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ORIGINAL ARTICLE

Frequency and type of tooth extractions in adults vary by age: register-based nationwide observations in 2012–2017

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ABSTRACT

Objective: This register-based study assessed the frequency of and age-specified variation in tooth extractions in adults visiting private dentists in Finland in 2012–2017.

Material and methods: Retrospective study design was used on the register-based data of private sector services. Data of the entire 6 years, 2012–2017, included records of a total of 6,252,039 patients. From among these, further detailed information was gathered in 2012 for 1,058,305 patients, and in 2017, for 985,043 patients. For each 6 years, the data were aggregated into patients' 5-year age groups that were observation elements. Proportions of patients undergoing oral surgical treatments were compared during the 6 years 2012–2017, and details of tooth extractions in 2012 and 2017. Linear regression modelling was used to analyse thinkable age- and year-related inclinations in oral surgical treatments.

Results: Across the 6 years, a total of 848,362 patients (13.6%) underwent oral surgical treatments, and the rates varied by year 13.3–13.8%. By age group, the smallest rates (9–10%) were for 35–49-year-olds and greatest (20–22%) for those aged below 25 or over 84. The rates in same-age groups were stable. In 2012 and 2017, mean numbers of tooth extractions per patient by year were 0.17 and 0.18, and per patients undergoing oral surgical treatments, 1.29 and 1.27, respectively. Proportion of patients undergoing oral surgical treatments and mean number of tooth extractions per patient was greater in younger and older age groups.

Conclusions: Tooth extractions in adults are age-dependent and age-specified differences remain stable across the years.

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Dental care; insurance; private practice; social security; tooth extraction

Introduction

Extraction is essential for teeth with irreversible conditions following serious disorders or fractures, as well as in cases of eruption problems, total impaction or catastrophic failures in treatment. Reasons for tooth extraction have been studied broadly, but little is known about the number of permanent teeth, other than third molars, undergoing extraction in adulthood.

Based on the insurance data of 1.3–1.8 million patients per year in Michigan, USA, Eklund [1] presents detailed graphics of numbers of tooth extractions in users of dental care by age and across years from 1992 to 2007. The report reveals a strong peak in extractions, about 0.55 teeth per patient aged 19–22, whereas the corresponding mean number for those aged 34–60 seems to be about 0.15 and about 0.20 up to the age of 85 years. The report concludes that there were rather small changes across the years inspected. Another report, based on cross-sectional data on actual dental services in Finland, shows that public and private treatments were provided for a little more than a million adult patients in either sector in 2009 [2]. Findings of that study are reported separately for the main categories of treatments, where tooth extractions form almost all procedures within 'Oral surgery'. For all private sector patients, the report estimates 200 oral surgical treatments per 1000 patients for the age group from 18 to 64 years and 302 for those aged 65 and over. For the public sector, the corresponding estimates are higher, 308 and 417, respectively [2].

Many earlier publications rely on self-reported data of extractions as they are based on questionnaires or interviews among representative samples of lay populations. In the United Kingdom, 14% of the population from 16 years of age, report having undergone tooth extraction during their most recent treatment course, the rates varying slightly by age group, 13% for those aged 25–44 and 15% for the 45–54-year-olds, but 18% for the 55–64-year-olds and 19% for those aged 85 and over [3]. In Finland, 13% of the dentate, aged 30 years and over, report tooth extraction during their most recent treatment course, the rates being 11–12% up to the age of 64 years and 17% for those aged 65 and over [4]. In these studies, data of numbers of tooth extractions are unavailable. However, the reports from corresponding cross-sectional data sets verify improvements in adults'

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dental health and increase in the mean number of the present teeth [3,4].

To know the pattern of tooth extractions in the population, detailed information is needed about the types and variation of the extractions by age group. This information would well serve dentists and the decision-makers of oral healthcare service. The aim of this register-based study was to assess the frequency of and age-specified variation in tooth extractions in adults visiting private dentists in Finland in 2012–2017. We hypothesize that tooth extractions decrease over the period under review.

