

Oral health condition and reasons for tooth extraction among an adult population (20-64 years old)

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Abstract *The study characterized the oral health condition and main self-reported reasons for tooth extraction in an adult population. The cross-sectional study examined 248 adults aged 20-64 years, representative of the population of Piracicaba, São Paulo, Brazil. The oral examination conducted in households used the DMFT and CPI indexes, use and necessity of prosthodontics according to the WHO criteria and the presence of visible biofilm. Demographic and socioeconomic data were collected along with reasons for tooth extraction through a questionnaire. Descriptive analysis was stratified by age in groups: 20-44 and 45-64 years old. The average DMFT was 20.37 (EP = 0.50), P = 3.34 (EP = 0.33) for young adults and P = 13.41 (EP = 1.45) for the older adults. Gingival pockets (CPI ≥ 3) were found on 20.5% of young adults and 53.0% of the older ones. While 38.8% used upper prosthesis, 46.7% needed lower prosthesis. Pain was the most prevalent self-reported reason for tooth extraction (37.5%), being this choice primarily because of lack of another treatment option (52%) and done in the private sector (47.2%). We concluded that young adults (20-44 years old) showed less missing teeth, periodontal diseases, and need for prosthetic use. Pain and lack of options of other treatments were the main self-reported reasons for performing tooth extractions.*

Key words *Adults, Oral health, Tooth extraction*

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Introduction

The Global Burden Disease, in 1990 and 2010, still shows untreated caries, serious periodontal disease and teeth loss among the health conditions that most impacted the health of the world population¹.

Epidemiological studies of oral health with population-based approach are important for the understanding of the distribution of oral diseases and to identify the health needs and planning of public policies that are more consistent with the studied reality.

In Brazil, the National Survey of Oral Health (SB Brazil) held in 2003 showed little expressive changes in the prevalence of the main oral diseases when compared to the first oral health epidemiological survey of 1986^{2,3}. The index of decayed, missing and filled permanent teeth (DMFT), which measures the caries experience, showed in 1986 an average of 22.5 teeth affected by caries in adults between 35–44 years old, and 20.13 in the year 2003. However, SB Brazil 2010 showed greater reduction in the prevalence of the caries experience in the adult Brazilian population, with an average of 16.3 affected teeth⁴, showing an improvement in the condition of oral health, a trend also verified in developed countries^{5,6}. This reinforces the need for epidemiological studies that monitor the distribution of dental caries, as well as the periodontal condition and its consequences, such as extractions and the use and need of prosthodontics.

Although in recent decades Odontology has followed a more conservative philosophy, and dental extraction has been considered a last treatment option by the dental surgeon, in some cases it becomes the only option⁷. Teeth extraction is a reflex of the oral disease experiences throughout life, mainly caries and periodontal disease, which have a complex etiology with biological, social and behavioral risk factors⁸. In addition, there is the influence of culture and of beliefs⁹ that lead individuals to opt for dental extraction. Because of this, knowing the personal reasons that led the individuals to opt for dental extraction seems to be an important piece of data given to Odontology and to Public Health. Studying these aspects in an adult population, covering an expansive age group, can facilitate the understanding and assist in health planning.

Therefore, the objective of this study was to characterize the condition of oral health and the main self-reported reasons of tooth extraction in an adult population with an expansive age range.

Material and methods

This study was cross-sectional and performed in the city of Piracicaba, located within the state of São Paulo, Brazil. The total population of Piracicaba was of 368,836 residents, of these 202,131 adults were within the age range of the study (20–64 years old) in the year of 2000¹⁰.

Data collection in households, in accordance to the process of probability sampling, was conducted between June and September, 2011. This research was approved by the Research Ethics Committee of the School of Odontology of Piracicaba – Unicamp.

