition-related diagnoses topped the list of primary and secondary reasons for extraction, whereas patients' wish, economy and anesthetics came to the forefront among tertiary reasons³. Extraction of teeth was found to be strongly influenced by the patient's dental attendance pattern, place of residence, number of teeth, and belief in retention of his/her own teeth for life. There was no significant bivariate effect of patient age, sex, educational level, or score on Corah's Dental Anxiety Scale on who made the extraction decision. Only 0.4% of patients said that family, friends or colleagues had influenced the decision to have their teeth extracted⁴. One third of patients consider the extraction decision to be their own, whereas two thirds think that dentists suggested extraction. When identifying the primary factor in their extraction decisions, dentists most frequently indicated nonrestorability followed by patient/family request, periodontal disease, and financial limitations⁵. Caries was the main cause of tooth loss in a geriatric population in Sweden and Canada (over 60%), whereas in Israel it was periodontal

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disease⁶⁻⁸. The major reason for tooth extraction among Tanzanians was dental caries or associated complications (81%), followed by periodontal disease (13%)⁹. According to Chauncey *et al.*, caries was judged to be the primary cause of tooth loss in adults from Boston (US), responsible for 33.3% of the extracted teeth¹⁰. Extractions for prosthesis preparation and periodontal diseases were the other major causes of tooth loss (31.3% and 18.7%, respectively). In Singapore, the percentage of teeth extracted due to periodontal disease and caries was comparable (35% either)¹¹. In US patients aged 40-69, 51% of the teeth were extracted for periodontal disease, 35.4% for caries, 9.5% for a combination of the two, and 3.5% for other reasons. When considering patients as a unit of analysis, 58.4% of them had tooth extraction for caries, 39.9% for periodontal disease, 5.0% for both, and 2.6% for other reasons¹².

Dental caries was the most common cause of extraction (64%) in Hungary, where 60.73% of the teeth extracted for caries had not been treated before extraction¹³. These data are consistent with those reported by Niessen and Weyant on 80% of tooth extractions in adults aged >35 attributed to caries or documented as root tips, suggesting the presence of root caries¹⁴.

The aim of the present study was to identify the reasons for tooth extraction in a civilian and military populations during the war in Croatia. Differences between the two populations were tested to draw conclusions on the distribution of these causes.

Material and Methods

Data were obtained from dental records of a military dental clinic located in the Gospić barracks on the front-line. During the 1995 war year, a total of 188 teeth were extracted. The professional dentistry staff were replaced every three months, thus four dentists worked there during the study period. Control group consisted of data from dental records of an urban community health center dental clinic located in the nearby town of Senj (80 km distance). Senj was far enough from the frontline for normal life to continue. During the same period, 246 permanent teeth were extracted in the civilian urban male population. Extraction procedure was performed by two civilian general dental practitioners. They used diagnostic criteria according to the International Classification of Diseases (ICD)¹⁵. The reasons for extraction were divided into four classes: (1) decay or root without crown (ICD K02 and K08.3); (2) endodontal or periapical disease (ICD K04); periodontal disease (ICD K05); and (4) fracture (ICD S05.5). Patients were divided into three age groups of 18-29, 30-30 and 40-49 years.

The χ^2 -test was used to determine statistical significance of differences between the two populations, jaws, jaw sides and teeth.

Results

More than 90% of all extractions in both groups were caused by dental caries and its sequels. Periodontal disease

Table 1. Distribution of extraction causes in military and civilian population according to age groups

Population/ Age (yrs)	Fracture	Caries/Root without crown	Endodontal/ Periapical disease	Periapical disease	Σ
Military					
18-29	4	42	41	2	89
30-39	1	37	34	2	74
40-49	0	7	10	2	19
50-59	0	3	3	0	6
Σ	5	89	88	6	188
Civilian					
18-29	0	39	11	1	51
30-39	0	44	17	2	63
40-49	1	38	12	32	83
50-59	1	15	7	26	49
Σ	2	136	47	61	246