Material and methods

Background

In Finland, every citizen is covered by the health insurance from the Social Insurance Institute (SII; KELA in Finnish), valid from the moment of birth, and immigrants are covered by the same insurance after receiving a long-term residence permit. The SII subsidizes dental treatment payments, excluding prosthetic care and orthodontics [5]. In the twenty first century, private sector services have performed about half of the dental care for adults [2,4]. For subsidization, the dentists report the treatment details by patient using codes uniform to all service providers and maintained by the National Institute for Health and Welfare (THL) in Finland [6]. The SII registers the treatment details by treatment year using each patient's national identity code. As background information, the patient's age but not sex, is included in the statistics provided by the SII.

Study design

This study, approved by the SII, utilized the SII database of dental care services provided by general dental practitioners and specialized dentists in any private dental office or clinic in 2012–2017. For each year, the data included the service information all over across the year, from the January 1 to December 31. Retrospective study design was used on the register-based data to compare numbers of patients undergoing oral surgical treatments during the 6 years from 2012 to 2017. This study included all patients in the 6 years observed and used aggregated macro-level data. No sampling was made since the data covered all patients from the selected ages and treatment years. The SII combined the visit-based information on treatments first to the lower-level units (patients) and then to age groups which formed the higher-level units [7], the observation elements for this study. Since register-based data were aggregated, no information existed on the identity of patients. Consequently, no ethics approval was required.

Definitions

A patient was defined as an actual user of private oral healthcare services when received at least one treatment procedure during the year observed. A patient undergoing oral surgical treatments was defined as one who received at least one oral surgical treatment procedure. Such patients formed a subgroup in among all patients.

The classification of healthcare procedures maintained by the THL includes the subtitle of 'Oral surgery' for surgical procedures on lips, teeth, jaw, mouth, and pharynx [6]. Tooth extractions belong to this category where the extraction codes are with the prefix 'EBA'. By the THL codes, we classified the extractions as (1) routine extractions (non-operative extractions under the codes EBA00 for routine extraction, EBA05 for demanding extraction, and EBA30 for root extraction), (2) surgical extractions (operative extractions under the codes EBA10 for routine operative extraction, and EBA12 for demanding operative extraction), and (3) infection control (multiple extraction under the code EBA15 that includes extraction of at least 4 totally damaged teeth per jaw, removed to eliminate the infection — for the most part as infected root remnants). The coding system was to fix the fee-based subsidization per extraction and accordingly included no codes for extraction reasons. Other codes with the prefix 'EBA' included hemisection, apicoectomy and coronectomy which were not taken as tooth extractions. The number of teeth extracted was the number of the corresponding tooth-based extraction codes except for the code of infection control, counted as 4 extracted teeth. Oral surgical procedures other than extractions were combined in a separate procedure group.

Study population

The data for this study for each of the 6 years from 2012 to 2017 comprised the numbers of all patients ($n = 6{,}252{,}039$) which included, as an inbuilt subgroup, numbers of patients undergoing oral surgical treatments ($n = 848{,}362$). In addition, the numbers and types of tooth extractions underwent by year were observed in detail for 2012 and 2017. In total, the data for these 2 years included all oral healthcare patients ($n = 1{,}058{,}305$ in 2012; $n = 985{,}043$ in 2017) who received subsidization for their treatment by private dentists; a total of 140,584 patients in 2012 and 135,469 in 2017 received at least one oral surgical procedure and were analysed here in detail.

Statistical analysis

The observation unit was the age group, and the data were aggregated into 5-year age groups from 20–24 years to 85–89 years, while the rest, 90 years and over, were combined into one group. Per each year, there were 15 age groups, totalling to 90 age groups in the 6-year-data. Patients in the age groups in 2012 belonged in 2017 to the next level age group, thus allowing cohort-based comparison. Descriptive statistics per age group included counts and percentages of population and patients and counts and mean numbers of tooth extractions. Attendance rate for patients visiting a private dentist was defined as their proportion (%) of the population by year and age group. Respectively, the rate of patients undergoing oral surgical

treatments was defined as their proportion (%) of all patients. Changes from 2012 to 2017 were described as differences in mean numbers of tooth extractions per patient, separately for the same-age and the age-cohort groups of the patients and further, as percentages of increase or decrease in the numbers of patients or extractions.