The sample calculation was carried out based on the prevalence of caries experience data of the study of Batista *et al.*¹¹, which examined adults aged between 20 and 64 years. A calculation for adults of 20 to 44 years old and another for adults of 45 to 64 years old was performed. A *d*eff of 1.5 was used, with a margin of error of 10%; a confidence interval (CI) of 95% was adopted, being added to the 20% total to compensate for possible losses. The sample size for adults from 20 to 44 years old was 172 and for adults from 45 to 64 years old was 68, totaling 240 adults. Estimating loss in data collection, regarding households, 30% were added to the sample size for the selection of households resulting in 342 households. Thirty-two census sectors were randomly drawn according to the probability sampling technique, two of them being alternates for replacement if there was need for it. Thus, 11 households were considered for each of the census sectors drawn and only one adult per household underwent collection.

Clinical oral examinations were conducted in the households, under artificial lighting without prophylaxis, or drying, using CPI probes and front surface mouth mirrors as recommended by the World Health Organization (WHO)¹². An examiner was trained by another benchmark examiner, through theoretical and practical discussions, accounting for a total of sixteen hours, obtaining agreement equal to or greater than 90% for coronary caries, treatment needs for the caries, periodontal condition, use and need of prosthesis. Intraexaminer agreement was observed from 96.5% to 100%, being within the standards of trustability¹³. The Kappa intraexaminer index ranged from 0.89 to 1.

Clinical oral health conditions studied were: caries experience (decayed, missing and filled teeth - DMFT index), need of treatment of cavities, periodontal condition (Community Peri-

odontal Index - CPI), use and need of dental prosthesis according to codes and criteria from the World Health Organization¹². The visible biofilm examination according to Ainamo and Bay¹⁴ was also performed, "yes" being considered when at least one tooth surface showed presence of visible biofilm. The healthy periodontium condition was considered when all sextants showed CPI=0. For other periodontal conditions the presence of diseases in cases where at least one sextant was affected was adopted. The presence of gingival pockets was given to pocket depth greater than 4 mm (CPI \geq 3).

In addition, each volunteer answered a questionnaire on demographic (sex, age, race and marital status) and socioeconomic (household income, education and social class) factors. Closed questions regarding reasons for the choice of dental extraction of the first tooth and others, possible treatment options, whether they had an extraction done in the last year and where dental services offerings were performed were also made. The questionnaire was applied prior to the collection of data in 10% of the size of the final sample, composed of 32 volunteers who did not participate in the study sample.

Ethnic groups were defined by self-declaration. Educational level was categorized according to number of years of completed education (\leq 4 years, between 5-10 years and \geq 11 years). The socioeconomic classification was carried out according to Graciano et al¹⁵, using a score based on educational level, household income, occupation, type of residence and number of residents in the home, and results in six social classes. For this study social classes were grouped in the medium, upper low and bottom low categories. Age was stratified into two groups: 20 to 44 years of age and 45 to 64 years of age.

For the analysis of the data, the Statistical Package for the Social Sciences (SPSS) version 20.0 and Excel[®] were used. A descriptive analysis was performed for complex samples, thus obtaining the absolute and percentual distribution, average, standard error (SE) and standard deviation (SD) of the variables under study. The weighting factors were weights of the census sectors and households calculated using probability sampling.

Result

We examined 248 adults aged from 20 to 64 years. There was a loss of 82 households, but

the minimum value required for the sample of adults, estimated at 240 adults, was reached. The weighted sample according to the sample weight of 248 examined adults was representative of approximately 149 thousand adults residing in Piracicaba, Brazil.

Table 1 presents the demographic and socioeconomic characteristics of adults of Piracicaba. Among those examined, there was a predominance of women between 45 and 64 years old, married, with family income equal to or greater than two minimum wages, years of completed education equal to or greater than 11 years and within the upper low social class.

The prevalence of untreated caries was of 35.4% for the population studied, while 86.4% had at least one restored tooth. Table 2 presents data on caries experience described for the studied sample and its correspondent for the adult population of Piracicaba. The average DMFT of the adult population of Piracicaba was 20.37 (EP = 0.50), 13.07 (EP = 0.60) for adults aged between 20 and 44 years and 23.63 (EP = 0.91) for adults aged between 45 and 64 years. In the younger population, the major component was crowned teeth, and in older adults it was missing teeth.