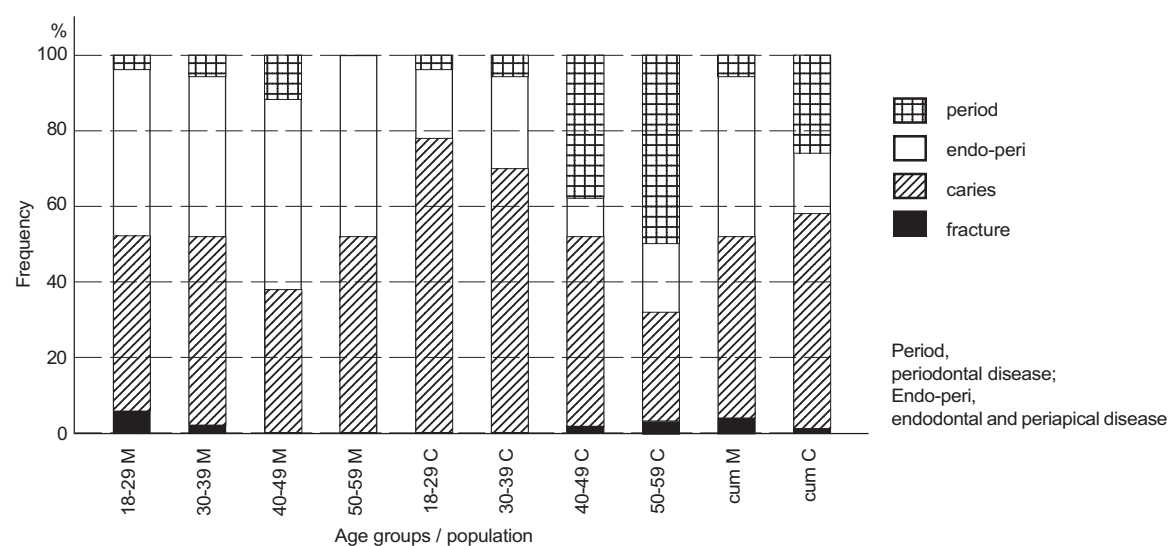


Fig. 1. Causes of tooth extraction in military (M) and civilian (C) populations

and trauma were minor causes (Table 1, Fig. 1). There were no significant differences either between the left and right side or between the upper and lower jaw. A higher prevalence of caries related extractions was recorded for the posterior teeth and upper jaw ($p < 0.05$). The upper right first permanent molar was the most commonly lost tooth (6.95%, $p > 0.05$). Extractions due to endodontal and periapical disease were more common in anterior teeth. Pooled results showed it to be more common in the maxilla than in the mandible ($p < 0.05$). Comparison showed 24.62% of extractions for the same cause in the upper an-

terior sextant ($p < 0.05$) *versus* none in the lower anterior sextant. The upper left second permanent molar was the most commonly lost tooth, however, caries was the most frequent cause of extraction of the lower first permanent premolar. Upper and lower incisors as well as lower second molar were lost due to periodontal disease caused by progressive periodontitis. Typically, trauma mostly caused loss of maxillary central incisors. Pooled results showed the most often extracted teeth to be 27, 14 and 36, more in the lateral than in the anterior segment, and more in the maxilla than in the mandible (Table 1, Fig. 1). The same

Table 2. Distribution of extraction causes in military population according to tooth type

MXT	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8	Σ
FR	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	4
CR	0	2	2	4	8	2	6	3	2	2	2	6	2	3	4	3	51
EP	2	4	8	2	5	1	2	1	4	6	2	5	5	6	9	3	65
PD	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
Σ	2	6	10	6	13	3	8	7	9	8	4	11	7	9	13	6	122
MDT																	
FR	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
CR	0	2	3	2	3	2	0	0	0	3	1	2	1	9	5	4	37
EP	1	3	4	4	1	0	0	0	0	0	0	2	2	2	3	1	23
PD	0	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	4
Σ	1	5	7	6	4	2	1	1	0	4	1	4	3	12	9	5	65

MXT, maxillary teeth; MDT, mandibular teeth; FR, fracture; CR, caries or root without crown; EP, endodontal or periapical disease; PD, periodontal disease