Comparison of the rates used percentage points (pp), i.e. arithmetic differences between the percentages. The roles of time (treatment year), attendance rate and age group in the various descriptors for tooth extractions were evaluated by means of linear regression modelling to reveal thinkable inclinations in oral surgical treatments. Dependent and independent variables in the regression model were numeric and the dependent variable was continuous. After fitting the linear regression model, the model assumptions were checked. Data handling, analyses and graphics were performed with Survo MM software (version 3.4.1; Survo Systems, Helsinki, Finland).

Results

During 2012–2017, around one million patients per year (24.4% of adult population) visited a private sector dentist and received subsidized treatment. In the 6 years, a total of 848,362 patients, averaging 141,394 (13.6%) patients per year, underwent oral surgical treatments. From 2012 to 2017, the actual number of all patients ($n = 1{,}058{,}305$ in 2012; $n = 985{,}043$ in 2017) decreased by 6.9% and of patients undergoing oral surgical treatments ($n = 140{,}584$ in 2012; $n = 135{,}469$ in 2017), by 3.6%.

In 2012 and 2017, the overall attendance rate in all patients varied by age, being below 10% in the age group of 20–24 and exceeding 30% in ages from 50 to 74 years (Table 1). Mean numbers of extractions per patient were 0.17 in 2012 and 0.18 in 2017 and varied by age group from 0.11 teeth to 0.34 teeth in 2012 and to 0.40 in 2017. The fewest extractions per patient were found in age groups from 35 to 54 years while the peaks of extractions occurred in 20–24-year-olds and in those aged 80 years and over. Minor or no change was seen in all groups, but in the age group of 90 years and over extractions almost tripled, from 0.15 to 0.40 per patient. Within the age-cohort groups, the changes in numbers of tooth extractions were downward for the baseline ages from 20–24 to 30–39 and upward for the rest of the age-cohort groups. The within-cohort changes were greatest for the two youngest age groups and for 85–89-year-olds, that was the oldest age cohort possible to be followed.

Across the 6 years observed, the overall annual rate of the patients undergoing oral surgical treatments ranged between 13.3%–13.8%. By age group, the rates were smallest (around 10%) in the age groups from 35 to 49 and greatest (20–22%) for those aged below 25 or being 85 and over (Table 2). Despite the notable differences between the age groups, the rates within same-age groups were stable across

Table 2. The 6-year range by age group in the rates (%) of patients undergoing oral surgical treatments using private service in 2012–2017.

	Details of the 6-year range of rates		
Age group (years)	Minimum %	Maximum %	Width pp
20–24	20.1	21.2	1.1
25–29	16.4	17.3	0.9
30–34	11.4	12.0	0.6
35–39	9.6	9.8	0.2
40–44	9.3	9.6	0.3
45–49	9.5	10.4	0.9
50–54	10.8	11.1	0.3
55–59	12.5	12.9	0.4
60–64	13.8	14.2	0.4
65–69	14.8	15.2	0.4
70–74	15.8	16.6	0.8
75–79	17.1	17.9	0.8
80–84	18.5	20.1	1.6
85–89	20.2	22.5	2.3
90+	20.6	22.4	1.8
Total	13.3*	13.8*	0.5*

The data, aggregated into 5-year age groups, cover 848,362 extraction patients in a total of 90 age groups. Minimum (%), maximum (%) and width (pp) of the range shown separately for each age group.
*Weighted by population age group size.

Table 1. No. of all patients (*n*) using private services, the attendance rate (Att%) as patients % of population, and mean number of tooth extractions per patient (Ex/*P*) in 2012 and 2017 per age group.