The presence of healthy periodontium was found in 11.1% of young adults and meant 5.0% of the total of individuals examined. The presence of visible biofilm on the dental surface during clinical examination was found in 38.1% of the participants. Regarding the presence of gingival pockets over 4 mm (CPI \geq 3), the prevalence was of 20.5% in younger adults and 53.0% in the older ones (Table 3).

In Table 4, the distribution of use and/or need for prosthesis on the upper and lower arches can be observed. The type of prosthesis most commonly used on the upper arch was Complete Dentures (19.8%), and on the lower arch, Removable Partial Dentures (11.3%). Regarding the need of use, 38.4% of the adults did not need upper arch prosthesis and 46.7% did not need lower arch prosthesis. While for the upper arch the greater need was for prosthesis for the replacement of a dental element (8.9%), for the lower arch it was the combination of prosthesis in 33.8% of the adults.

The experience of having had a tooth extracted was found in 84.3% (n = 209) of the adults examined. The average age for the first tooth extraction was of 18.77 (DP = 8.85) years. Table 5 shows the most prevalent self-reported reasons for the choice of dental extraction of the first

Table 1. Demographic and socioeconomic characteristics among adults aged 20-64 years residing in Piracicaba, SP, Brazil, 2011.

Characteristics of the sample			Sample	Population	95%CI
			% (n)	% (n)	%
Demographic	Sex	Male	27.8 (69)	33.5 (50.166,438)	22.6-46.6
		Female	72.2 (179)	66.5 (99.468,883)	53.4-77.4
	Age (age group)	20-44 years old	55.6 (138)	*30,9 (46.205,521)	23.3-39.3
		45-64 years old	44,4 (110)	69.1 (103.429,800)	60.4-76.7
	Race	White	79.8 (198)	78.2 (117.034,328)	67.1-86.3
		Black	8,5 (21)	6,6 (9.886,771)	3.4-12.4
		Mixed race	10.9 (27)	14.8 (22.093,398)	6.9-28.8
		Yellow	0,8 (2)	0.4 (620,833)	0.1-1.8
	Marital status	Single	18,1 (45)	12.2 (18.299,063)	7.1-20.2
		Married	70.2 (174)	73.0 (109.223,210)	66.4-78.7
Divorced or widowed		11,7 (29)	14.8 (22.113,049)	8.6-25.4	
Socioeconomic	Household income	≤ 1 salary	3,6 (9)	3.2 (4.718,33)	1.1-9.0
		1-2 salaries	12,1 (30)	9.7 (14.123,959)	5.4-16.6
		≥ 2 salaries	81.9 (203)	87.1 (127.487,081)	78.4-92.7
		Missing	2,4 (6)	-	-
	Education	≤ 4 years	17,3 (43)	28.5 (42.576,751)	16.8-43.9
		5-10 years	27,8 (69)	29,2 (43.671,486)	23.3-35.9
		≥ 11 years	54,8 (136)	42,4 (63.387,084)	28.2- 57.9
	Social class	Medium	17,3 (43)	11,5 (17.197,083)	6.5-19.5
		Upper Low	67,3 (167)	75,3 (112.462,925)	65.3-82.9
		Bottom Low	15,3 (38)	13,3 (19.975,313)	8.4-20.5

Note: Sample: unweighted descriptive analysis. Population: weighted descriptive analysis. * *inverted proportion in the age variable with respect to the weighted analysis due to sampling characteristics of the census sectors*

Table 2. Clinical characteristics of the caries experience (DMFT), stratified by age group, among adults residing in Piracicaba, SP, Brazil, 2011.

