ORIGINAL ARTICLE

CHARACTERIZATION OF DENTAL LOSS IN PATIENTS ATTENDED IN A TEACHING SERVICE CLINIC IN THE CITY OF CALI - COLOMBIA.

CARACTERIZACIÓN DE LA PÉRDIDA DENTAL EN PACIENTES ATENDIDOS EN UNA CLÍNICA DE DOCENCIA SERVICIO EN LA CIUDAD DE CALI – COLOMBIA

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ABSTRACT

Introduction: partial or total tooth loss is a common condition in the global population, which can have an impact on occlusion, nutrition and quality of life. Tooth loss continues to be a reality despite advances in dental treatments.
Objective: To characterize the dental loss of patients who attend teaching-service clinics in the City of Cali.
Methods and materials: Observational, descriptive cross-sectional study. 105 patients were included during a period of 6 months who attended the different dental services in the teaching service clinics. Sociodemographic characteristics, the presence of systemic diseases, the cause of tooth loss, the type of edentulism and whether previous edentulism were present were recorded. The case of tooth loss was defined in individuals with 1 or more missing teeth. A descriptive analysis of the frequency distributions and measures of central tendency and dispersion for the qualitative and quantitative variables respectively, bivariate analysis with contingency tables and statistical test of association was carried out. All in the statistical software R studio.
Results: A dental loss of 273 teeth was recorded in 105 patients, with an average age of 47 years (Std. SD ± 18.0) between 16 and 80 years. It was more frequent in women 18 (57%) than in men (43%), 46% reported some systemic disease. The main cause of tooth loss was dental caries (23.8%) and periodontitis (18.1%). The third molar was the most extracted (30.7%) and the canine (12.4%). The least common was the second premolar (7.3%). According to the life cycle, in adolescence and youth (12.3%) the main cause was the impacted tooth, in adulthood it was caries (14.28%) and in old age it was periodontitis (9.52%).
Conclusion: Tooth loss in a teaching clinic service was more frequent in women, it occurred at any age and in any tooth in adult patients and the main causes were caries and periodontitis. Given that there was a high frequency of tooth loss, it is important to identify the associated factors so that more preventive and non-invasive treatments can be done from academia, contributing to the long-term survival of teeth in patients.

CLINICAL RELEVANCE

Tooth loss occurs in all ethnic groups, sexes and ages. It is important to identify the causes and associated factors in order to contribute to decision making in oral health, not only from a curative treatment but also from a preventive treatment. In the last stages of the life cycle it is essential and viable to have complete, stable and functional dentition and from the academy it is important to identify why the treatments do not reduce dental loss and to question from public health policies that impact on access to health services to academic training that should emphasize more on the formation of preventive than corrective treatments and to question whether we could be presenting an overtreatment in indifferent areas of our profession.

INTRODUCTION

Dental loss has been related to different sociodemographic factors, geographic location, access to dental consultation and the health policies of the population related to the coverage of oral health services. It occurs due to treatment of dental diagnoses with unfavorable prognoses, although it is also observed that it can be due to the patient's requirements for not being able to carry out treatments of high economic cost or at the suggestion of the professional, sometimes occurring as a consequence of overtreatment.

The main causes reported are caries and periodontitis without differences and have been related to alterations in occlusion, phonation, esthetics and nutrition, and in recent years it has also been suggested that it has an impact on the quality of life due to psychological effects on the patient's well-being and self-esteem.[1,2]

The prevalence of partial and total edentulism is geographically related to differences in health systems, economic factors, lifestyles and attitudes towards oral care.[2] In countries such as Brazil the highest edentulism is reported to occur between 60 and 79 years of age, with 54.7%.[1] Although there are differences related to age and countries, it has been reported that men present more dental loss due to caries between 21 and 30 years of age and due to periodontal disease between 41 and 50 years of age,[3] it is also associated with age and is related to socioeconomic level and low academic level.[4]