Age	All patients in 2012			All patients in 2017			ΔEx/*P* by age	
(years)	*n*	Att%	Ex/*P*	*n*	Att%	Ex/*P*	Same	Cohort
20–24	30,448	9.0	0.34	24,011	7.3	0.33	−0.01	−0.08
25–29	45,576	13.4	0.25	37,207	10.5	0.26	+0.01	−0.09
30–34	59,475	17.3	0.16	46,716	13.3	0.16	±0.00	−0.04
35–39	66,829	20.3	0.12	56,679	16.2	0.12	±0.00	−0.01
40–44	73,333	22.4	0.11	63,885	19.2	0.11	±0.00	+0.01
45–49	98,802	26.5	0.11	71,917	21.9	0.12	+0.01	+0.02
50–54	121,850	32.8	0.13	98,492	26.6	0.13	±0.00	+0.02
55–59	140,124	37.0	0.15	117,920	32.3	0.15	±0.00	+0.02
60–64	139,620	35.8	0.17	129,572	35.3	0.17	±0.00	+0.01
65–69	113,998	34.4	0.19	121,858	32.9	0.18	−0.01	+0.01
70–74	71,791	30.7	0.21	98,569	32.1	0.20	−0.01	+0.02
75–79	48,237	26.2	0.24	59,413	28.7	0.23	−0.01	+0.03
80–84	30,612	21.1	0.30	35,003	23.6	0.27	−0.03	+0.03
85–89	13,439	15.8	0.33	17,704	18.3	0.33	±0.00	+0.07
90+	4171	10.8	0.15	6097	12.3	0.40	+0.25	n.a.
Total	1,058,305	25.1*	0.17*	985,043	22.8*	0.18*	+0.01	n.a.

Change (ΔEx/*P*) in Ex/*P* from 2012 to 2017 shown for same-age groups (Same) and for age-cohort groups (Cohort).
*Weighted by population age group size.

the 6 years as the width of ranges was at smallest, 0.2 pp for the age group 35–39, and at widest, 2.3 pp for the age group 85–89. For all years, the rate curves followed tightly the V-shaped forms shown for 2012 and 2017 in Figure 1.

As explained by linear regression models, the rate of the patients undergoing oral surgical treatments and the mean number of tooth extractions per patient were associated with overall attendance rate and patients' age group while no association was found with the treatment year (Table 3). Assumptions of multiple regression (linearity, multicollinearity, homoscedasticity and normality of the residuals) were met in both models.

In 2012, a total of 181,133 teeth were extracted and in 2017, 172,680 teeth. Within all treatments performed in 2012 (in total 4.95 million subsidized procedures), oral surgical procedures comprised 4.8% of all, being a sum of the proportions of extractions (3.7%) and procedures other than extractions (1.1%). In 2017, 4.01 million subsidized procedures were performed, and the corresponding percentages were 5.7%, 4.3% and 1.4%, respectively.

Among the patients ($n = 140,584$) undergoing oral surgical treatments in 2012, the mean number of tooth extractions was 1.29 for all and the range by age group 1.15–1.66 while among the patients ($n = 135,469$) in 2017, the corresponding mean was 1.27 and the range, 1.13–1.81. Figure 2 presents the means by age group as curves for 2012 and 2017. The curves are U-shaped and highly identical for both years, and the means were lowest for patients in ages between 40 and 50 years.

In 2012 and 2017, routine extractions dominated as the type of extraction, while surgical extractions accounted for 10–11% and extractions due to infection control for 4–6% of all extractions (Table 4). The change from 2012 to 2017 showed a decrease in numbers of all extractions and of routine extractions whereas the actual number of extractions related to infection control increased by 33.3%, and their proportion of all extractions, by 1.7 pp, from 4.2% to 5.9%.

In all age groups, routine extractions dominated, as shown in Figure 3 for 2017. The proportion of routine extractions increased almost linearly from 68.9% in 20–24-year-olds and was around 86–87% for those aged 60 and over. Surgical extractions showed a clear decrease by age from 30.4% in the youngest age group to 3.4% in the oldest. In turn, proportion of extractions due to infection control increased steadily by age, from around 1% for those below 35% to 10.8% in the oldest age group.