Clinical characteristics	Average in the sample* (DP)			Weighted average** (EP)		
	Total	20 to 44 years old	45 to 64 years old	Total	20 to 44 years old	45 to 64 years old
Decayed (D)	1.04 (± 2.06)	0.99 (± 2.24)	1.10 (1.97 ±)	1.01 (± 0.14)	0.94 (± 0.23)	1.01 (± 0.14)
Missing (M)	8.35 (± 9.16)	3.30 (± 3.77)	14.68 (± 9.97)	10.30 (± 0.82)	3.34 (± 0.33)	13.41 (± 1.45)
Filled (F)	8.68 (± 6.29)	8.66 (± 5.74)	8.70 (± 6.96)	9.06 (± 0.67)	8.79 (± 0.60)	9.18 (± 0.81)
DMFT	18.02 (± 8.89)	12.94 (± 7.26)	24.49 (± 6.16)	20.37 (± 0.50)	13.07 (± 0.60)	23.63 (± 0.91)

Note: *Average in the sample: unweighted descriptive analysis. ** Weighted Average: weighted descriptive analysis by the sample weight.

Table 3. Clinical characteristics of periodontal condition, stratified by age group among adults resident in Piracicaba, SP, Brazil, 2011.

Clinical characteristics	Total	20 to 44 years old	45 to 64 years old
	% (95%CI)	% (95%CI)	% (95%CI)
Healthy periodontium*	5.0 (3.0-8.2)	11.1 (7.4-16.5)	2.3 (0.7 -7.6)
Presence of biofilm	38.1 (27.0 -50.6)	39.0 (28.1 -51.1)	37.7 (21.4 -57.4)
Gingival bleeding**	52.5 (43.2 -61.6)	58.2 (49.9-66.1)	49.9 (36.7-63.2)
Dental calculus**	59.7 (51.3-67.6)	73.4 (66.4-79.4)	53.6 (43.3-63.6)
Gingival pockets**	43.0 (32.8-53.8)	20.5 (14.5-28.3)	53.0 (40.7-65.0)

* CPI = 0 in all sextants. **Condition in at least one sextant. Note: Weighted descriptive analysis.

Table 4. Use and need of prosthesis on the upper and/or lower arch, stratified by age group, by adults resident in Piracicaba, SP, Brazil, 2011.

Clinical characteristics		Total % (95%CI)	20 to 44 years old % (95%CI)	45 to 64 years old % (95%CI)
Use of upper prosthesis	Does not use prosthesis	61.2 (51.6-70.0)	94.6 (88.1-97.6)	46.4 (32.2-61.2)
	Uses a FD	1.3 (0.4-4.3)	0.7 (0.1-5.2)	1.5 (0.4-6.3)
	Uses more than one FD	2.7 (0.8-8.8)	-	3.8 (1.1-12.7)
	Uses RPD	14.5 (8.5-23.7)	4.1 (1.5-10.8)	19.1 (10.4-32.5)
	Uses RPD+FD	0.5 (0.1-4.1)	-	0.8 (0.1-5.9)
	Uses CD	19.8 (14.8-26)	0.7 (0.1-5.1)	28.3 (21.3-36.6)
Use of lower prosthesis	Does not use prosthesis	80.8 (71.0-87.9)	98.6 (94.5-99.7)	72.9 (57.8-84.1)
	Uses a FD	0.7 (0.1-3.6)	0.7 (0.1-5.2)	0.8 (0.1-6.1)
	Uses more than one FD	2.1 (0.8-5.8)	-	3.1 (1.1-8.6)
	Uses RPD	11.3 (6.3-19.5)	0.7 (0.1-4.9)	16.1 (8.5-28.3)
	Uses RPD+FD	0.5 (0.1-4.0)	-	0.8 (0.1-5.7)
	Uses CD	4.4 (2.3-8.4)	-	6.4 (3.1-12.7)
Use of upper prosthesis	Does not need	81.6 (76.0-86.2)	82.3 (75.7-87.5)	81.3 (73.8-87.1)
	Needs 1 element prosthesis	8.9 (4.5-16.9)	10.5 (6.5-16.6)	8.1 (3.1-19.9)
	More than 1 element	1.6 (0.3-7.1)	-	2.3 (0.5-10.3)
	Combination of prosthesis	6.3 (3.4-11.4)	7.1 (3.7-13.5)	6.0 (2.5-13.6)
	Needs CD	1.6 (0.5-5.2)	-	2.3 (0.7-7.8)
Use of lower prosthesis	Does not need	53.3 (47.1-59.4)	63.6 (54.8-71.6)	48.7 (41.4-56.0)
	Needs 1 element prosthesis	8.4 (4.9-14.0)	13.6 (8.0-22.2)	6.1 (2.7-13.2)
	More than 1 element	0.7 (0.1-3.7)	2.4 (0.5-11.1)	-
	Combination of prosthesis	33.8 (26.4-42.1)	20.4 (13.9-28.8)	39.8 (31.1-49.3)
	Needs CD	3.7 (1.5-8.7)	-	5.4 (2.1-12.9)

