



# Correlation between missing teeth, sociodemographic and oral hygiene variables in adult orthodontic patients

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## Introduction

Adults are increasingly seeking orthodontic treatment (Peterson et al., 2005), and the lack of information between missing teeth, sociodemographic and oral hygiene variables, makes it important to investigate this association in samples with wider adult age ranges, even more in high-income countries where emerging adulthood has extended to about 29 years of age (Arnett et al., 2014).

We aimed to investigate whether missing teeth, sociodemographic and oral hygiene variables might be confounding variables in this association between adult orthodontic patients.

## Materials and Methods

This cross-sectional study consecutively enrolled patients with at least 15 years of age, that sought orthodontic treatment between January 2019 to March 2020, at the Orthodontic Care Consultation of Egas Moniz Dental Clinic (Monte de Caparica - Almada, Portugal). Exclusion criteria were patients with severe diseases, craniofacial abnormalities, cognitive deficits, caries, periodontal diseases, and previous orthodontic treatment history. A total of 93 patients were enrolled in the study.

Participants provided information on their sociodemographics by a self-reported questionnaire. The participants' oral health hygiene habits included daily frequency of toothbrushing, dental flossing, and type of toothbrush. The number of missing teeth was recorded via clinical observation, assisted by panoramic x-ray and excluding third molars. Also, we categorized the missing tooth according to the tooth type: anterior teeth (incisors and canines), premolars and molars.

Resulting data were submitted to descriptive and inferential statistical analysis. A significance level of 5% was considered. The statistical analysis of the results was performed with IBM SPSS Statistics version 24.0 for Windows (Armonk, NY: IBM Corp.). This study was carried out in accordance with the Helsinki Declaration of 1975 as revised in 2013 and approved by the Egas Moniz Ethics Committee (ethical approval no. 769). An informed consent was signed by the patient or legal responsible.

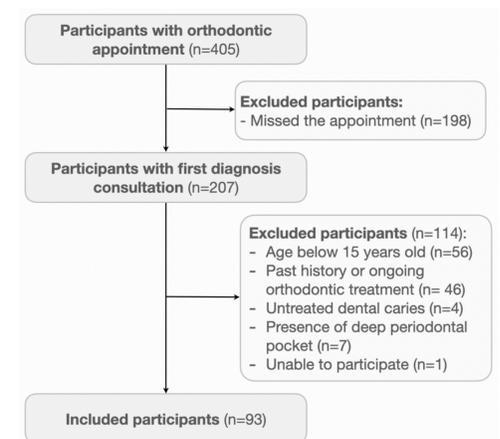


Figure 1: Participants flowchart.

## Results

From an initial sample of 405 patients with a scheduled orthodontic appointment, 207 presented to the Egas Moniz Dental Clinic Orthodontic Department. Of these, 93 participants (33 males and 60 females) met the eligibility criteria (Figure 1), aged 15 to 60 (Table 1).

This sample had a majority of participants with a middle education level (58.1%), mainly in a single status (70.9%), and being students (47.3%) or being employed (47.3%). Regarding sex discrepancies, educational level ( $p=0.022$ ) and daily toothbrushing frequency ( $p=0.019$ ) presented differences.

Participants aged 30 years old or older had significantly more missing teeth ( $p<0.001$ ), better self-reported interproximal hygiene ( $p<0.001$ ), and had different marital ( $p<0.001$ ) and occupation status ( $p<0.001$ ) than participants under 30 years old. Moreover, participants aged 30 years old or older had significantly less molars and premolars present ( $p<0.001$ ).

Variable	Female (n=60)	Male (n=33)	p-Value *	Age $\geq 15$ and < 30 (n=57)	Age $\geq 30$ (n=36)	p-Value *	Total (n = 93)
Age, mean (SD)	31.6 (14.5)	27.1 (14.0)	0.078	19.7 (3.8)	46.2 (9.0)	<0.001	30.0 (14.4)
Education level, n (%)			0.022			0.490	
Middle	34 (56.7)	20 (60.6)		31 (54.4)	23 (63.9)		54 (58.1)
Higher	26 (43.3)	13 (39.4)		26 (45.6)	13 (36.1)		39 (41.9)
Marital Status, n (%)			0.176			<0.001	
Single	40 (66.7)	26 (78.8)		55 (96.5)	11 (30.6)		66 (70.9)
Married/Union of fact	17 (28.3)	4 (12.1)		2 (3.5)	19 (52.7)		21 (22.6)
Divorced	3 (5.0)	3 (9.1)		0	6 (16.7)		6 (6.5)
Occupation, n (%)			0.290			<0.001	
Student	25 (41.7)	19 (57.6)		44 (77.2)	0		44 (47.3)
Employed	32 (53.3)	12 (36.4)		10 (17.5)	34 (94.4)		44 (47.3)
Unemployed	3 (5.0)	2 (6.0)		3 (5.3)	2 (5.6)		5 (5.4)
TB frequency per day, n (%)			0.019			0.064	
3	10 (16.7)	8 (24.2)		7 (12.2)	11 (30.6)		18 (19.3)
2	49 (81.7)	20 (60.6)		47 (82.5)	22 (61.1)		69 (74.2)
1	1 (1.6)	5 (15.2)		3 (5.3)	3 (8.3)		6 (6.5)
Interproximal cleaning, n (%)			0.505			<0.001	
Yes	16 (26.7)	6 (18.2)		5 (8.8)	17 (47.2)		22 (23.7)
Powered toothbrush, n (%)			0.422			0.587	
Yes	6 (10)	6 (18.2)		6 (10.5)	6 (16.7)		12.0 (12.9)
Missing teeth, mean (SD)	2.3 (3.1)	1.2 (2.3)	0.118	0.4(1.0)	4.3 (3.2)	<0.001	1.9(2.9)
Type of tooth lost, n (%)							
Anterior teeth	6 (0.4)	3 (0.3)	0.917	2 (0.1)	7 (0.7)	0.138	9 (0.3)
Premolars	37 (2.2)	11 (1.2)	0.285	5 (0.3)	43 (4.3)	<0.001	48 (1.8)
Molars	92 (5.5)	27 (2.9)	0.066	15 (0.9)	104 (10.3)	<0.001	119 (4.6)

TB - Tooth brushing; \* Mann-Whitney for continuous variables, chi-square test for categorical variables,  $p < 0.05$  denoted in bold.

Table 1: Number of missing teeth, sociodemographic and oral hygiene variables according to age, gender and for overall participants. (N=93)

## Discussion and Conclusions

We included participants aged 15 years old or older because late adolescence stands for a biological, psychological and social state of development better established, with adult cognitive skills well developed (Hazen et al., 2008).

Among different oral conditions, tooth loss represents the worst dental issue regarding oral health (Peres et al., 2019). The worldwide prevalence of severe tooth loss declined between 1990 and 2010, from 4.4% to 2.4% (Kassebaum et al., 2014). Our data show that this population reported similar oral hygiene habits in agreement with other regional and national studies in Portugal (Santos et al., 2015; Melo et al., 2017; Botelho et al., 2019), that may explain the significant number of missing teeth. Notwithstanding, the loss of at least one tooth in this population was less prevalent than nationally reported (Melo et al., 2017), and the average missing teeth was lower than in Lisbon Metropolitan Area study (Botelho et al., 2019), considering the same age groups.

Toothbrushing frequency and education level are significant variables on gender. Better self-reported interproximal cleaning, marital and occupation status and less presence of molars and premolars, showed association with patients 30 years old or older.

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