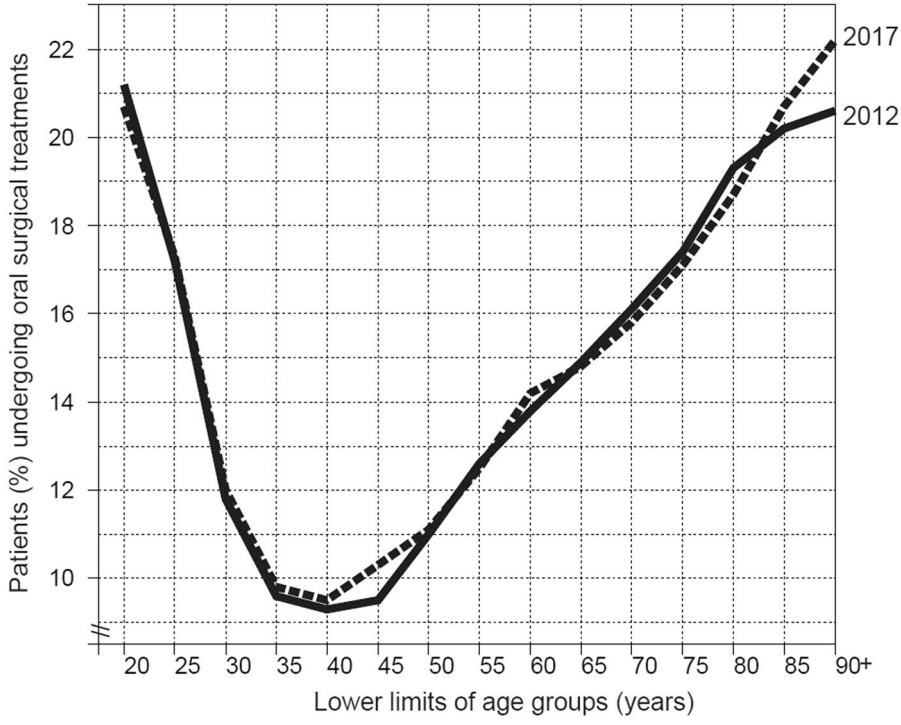

Figure 1. Patients undergoing oral surgical treatments ($n = 140,584$ in 2012; $n = 135,469$ in 2017) as % of all patients by age group in the respective years.

Table 3. Variation in the rate of private sector patients undergoing oral surgical treatments (Model A) and in the mean number of tooth extractions per patient (Model B), explained by linear regression models applied on the age-group-aggregated data.

Models and the explanation R^2	Explanatory factors	Regression coefficient (95% confidence limits)	Standard error	t	p
Model A	Attendance (%)	−0.283 (−0.410, −0.156)	0.065	−4.35	<.001
R^2 0.540	Time (year)	−0.056 (−0.485, 0.373)	0.219	−0.26	n.s.
	Age group	0.123 (0.070, 0.176)	0.027	4.61	<.001
Model B	Attendance (%)	−0.006 (−0.008, −0.003)	0.001	−3.76	<.001
R^2 0.413	Time (year)	0.001 (−0.009, 0.011)	0.005	0.173	n.s.
	Age group	0.002 (4e–05, 0.004)	0.001	3.08	.005