*FD = Fixed Dentures. **RPD = Removable Partial Dentures. ***CD = Complete Dentures. Note: Weighted descriptive analysis.

tooth and of the rest of the missing teeth. For the first tooth, the most reported reason was pain in 37.5% of the cases, confection of dental prosthesis in 16.9% and large carious cavity in 9.3%. For the other teeth, pain remains as the main reason with 34.6%, followed by tooth having been considered lost in 10.1% and periodontal problem in 6%. Of the adults examined, 52.0% said that the choice for extraction rather than keeping the tooth was due to the absence of another type of treatment at the time of search of the dental service, and 14.2% because of the high cost of the procedures that would be needed. The dental extractions were performed predominantly in the private sector (47.2%).

Discussion

In this study, young adults aged from 20 to 44 years showed reduced severity of evaluated clinical oral health conditions, such as caries experience, gingival pockets, use and need of dental prosthesis. This fact can be explained due to the

cohort effect of oral diseases, mainly in the adult age range, a result of a history of suppressed demands and the accumulation of needs of dental procedures. Thus, a clear progression of existing oral problems^{11,16,17}.

In this study, the DMFT index was lower for the age group of young adults, which may be a reflex of the increase in access and recent policies of prevention and treatment for these individuals¹⁸, when in the past access was restricted to children. This finding highlights the importance of epidemiological studies covering a larger age group in relation to the group of 35 to 44 years old established as adults by WHO¹², as it allows the observation of a little studied population that has a growing caries experience compared to age groups of adolescents, adults and older adults, mainly due to the components of missing and crowned teeth²⁻⁴. Expanding the age range allows an understanding of the moment when changes in the prevalence of oral diseases happen.

The DMFT of this study was superior to the one found in adults aged between 20 and 59 years living in rural areas of the state of Pernambuco¹⁹.

Table 5. Frequency of self-reported reasons for tooth extraction, extraction having been made in the last year and type of service used, stratified by age group, among adults residing in Piracicaba, SP, Brazil, 2011.