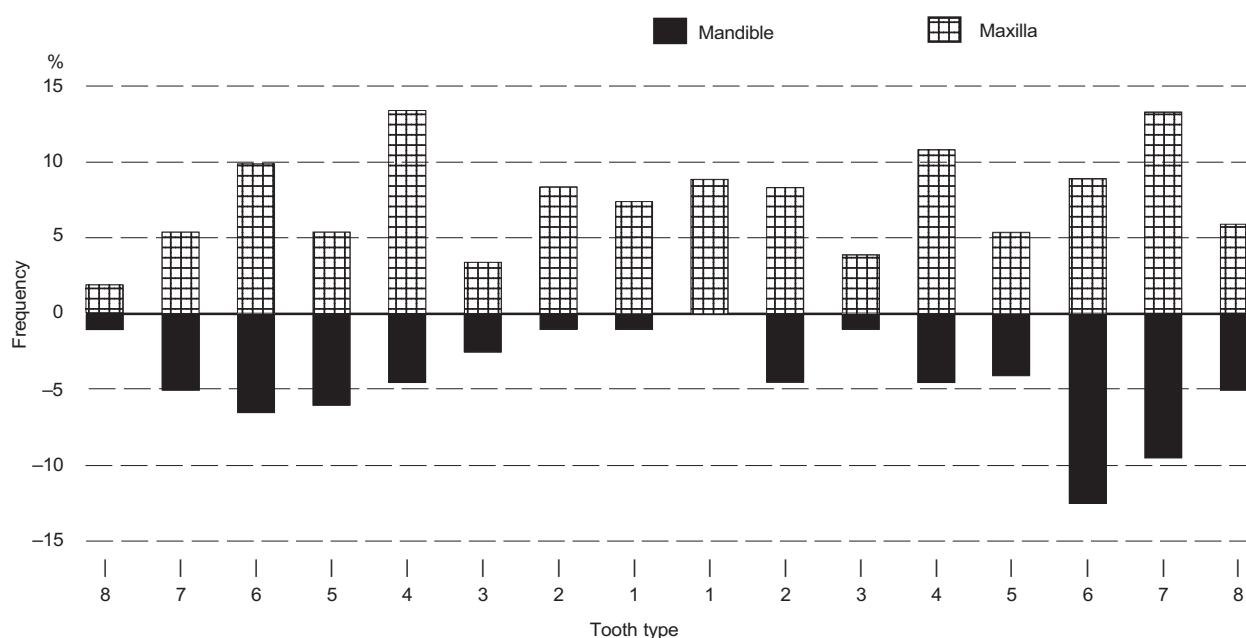


Fig. 2. Extractions according to tooth type in the mandible and maxilla

causes of extraction were generally identified in different ages (Table 1, Fig. 1). Significant differences in extraction causes were found between the military and civilian populations in pooled results ($p < 0.01$), and in the 18-29 and 40-49 age groups ($p < 0.05$ and $p < 0.01$, respectively). In the civilian population, teeth were more commonly lost due to periodontal disease ($p < 0.01$) and for caries at age 18-29 ($p < 0.05$) as compared with the military population. Extractions due to endodontal and periapical disease were significantly more frequent in the military population aged 18-29 ($p < 0.05$) and 40-49 ($p < 0.01$) as well as in pooled results ($p < 0.01$) (Table 2, Fig. 2). There were 20% to 40% less extractions for this cause in the civilian population.

Discussion

In contrast to our results, Jaafar *et al.* found the highest proportion of extractions due to caries and periodontal disease in the 21-30 and 41-50 age group, respectively¹⁶. In our study populations, caries and its sequels were the main causes at all ages. However, in the civilian population the percentage of extraction due to periodontal disease tended to increase with age. Concerning caries as the cause of tooth extraction, the highest proportion of extractions involved posterior teeth (first permanent molar), whereas in case of periodontal disease a slightly higher proportion of anterior teeth were lost. According to Jaafar *et al.*,

this trend is more pronounced in the lower than in the upper jaw. Generally, extractions related to caries tend to increase posteriorly, and those due to periodontal disease anteriorly¹⁶. This is consistent with our study.