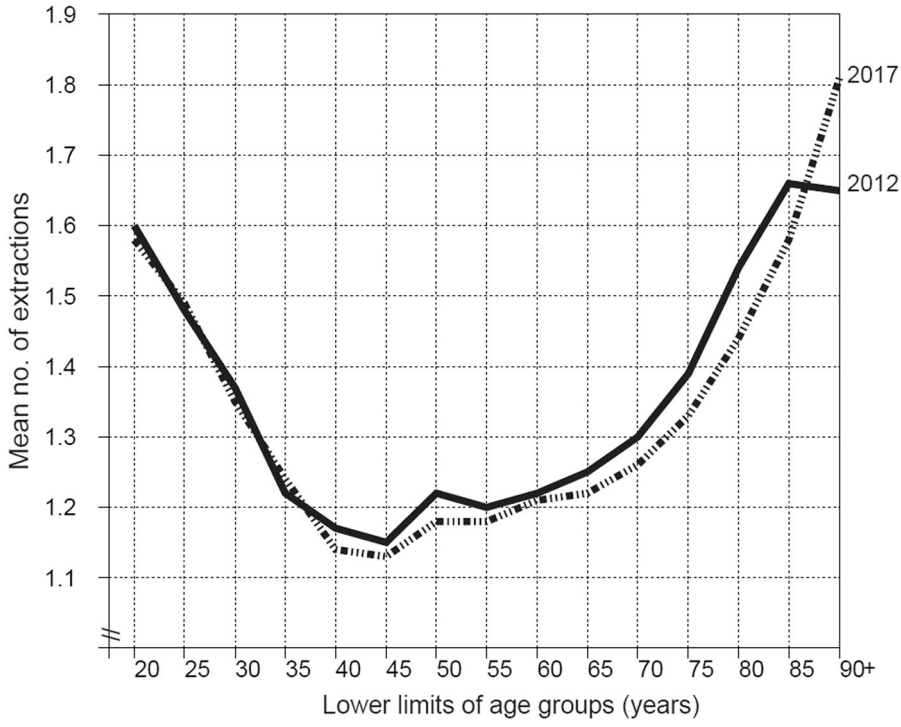

Figure 2. Mean numbers of tooth extraction per patient undergoing oral surgical treatments by age group: in total 181,133 extractions in 2012, and 172,680 in 2017.

Table 4. Numbers (n) and distributions (%) of tooth extractions by type in 2012 and 2017 and the changes from 2012 to 2017 in actual numbers of extractions shown as counts (Δ*n*) and percentages (Δ*n*%).

	2012		2017		Change from 2012 to 2017	
Type of extraction	*n*	%	*n*	%	Δ*n*	Δ*n*%
Routine	154,706	85.4	143,870	83.3	−10,836	−7.0
Surgical	18,803	10.4	18,646	10.8	−157	−0.8
Infection control	7624	4.2	10,164	5.9	+2540	+33.3
Total	181,133	100.0	172,680	100.0	−8,453	−4.7

Discussion

This study covering 6,252,039 private sector patients, with the data aggregated in 5-year age groups, evaluated the implementation of tooth extractions subsidized by the Social Insurance Institute in Finland in 2012–2017. Our nationwide findings gave no support on the hypothesis of decreasing trend in tooth extractions by treatment year. In contrast, the mean number of extractions per patient alongside with the proportion of patients undergoing oral surgical treatments per age group remained practically equal in the same-age groups across the 6 years. Notable differences between the age groups were, however, found both in the numbers of teeth extracted and in the rates of dental patients receiving any oral surgical treatment.

We revealed by-age-varying rates for undergoing oral surgical treatment and found highest rates for the youngest and the oldest age groups. Our detections are in line with a questionnaire-based study from Ontario, Canada [8] and with an insurance-based study from the USA [1]. In comparison with the data from the USA [1], the present findings showed a similar peak for the youngest age groups, presumably following extractions of third molars, which are most common below age 30 [9]. Yet, in our data, the mean numbers of extractions per patient below 25 years were only half of that shown in the data from the USA [1], which may indicate that third molar extractions are performed at a later age in Finland than in the USA.

In our data, the youngest age groups' low attendance to private sector dental care may vague the whole picture on their part, probably because they continue to use public sector care, to which they were entitled free of charge until age 18. For the oldest patients in our study, extractions were at the same level as in the youngest age group and were from age 80 on clearly greater than those in the data from the USA. In both studies, mean numbers of extractions were fairly similar for those aged 30–69.

An important finding was the age-related stability in extractions across the years inspected. Our findings are thus in line with those reported from the USA [1] and Australia [10,11]. Stability in extractions also in Germany has been documented with just a minor decrease (from 9.5% in 2010 to 8.3% in 2018) in tooth extractions [12]. The similar