Question		Variables	Total % (n)	20-44 years old % (n)	45-64 years old % (n)
Reason for first permanent tooth extraction in life*	Pain		37.5 (93)	29.7 (41)	47.3 (52)
	Large cavity		9.3 (23)	5.8 (8)	13.6 (15)
	Tooth loss		7.7 (19)	5.1 (7)	10.9 (12)
	Cracked crown		6.5 (16)	4.3 (6)	9.1 (10)
	Broken tooth		1.6 (4)	-	3.6 (4)
	Periodontal problem		2.4 (6)	0.7 (1)	4.5 (5)
	Endodontic problem		2.0 (5)	0.7 (1)	3.6 (4)
	For confection of prosthesis		16.9 (42)	26.8 (37)	4.5 (5)
	Never had a tooth extracted		15.7 (39)	26.8 (37)	1.8 (2)
Reason for extraction of the remaining permanent teeth*	Pain		34.6 (86)	29.7 (41)	40.9 (45)
	Large cavity		5.6 (14)	1.4 (2)	10.9 (12)
	Tooth loss		10.1 (25)	5.1 (7)	16.4 (18)
	Cracked crown		0.4 (1)	0.7 (1)	-
	Broken tooth		5.6 (14)	5.8 (8)	5.5 (6)
	Periodontal problem		6.0 (15)	-	13.6 (15)
	Endodontic problem		3.2 (8)	2.2 (3)	4.5 (5)
	For confection of prosthesis		1.2 (3)	-	2.7 (3)
	Other reasons		15.7 (39)	29.7 (41)	4.5 (5)
Reason for extraction instead of keeping teeth*	Never had a tooth extracted		15.7 (39)	26.8 (37)	1.8 (2)
	There was no treatment that could have been done on the tooth		52.0 (129)	44.2 (61)	61.8 (68)
	Other treatments would have costed a lot		14.1 (35)	10.9 (15)	18.2 (20)
	Not worth the time and effort required to restore the tooth, but not because of money		3.2 (8)	4.3 (6)	1.8 (2)
	Because it was necessary in order to make a partial or complete denture		0.8 (2)	-	1.8 (2)
	The other treatments would cause a lot of pain		2.4 (6)	1.4 (2)	3.6 (4)
	Because I haven't had much success with other treatments in the past		0.8 (2)	0.7 (1)	0.9 (1)
	It would be a lot of pain to consider other options		2.4 (6)	0.7 (1)	4.5 (5)
	Other reasons		5.6 (14)	8.7 (12)	1.8 (2)
	Never had a tooth extracted		15.7 (39)	26.1 (36)	2.7 (3)
Tooth extracted in the last year	Yes		14.9 (37)	8.0 (11)	21.8 (24)
	No		85.1 (211)	90.6 (125)	78.2 (86)
Sector where the tooth extraction was performed	Public		28.6 (71)	29.0 (40)	28.2 (31)
	Private		47.2 (117)	38.4 (53)	58.2 (64)
	Insurance		8.1 (20)	5.8 (8)	10.9 (12)
	Other		0.4 (1)	0.7 (1)	-
	Never had a tooth extracted		15.7 (39)	26.1 (36)	2.7 (3)

* The variables that don't add up to 100% have missing data. Note: Weighted descriptive analysis.

When the P component is analyzed separately, adults of Piracicaba had on average P=10.30 equivalent to 50.56% of the total index, in the interior of Pernambuco it being P = 11.7, corresponding to 73.58%¹⁹. The possible explanations for the greater value of the DMFT index in the

urban population are easier geographical access and greater provision of dental services in urban centers¹⁸, which reflected in a greater average of crowned teeth in adults of Piracicaba. While in the countryside, the higher prevalence of missing teeth can be explained due to worse socioeco-

nomic conditions and shortage of preventive and curative resources, which are most of the time replaced by emergency dental procedures, which tend to be mutilating¹⁷.

The high DMFT index found in this study corroborates with other studies with Brazilian adults, in addition to it having missing (M) and filled (F) teeth as most responsible for the final value of the index^{16,19,20}. In Brazil, the first two epidemiological studies of oral health, carried out in 1986 and 2003 showed no significant differences in the reducing of the caries experience in the state of São Paulo^{2,3}, but the 2010 survey showed a decrease of 19% compared to results in the year 2003^{3,4}, revealing a possible reversal of the main component within the DMFT index. The increase in crowned teeth prevalence and their greater expressiveness in the total value of the index was also verified in Brazilian adults, going from 48.1% to 67.25% of the DMFT index^{3,4}. This reversal can be a reflex of a greater supply of and access to public dental services¹⁸, mainly due to the creation of the National Oral Health Policy and expansion of dental services and inclusion of the Oral Health in the Family Health Strategy Team, evidencing a valorization of both specialized and basic care, with the creation of the Dental Specialties Center²¹.

Regarding periodontal condition, a healthy periodontium was found in 5.0% of the adults, and was even less present in the older adults (2.3%). This condition was similar to those of Danish adults (7.7%)²², but far less prevalent than what was found in Brazilian (17,8%)⁴ and Sudanese (36,1%)²³ adults. The presence of gingival bleeding during the periodontal examination was very similar in younger and older adults, and also comparable to other studies in Brazil^{4,24}, which shows that hygienization is still inadequate for this population. In this study, dental calculus was the most prevalent periodontal condition, which was similarly found in the results for the age group of young adults (73.4%) of Chapecó, state of Santa Catarina²⁴, though it was lower than the result of all adult sample of the city (90.3%). This lower prevalence, even for the younger age group, can be explained by the expansive age group, which can less prevalently affect adults under 34 years old. Both studies have much higher prevalence than what was found in Brazilian adults (28.4%) in 2010⁴.