In Greece, Kamberos *et al.* found posterior regions to be associated with a higher percentage (60.45%) of extractions. Similar to our results, there were more extractions in the maxilla (55.58%). A higher prevalence of extractions related to caries and its sequels was recorded under age 40 (79.26%)¹⁷. In an Israeli geriatric population, premolars were the teeth most frequently extracted for caries (32%), whereas incisors predominated in the group of teeth extracted for periodontal disease (31%)⁸. The principal reason for extraction in the Caribbean was also caries (61.6%), followed by periodontitis (29.9%). The tooth types most commonly extracted due to caries were lower and upper first molars, which is comparable with our results. Lower central incisors were the most commonly extracted teeth due to periodontal involvement¹⁷. Third molars were the tooth type most commonly extracted in Canada. Posterior teeth were most frequently lost in younger age groups, and anterior teeth in older subjects¹⁸.

For cosmetic reasons, patients pay more attention to anterior teeth while neglecting the lateral ones. Due to neglect, lateral teeth are more prone to decay, which leads to endodontal disease if left untreated. Upper lateral teeth are difficult to treat, so dentists tend often to extract them

because of their complex endodontal morphology and thus more complex endotherapy. An unmotivated patient cannot motivate his dentist to apply conservative/endodontic therapy. There was a high prevalence of caries causing extraction in the military population in Croatia (90% including its consequences). Similar data have been reported from surveys carried out in the Caribbean Islands (62%)¹⁹, Hungary (64%)³, Greece (80%)¹⁷ and Tanzania (81%)⁹. In industrialized countries like Canada, USA, Singapore and Scotland, caries accounts for 25% to 50% of tooth extractions^{7,10,11,20}. Tooth loss reduces the quality of life and daily functioning. Although a consequence of caries and periodontitis, it reflects the attitudes of patients and dentists, accessibility, availability and standard of dental care. In the military population, the prevalence of extractions for endodontal and periapical disease was higher by 20% to 40%. This could be ascribed to the military way of life, frequent absence from the barracks, and fieldwork. The lack of free time results in the neglect of natural teeth, dental hygiene, dental check-ups, and restorative treatment. As it is not feasible for soldiers to pay regular dental visits, given the complexity of endotherapy military dentists tend to use extraction more frequently.

Conclusion

The main cause of natural tooth loss in the military population is soldiers' negligence and lack of free time for conservative and endodontic therapy. The results indicate the need of appropriate education of both soldiers and military dentists. The need of investing all efforts to avoid extraction, to try restorative treatment instead, and to improve prevention through oral hygiene education should be emphasized. Croatian military dentists should receive education on single visit endodontics, which would enable them to provide more comprehensive and faster therapy while seeing fewer patients.

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Sažetak

RAZLOZI ZA EKSTRAKCIJE KOD VOJNOG OSOBLJA I CIVILA TIJEKOM RATA U HRVATSKOJ

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Cilj studije bio je utvrditi razloge za vađenje zuba među vojnim osobljem i civilima tijekom rata u Hrvatskoj. Podaci iz vojne zubne ambulante smještene na prvoj bojišnici uspoređeni su s podacima ambulante iz obližnjega grada Senja. Ispitanici su podijeljeni u tri dobne skupine (18-29, 30-39 i 40-49 godina) prema Međunarodnoj klasifikaciji bolesti. U statističkoj analizi primijenjen je χ^2 -test. Kod civilne populacije prevladavalo je vađenje zuba zbog kvarenja ili parodontne bolesti, dok je kod vojnog osoblja više zuba izvađeno zbog traume te zbog endodontne i periapikalne bolesti ($p < 0,05$ oboje). Kod vojne populacije nije bilo statistički značajne razlike između lijeve i desne strane usne šupljine, kao ni između zuba gornje i donje čeljusti. Kod vojne populacije glavni uzroci gubitka zuba su zapuštenost zuba i nedostatan vrijeme za sveobuhvatnu terapiju (endodontsko, parodontno ili protetsko liječenje). Utvrđena je potreba obrazovanja kako vojnog osoblja tako i vojnih stomatologa.

Ključne riječi: *Vađenje zuba; Parodontne bolesti – komplikacije; Vojno osoblje; Odrasla osoba; Rat; Hrvatska*