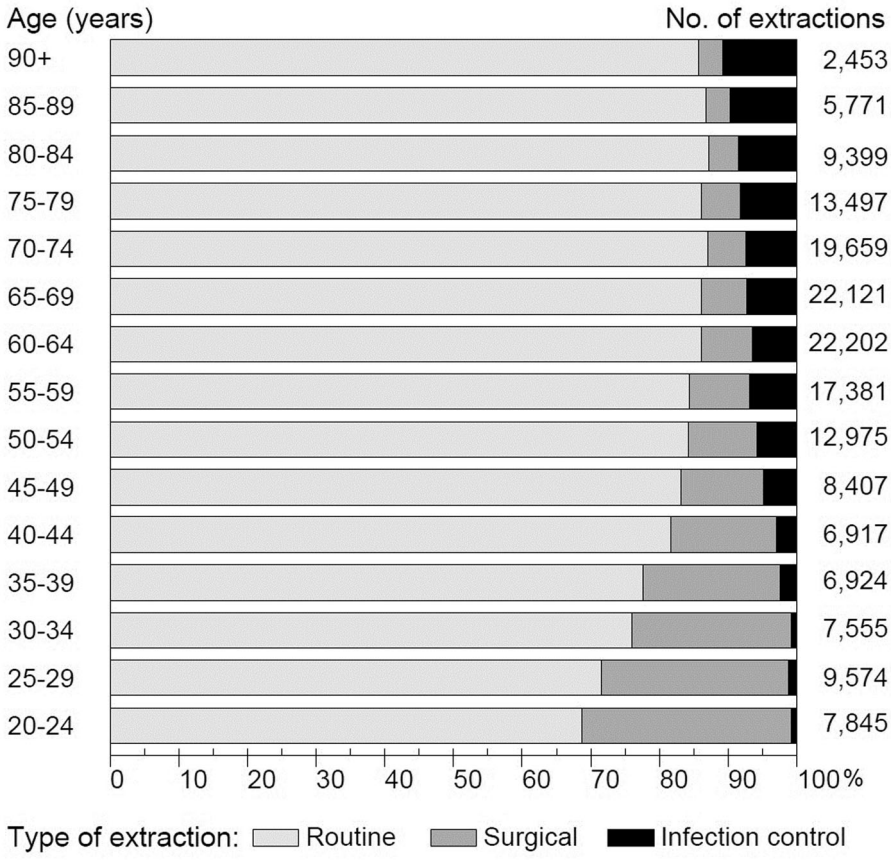

Figure 3. Distributions (%) of tooth extractions ($n = 172{,}680$) by type of the extraction within age groups in 2017.

extraction rates reported may indicate the natural progress of dental diseases, finally ending up with tooth loss and thus actually describing the rate for tooth mortality.

In our study, the steadiness was observed in the parallel shapes of the rates of patients undergoing oral surgical treatments and in the narrow width of the ranges within each age group across the 6 years. Further, the changes in the mean numbers of extractions per patient were almost zero except for patients aged 90 and over. The permanency of the rates and quantities of tooth extractions across the years of treatment was as well confirmed in the regression models that at the same time revealed strong influences generated by dental care overall attendance rate and patients' age. In contrast to our evidence of the steadiness, a study from Brazil reported decrease in trends in the proportions of tooth extractions of all treatment procedures and in the numbers of extractions of permanent teeth per the total population [13]. Their nationwide 15-year data, with no age-related classification, were analysed by linear regression modelling and graphically revealed surprisingly large variations by treatment year.

Our data cannot reveal any reasons for the remarkable increase from 2012 to 2017 found in number of tooth extractions in the oldest age group. It may be reasoned from dentists' increased know-how in geriatric dentistry, such as the awareness of the risks following oral and dental infections in the very old people [14]. Moreover, many nursing homes in Finland organize dental check-ups at least for the new residents shortly after their incoming to the ward. That, alongside with the private dental care required by residents' relatives, may play a role in the notable increase found in numbers of extractions related to infection control in the very old age groups. In addition, the number of dentate in the oldest age groups is probably in increase, as can be supposed by the reported trends of changes from 1980 to 2000 [15]. Consequently, that may explain why the hypothesis of expected reduction in tooth extractions remained without support.

The private sector provides about half of the dental healthcare for adults in Finland. Until now, just one article, with focus to year 2009, has utilized data sets from both public and private sector to report the main lines of treatments in the whole country [2]. Regrettably, the findings on patients of all ages were reported only for 3 wide age categories: <18, 18–64, and >64 years of age. Based on the facts given in their report, calculations of the mean number of oral surgical procedures for patients aged 18 and over result to 0.34 in the public sector and 0.22 in the private sector. The figures include all oral surgical procedures and are thus over-estimates for tooth extractions and exceed our findings, which still are somewhat in line with their estimate for private sector. The sector-difference in oral surgical treatments, found in their report as well as when based on adults' reporting in a nationwide survey [4], may indicate accumulation of extractions into the public sector. A considerable flow of patients from private sector to public sector has been

notable, in particular for ages from 30 to 54 years [16]. Reasons for the flow are unknown but may indicate that patients who select private dental care prefer to retain their teeth and have the economic resources to do so.