The prevalence of gingival pockets above 4 mm was 43% in the studied population, higher than what was found in Brazilian adults (30.6%)⁴ and similar to the the data found in Danish adults

(42%)²². The higher prevalence of this condition in the older adults is consistent with results from studies with an expansive age group of German adults²⁵ and refers to the deterioration of the periodontal condition over time.

Being caries and periodontal disease the main causes of teeth loss, and both are chronic diseases, they require in addition to curative treatment the maintenance of the state of oral health with permanent healthy dental and periodontal condition. There is a need for reorganization of health care aimed at adults, that emphasizes new needs in health and especially the control of risk factors common to other chronic diseases, such as diet, smoking and oral hygiene²⁶.

The reflex of accumulated dental extractions brings the need for the oral rehabilitation of these patients. The knowledge of the need and use of prosthesis by the population is essential for planning health services for the adult population²⁷. Data from SB Brazil 2010 showed that 69.8% of adults did not wear upper arch prosthesis and 90.9% did not wear lower arch prosthesis⁴, a piece of data compatible with the findings of this study. In a province of Iran²⁸, with samples in an expansive age group of adults and older adults (19 to 75 years old), 89.5% did not use any prosthesis, 2.3% had a single removable partial lower denture, 3.6% had removable complete upper and lower dentures, and 4.6% had fixed dentures. In this study, complete dentures were the type of prosthesis most commonly used on the upper arch, followed by removable partial dentures. This prevalence is reversed for the prosthesis type most often used on the lower arch.

Other data compatible with the literature is the greater need of prosthesis on the lower arch and combination of fixed or removable partial dentures for substitution of more than one oral element²⁴. However, when the data from this study is verified with the need for prosthetic needs the outcomes are divergent. In the survey conducted in Brazil, only 31.2% of Brazilian adults did not require any kind of prosthesis⁴. In Dalarna⁵, in Sweden, a complete denture need was found in only 1.9% of the population, an extremely low number when compared with this study, what suggests a lower prevalence of missing teeth or greater resoluteness when needed, through prosthetic rehabilitation in Sweden.

Despite all the efforts of the Brazilian Unified Health System to achieve universality and integrality of care, to, among other things, improve the oral health of Brazilians, it is clear that tooth extraction still is a very prevalent condition, es-

pecially among adults and older adults⁴. In Brazil, the belated search of adults for dental services for solution of oral diseases is historically verified, as also observed in this population of Piracicaba, with the high prevalence of the presence of visible biofilm being a determining factor of caries and periodontal diseases, a valorization of the searching for dental services in stages prior to the settlement of these diseases being required. The demand for service, motivated by pain in case of emergency, mainly occurs in the more advanced stages of these diseases, what occasionally results in dental extraction¹⁷. This data was verified in this study in Piracicaba, as the clinical picture of pain was reported as the biggest reason for tooth extraction of the first tooth and of the others for the studied population, but mostly in the age group of older adults (45-64 years old). Other reasons that were cited were tooth that were already lost and periodontal problems. This confirms the findings of the study in Family Health Units in Campina Grande, state of Pernambuco²⁹, which showed caries and pain as the most reported reasons. However, these findings differ from studies with clinical insight, because they refer to conditions evaluated by professionals and not by individuals, being caries and periodontal disease the most prevalent reasons in these studies^{1,7,30}. In the age group of young adults (20-44 years old), the other reasons variable appeared with high prevalence, and can be explained by the dental extractions performed with orthodontic indication.