Recently in the United States, the National Health and Nutrition Examination Survey (NHANES) in older adults took into account sex, race, age, level of education and reported a total loss of 12.9% that increased with age, in the Afro-descendant race and with a low educational level.[5]

Total edentulism has decreased but partial edentulism is still present from an early age. The prevalence and severity of oral diseases has decreased in some countries, but in vulnerable populations there are still high rates of tooth loss.[2] The most commonly identified factors include smoking, poor plaque control, age and female sex.[6]

In Colombia the studies are very limited, in the last ENSAB IV (2014) it was reported that dental loss begins at the age of 20 years and continues until old age, highlighting that the social determinants of oral health are associated with social, environmental and economic factors rather than individual behavioral changes.[7]
Different studies report that the causes of dental loss include caries, periodontitis, coronal or radicular fractures, orthodontic treatments, restorative treatments, trauma and medical procedures such as radiotherapy and chemotherapy.[8]

The Global Burden of Disease study (GBDA 2016) established that dental caries was the most prevalent disease from 1990-2016 (2.44 billion) considering it a high risk factor for tooth loss.[9] Periodontitis is influenced by economic factors, low education and low socioeconomic status and has also been reported as a factor associated with tooth loss in different countries,[10-12] a predictive model has been suggested with tooth type and clinical attachment loss, for the prediction of tooth loss burden.[13] Other reported causes include endodontic treatments due to treatment failure and periapical infection[14] and in some countries it is reported to be more frequent in older men with an average of 20.52 teeth lost per person.[15]

In relation to the frequency of lost teeth, it has been reported that the lower incisors are the most frequently lost due to periodontitis, followed by the upper incisors and the upper second molars. The first molars due to dental caries and the upper central incisors due to periodontal disease have been reported as the most common groups of teeth lost.[3,16]

Other studies report that the frequency is higher in women with less education and less oral hygiene habits. Poor health habits and health policies are reported as factors related to dental loss in countries such as Mexico, but it has also been observed in countries with higher standards of living and comprehensive medical care, such as Finland.[17]

In recent years dental loss has been suggested as a marker of general health and is associated with different diseases such as hypertension, diabetes, asthma, arthritis, rheumatism, mental problems and cardiovascular diseases among others because it has been observed that patients with systemic multimorbidity have no functional dentition and high severe dental loss.[18]

In Colombia there is limited evidence related to the causes of dental loss, and its results will allow to increase scientific knowledge and contribute to take measures related to intervention treatment and prevention in order to contribute to reduce dental loss. The objective of the study is to characterize the dental loss of patients who attend a dental clinic for teaching services over a period of 6 months in Cali, Colombia.

MATERIALS AND METHODS

Study design

A descriptive cross-sectional observational study was carried out in the dental clinics of a teaching service institution for a period of 6 months in Cali, Colombia. The calculated sample size was 100 patients, the approval of the ethics committee of the Faculty of Health was obtained considering it a minimum risk research.

Participants of the study

The information was taken from the clinical histories of the patients attended during the period from July to December 2023. The variables included were socioeconomic stratum, age, sex, ethnicity, cause of dental loss reported in the history, tooth extracted, and previous total or partial edentulism.

Inclusion and exclusion criteria

The inclusion criteria were exodontic treatment of any permanent tooth, being over 18 years of age, any ethnicity and any sex. Supernumerary and deciduous teeth were excluded.

Sample calculation

To calculate the sample the finite population formula was used, in a population of 1,200 patients (N) attending the school clinics with indication of exodontia in a period of 4 months, with a sampling error of 10% (e=0.10), a confidence level of 95% (Z2=1.96) and a prevalence of dental loss equal to 0.20, a minimum sample size of 84 subjects was obtained, expanding the sample with a minimum of 100 patients.