Routine extractions dominated in patients of all age groups, indicating that outpatient care in the Finnish healthcare system is a suggested norm for all disciplines. The SII gives definitions for each treatment code, and the operator is to define which code is suitable in each case. Based on the proportions of extraction types, it seems that Finnish dentists generally perform uncomplicated extractions of erupted teeth as well as uncomplicated removals of fractured or retained dental roots and partially erupted teeth. In line, these competencies have been suggested for graduating dentists in Europe [17] and as the profile of dentists in countries with developed economies [18]. In Finland, the proportion of dentists specialized in oral and maxillofacial surgery is around 2.4% of working-age dentists, thus confirming the role of general dentists in everyday practice and uncomplicated tooth extractions.

The reliability of the data is undeniable and the usability excellent since the very large data set analysed here definitely is based on all actual patient visits and treatments provided. Registration of patients' treatment procedures into SII statistics was originally not designated for research purposes. Assuredly, the register-based data, recorded and harvested for subsidization of patient fees, provide reliable information of the treatment procedures. The documentation of treatment is obligatory, and the operators are required to record all measures by detail to abide by the legislature for healthcare services. The data, covering all target patients, and with no sampling made, are not susceptible to bias. However, these data across the 6 years cover only the treatments performed in the private sector, which consists practically half of all dental care provided for adults in Finland [2]. Unfortunately, no corresponding age-specified data from the public sector are available. The same lack is true globally, since age-specified extraction findings are available only from the USA [1] and Australia [10,11].

Describing the reality based on actual treatments provided indicates strength in our study. Usually, most reports about the frequency of tooth extractions are concentrated on the reasons for extraction, and most articles are based on questionnaires addressed to either dentists or patients. As examples, just two papers [19,20] were selected to be commented here: In Florida, USA, a 24-month follow-up was conducted among dentate dental visitors, aged 45 and over ($n = 873$), and 26% underwent tooth extraction during the observation period [19]. In the United Kingdom, 23 general dental practitioners reported that 17% of a group ($n = 2{,}799$) of their regularly attending patients underwent tooth extraction over 5 years [20]. Neither of these studies has reported age-specified extraction rates or the rates per year.

The register system of the SII places under the same main category all patients who received any oral surgical procedure. Thus, it was impossible to distinguish numbers of those patients who received just tooth extractions, while the data offered the information of the numbers of tooth extractions. In addition to tooth extractions and other tooth-based procedures, such as hemisection, apicoectomy and coronectomy, there are other types of oral surgical treatments; most of them infrequent, whereas e.g. the placement of a dental implant is frequent in the private dental care, where per year about 20,000 patients receive implants [21]. This indicates that patients with oral surgical procedures other than tooth extractions made up only a minor part of all patients receiving oral surgical procedures. Consequently, the rates of patients undergoing oral surgical treatments only slightly overestimate the actual rates of patients receiving tooth extractions.

The limitations of the study stem from the structure of the register-based data. The observation unit was the age group, and the data were aggregated into 5-year age groups. Consequently, no patient-level data were available and accordingly, the information of patients' sex and socio-economic status was unattainable. Further limitations in the register-based data were the absence of the information on the operators' characteristics, patients' socio-economic status, the identification of a tooth extracted, and the reasons for a tooth extraction, yet none of these were included in the objects of our study. Moreover, our data covering only treatments performed in the private sector represent just half of the entity of dental care provided for adults. This again might be a limitation that influences the generalizability of the findings.

To obtain more detailed information about tooth extractions further research using individual-based data harvested from a representative sample of adult patients is called for. For example, mapping of the reasons for tooth extractions would increase knowledge of the fate of teeth and help to plan contents of dental care services for various age groups.

Conclusion

The rate of patients undergoing oral surgical treatments in adults was highly age-dependent, the youngest and the oldest patients received extractions more frequently than middle-aged ones. The age-specified differences were very stable across the 6 years. Alongside with population ageing and retaining more of their teeth up to old age, the volume of tooth extractions may enlarge and thus require more attention to tooth extractions in old-age patients.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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