Another issue raised in this study was the decision to extract the tooth rather than keep it; the most frequent reasons were the lack of another treatment option and the high cost of other necessary procedures. This refers to the understanding that when the periodontal and restorative preventive procedures in primary care are not sought, there is progression of oral diseases and restriction of treatment^{7,31} options. This data was also verified in the study with patients who donated the extracted teeth to a bank of human teeth of Curitiba, state of Paraná³², because most of those being interviewed claim to have searched for dental service only once before the decision of tooth extraction, i.e., the same day in which the procedure was carried out.

A qualitative study with adults and older adults in the School of Odontology of Belo Horizonte³³ showed other reasons for tooth extraction experienced throughout life, such as lack of knowledge of means for the maintenance of the teeth, difficulty of access to oral health ser-

vices, lack of financial resources, dental iatrogenic history and fear of the procedures that would be needed for the maintenance of the teeth. The study adds that even individuals who had access to dental services made the choice of dental extraction for believing they were doing a less costly and time consuming procedure.

In the study of Campina Grande²⁹, 18% of extractions were done by the will of the patient. This decision was made by the patient not only due to cost, but also because of the sense of symptomatological relief and possibility of the development of new clinical pictures of pain in the future. In addition to lack of confidence in restoring procedures of high cost and questionable prognosis, which occasionally culminate in the same resolution, dental extraction³⁴. Furthermore, the choice for the permanence of the dental element can infer on the permanence of the possibility of the development of new clinical pictures of discomfort and painful symptoms, while the choice for tooth extraction is associated with the belief of removal of the cause and resolution of the problem.

Regarding the place chosen by individuals for the performing of the extractions in this study, there was predominance of the particular sector differently from what was found in other Brazilian studies^{17,19,29}. Barbato *et al.*¹⁷ assumes that the public sector, for providing services for a population that is, in theory, poorer economically and, consequently, has less access to dental care, would perform more tooth extractions. However, it is known that the consistent oral health public policies in Brazil are considered recent. An analysis of the accumulated history of tooth loss in an expanded age range will show that the demand for resolution of oral problems and lack of supply of public services can justify the prevalence in this study of the performance of dental extractions in the private sector. Furthermore, in the past, the professional practice in Odontology was not very conservative, and for a long time extraction was considered the most viable resolution for riddance of dental pain.

The limitations of the study are in its cross-sectional character, which means that exposure and outcome are evaluated in a single moment in time, so there could be a prevalence bias. The questionnaire also included past experiences of tooth extraction and previous history of dental care, which depend on the individual's memory for accuracy. In addition, because the sample consisted of adults and the research was carried out in households, an increased participation of

women is anticipated, even during non-business hours. This greater adhesion of the participation of women also occurs in relation to demand and use of dental services^{18,15}. When the studies are conducted on samples of workers, there is a predominance of male participants^{11,16}. Therefore, the discussion on what is the best place to carry out epidemiological surveys on adult population is raised, considering the importance of it being representative of the population and at the same time minimizing the possible biases of sample selection.

According to the data collected, the need to facilitate public access to oral health services for adults is notorious, emphasizing the importance of epidemiological studies on the population of adults in expanded age range. Understanding and reflecting on the motivation that leads individuals to opt for tooth extraction is relevant, and thus, more research is required to further characterize and support the creation of more effective and resolute public policies. It is worth

mentioning that the strategies of promotion and prevention of oral health must consider the target population and its needs when planning dental services. As was observed in this population of adults in expanded age range, the experiences and stages of oral diseases present themselves differently among the studied age groups.

Conclusion

The expanded age range enabled characterizing differences between the age groups in the population of adults. Young adults showed lower severity of clinical oral health conditions for caries experience and periodontal disease, while older adults presented greater use and need of dental prosthesis. The pain was the main motivation of choice for tooth extraction in the adults studied, being aggravated in most cases by the lack of another treatment option at the time of search for dental care.

Collaborations

MF Silva-Junior and ACC Souza wrote the manuscript, MJ Batista conducted the study design, data collection and analysis, and final manuscript review, MLR Sousa collaborated in all phases, from study design, data collection and final review of the manuscript.

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