Statistical method

The information was collected in an Excel database and a univariate statistical analysis was carried out with the frequency distributions for each of the categories of qualitative variables; in the case of quantitative variables the statistics of mean and standard deviation were obtained. A bivariate analysis was made of the cause of dental loss with and life cycle of age. All the analyses were carried out using R Studio version 4.31 statistical software.

RESULTS

Of the 105 patients attended, 53.33% were female and 46.67% were male. A total of 28.57% belonged to socioeconomic stratum 3 and 59.02% were from the department of Valle del Cauca. 51.43% were single, the subsidized health regime was the most frequent with 35.24% and as for the level of education, 53.33% did not report their level of schooling (Table 1).

Table 1. General characteristics.

Characteristics	N=105	100%
Gender		
Male	49	(46,67)
Female	56	(53,33)
Socioeconmic Stratum		
1	17	(16,19)
2	16	(15,24)
3	30	(28,57)
4	8	(7,62)
5	4	(3,91)
Not reported		
Etnicity		
Afro-descendant	5	(4,76)
White	12	(11,43)
Indigenous	3	(2,86)
Mestizo	35	(33,33)
Not reported	50	(47,62)
Place of procedence		
Valle del Cauca	63	(59,02)
Not reported	13	(12,38)
Cauca	12	(11,41)
Nariño	5	(4,76)
Bogotá	4	(3.81)
Venezuela	5	(4,76)
Antioquia	2	(1,90)
Norte de Santander	1	(0,95)
Marital status		
Married	25	(23,81)
Divorced	3	(2,86)
Single	54	(51,43)
Unmarried	5	(4,76)
Not reported	18	(17,14)
Health system		
Contributory contributory	17	(16,19)
Contributory beneficiary	22	(20,95)
Subsidized	37	(35,24)
Not reported	29	(27,62)
Academic preparation		
Primary	10	(9,52)

Secondary	25	(23,81)
Technical	2	(1,90)
Technologist	3	(2,86)
Professional	9	(8,57)
Not reported	56	(53,33)

The mean age was 47 years (SD 18.0) with a range of 16 -80 years (Med IQR 51.0 [31.0;60.0]). The highest tooth loss was observed in the adult group (46.6%) followed by old age (31.43%) as shown in Table 2.

Table 2. Age by life cycle.

Life Cycle	N=105	100%
Adolescence 12-18 years	7	(6.67%)
Jouth 19-26 years	16	(15.24%)
Adulthood 27-59 years	49	(46.67%)
Old age + 60 years	33	(31.43%)

The age range was 16-18 years and when observing the number of teeth lost by age, the highest frequency was at 55 years, followed by 76 years and 47 years. There was no increase in the number of teeth lost with increasing age (Figure 1).
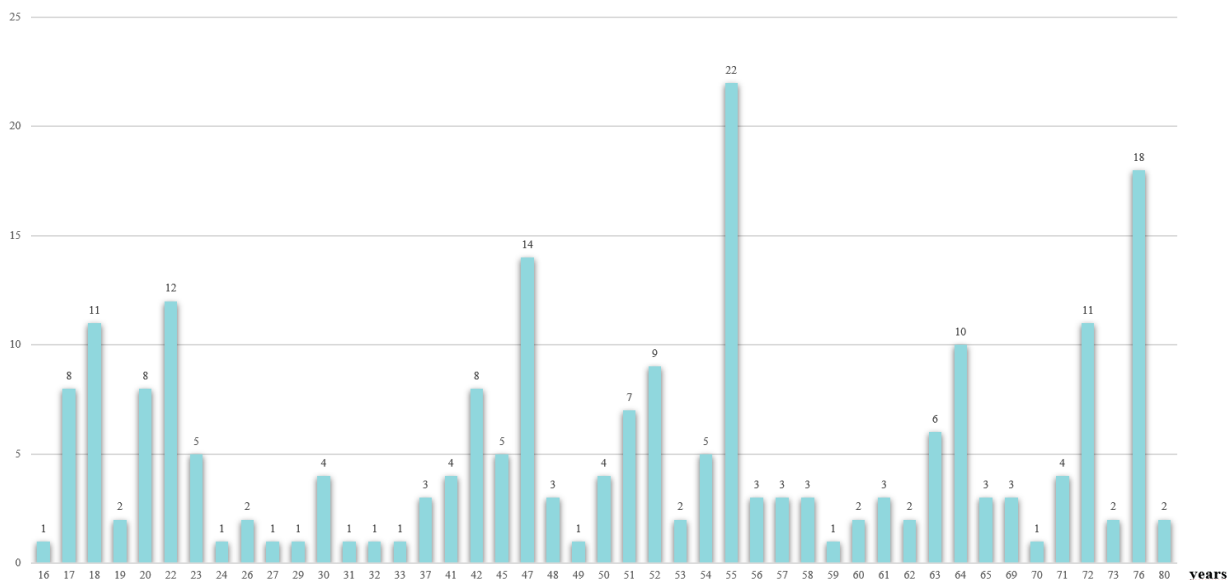

Figure 1. Tooth loss by age

In relation to systemic status, it was observed that 8.57% were diagnosed with hypertension, 5.71% with gastritis and 3.81% with diabetes, among others (Table 3).

Table 3. Systemic state.

Systemic disease	N=105	100%
Arterial hypertension	11	10,47%
Gastritis	7	6,6%
Diabetes	6	4,7%
Anxiety - Depression	7	6,6%
Hyperthyroidism	4	3,8%
Asthma	2	1,9%
Arthritis	2	1,9%
Other	11	10,47%
Not present /Did not report	55	52%

Causes of dental loss

The main cause of dental loss was caries with 20.95 %, followed by periodontitis with 16.19%. Other associated causes were the indication for treatments such as orthodontics (3.9%) and prosthodontics (2.9%) and 3.9% of patients requested extraction due to possible high costs of definitive treatment or acute pain (Table 4).

Table 4. Cause of tooth loss.

Characteristic	N=105	100%
Caries	25	23.8
Periodontitis	19	18,1
Included tooth	17	16.2
Abandoned root	15	14.3
Tooth fracture	15	14.3
Indicated by orthodontics	4	3.9
Voluntary extraction	3	2.9
Indicated by prosthodontics	3	2.9
Poor prognosis	2	1.9
Malocclusion	1	0,9
Endodontic compromise	1	0,9

When looking at the cause of loss in adolescence and young adulthood. The greatest cause was the included tooth. In adulthood caries was the greatest cause followed by periodontitis and in old age it was periodontitis, followed by dental fracture. In old age and adulthood the different causes of tooth loss were present in all ages (Table 5).

Table 5. Cause of tooth loss and life cycle by subject.

Characteristic	Adolescence 12-18 years	Youth 19-26 years	Adulthood 27-59 years	Old age +60 years	TOTAL N=105 (100%)
Caries	0	5	15	5	25(23,8)
Periodontitis	0	1	8	10	19(18,1)
Included tooth	4	9	3	1	17(16,2)
Abandoned root	0	0	9	6	15(14,3)
Tooth fracture	0	1	6	8	15(14,3)
Indicated by orthodontics	2	1	1	0	4(3,9)
Voluntary extraction	0	2	1	0	3(2,9)
Indicated by prosthodontics	0	0	2	1	3(2,9)
Poor prognosis	0	0	2	0	2(1,9
Malocclusion	0	0	1	0	1(0,9)
Endodontic compromise	0	0	0	1	1(0.9)
TOTAL	6 (5,71%)	19(18,09%)	48 (45.71%)	32 (30,47%)	105 (100.00%)

The total number of teeth extracted in the 105 subjects was 273 teeth. The frequency of tooth loss by groups of teeth was similar in the upper (57%) and lower (42.86) jaws. The upper third molars (15.70%), upper canines (8.42%) and upper second molars (5.86%) were also frequent. All the teeth presented dental loss and the least frequent was the second premolar (2.19%) (Table 6).

The teeth extracted (N=273) by life cycle were more frequent in adulthood (47.25%) and with greater frequency of third molars and second molars. In adolescence and youth the loss of third molars predominated. In old age the canine and lateral incisors were the most lost. Dental loss occurred at all ages (Table 7).

Lastly, the presence of pre-existing tooth loss was observed to be very similar in the upper (54.27%) and lower (52.37%) jaws. Pre-existing total edentulism was less frequent (4.7%)

Table 6. Tooth loss by group of teeth.

Teeth	Maxillary teeth	Mandibular teeth	Total
Third molar	43 (15,70)	41(15,01)	84(30,76)
Second molar	16(5,86)	12(4,39)	28(10,25)
First molar	16 (5,86)	8(2,93)	24(8,79)
Second premolar	14(5,12)	6(2,19)	20(7,32)
First premolar	15(5,49)	11(4,02)	26(9,52)
Canine	23(8,42)	11(4,02)	34(12,45)
Lateral incisor	14(5,12)	15(5,49)	29(10,62)
Central incisor	15(5,49)	13(4,76)	28(10,25)
TOTAL	156(57,14)	117(42,86)	273(100)

Table 7. Dental loss according to life cycle by teeth.

Dientes	Adolescencia 12-18 años	Juventud 19-26 años	Adultez 27-59 años	Vejez +60años	TOTAL N=273(100%)
Tercer molar	17	29	34	4	84(30,76)
Segundo molar	0	0	18	10	28(10,25)
Primer molar	1	0	17	6	24(8,79)
Segundo premolar	0	0	10	10	20(7,32)
Primer premolar	0	4	13	9	26(9,52)
Canino	0	0	12	22	34(12,45)
Incisivo lateral	0	0	14	15	29(10,62)
Incisivo central	0	0	11	17	28(10,25)
TOTAL	18(6,59)	33(12,08)	129(47,25)	93(34,08)	273(100)

Table 8. Pre-existing tooth loss.

Characteristics	N=105	100%
Edentulism Upper Maxillary		
Partial	53	50,4
Total	4	3,80
None	48	45,71
Edentulism Lower Jaw		
Partial	54	51,42
Total	1	0,95
None	50	47,63

DISCUSSION

According to the sociodemographic characteristics of patients with dental loss, most articles report that it is more frequent in women. In our study it was found to be more frequent in women with 55% similar to the results of Kassebaum, N. J., et al. [6]

In our study an age range was observed between 16 and 80 years of age, in Mexico it has been reported from the age of 20 years.[19] and the group with the greatest loss was observed in adulthood with 46, 67% and an average age of 51 years. In the United States it is reported in those over 60 years of age. This suggests that dental loss is not exclusive to older patients and that early dental care is crucial for preventing dental loss in adulthood.[1,4]

Although the evidence is controversial in Japan, it was found that the greatest dental loss was recorded in the working class population.[4]

In a study by Eleanor Fleming et al. (2020) they confirm the correlation between race, education and dental loss, and in contrast to our study we found less frequency in this race with 4.76%.[23] According to academic preparation, previous research such as that of Nakahori et al. [24] reported that people with fewer years of schooling have greater dental loss and we reported the highest frequency in secondary education (23.81%), followed by patients with elementary education (9.52%).

The study showed that dental caries was the main cause of dental loss similar to other studies in Venezuela [22] that reported 73.0% of the elderly with dental caries loss.

According to the study, periodontitis occupies second place in terms of causes of dental loss, like the studies of Buchwald et al, which also associate it with low socioeconomic level, low education and economic factors.[20]

The causes of dental loss were associated with various factors mentioned above; however, it is important to emphasize that they are not the only ones identified in the study of dental loss. 53.3% were found to belong to the female gender, and related literature reports similar data where the female gender presents greater losses than the male gender; however, since 2010 these figures have been equalizing, resulting in a main variable which would be age.[6]

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