Perception of microdontia and vertical alteration of size of upper incisors by students of the Dentist Surgery Degree of the Autonomous University of Nayarit

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Abstract

Objective: To evaluate the perception of microdontia of the right lateral incisor and the decrease in the vertical size of the left central incisor by first and last year students of the Dental Surgery Degree of the Autonomous University of Nayarit. **Methods:** A descriptive, observational and cross sectional study was conducted: 10 smile photographs were assessed on a scale from 0 (not attractive) to 10 (attractive). The evaluation group included 64 people: 32 first year students and 32 fifth year students. They rated five photographs with reduction in crown size and an increase in the gingival level of the central incisor, and five photographs with microdontia of the lateral incisor. **Results:** When evaluating the reduction in crown size and increase in the gingival level of the left central incisor, both groups rated the control photograph higher. In the microdontia of the lateral incisor, the fifth year students rated the control image 5.5 on average, and the first year group rated it higher. **Conclusions** Both groups detected the changes.

Keywords: perception, tooth, incisor, photographs, Mexico.

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Introduction

Dental anomalies occur between the sixth and eighth weeks of intrauterine life, the stage during which embryonic structures such as the dental sac, dental papilla and tooth undergo conversion. In the histodifferentiation process, these structures result in the formation of enamel, dentine and cementum [1].

Dental anomalies are defined as congenital malformations of tooth tissues that are due to changes that affect the natural process of odontogenesis, which involves various genes that regulate this process. If the process is altered, the temporary or permanent dentition, or both, can be negatively affected, causing a delay in the change from deciduous to permanent dentition and, in some cases, underdevelopment of the jaws; it can also affect characteristics such as the number, size, shape, structure and color of some or all of the teeth [23].

Morphological dental anomalies are common, with a prevalence of 74.7% according to Freer (1998) [4]. In 2013, Gómez-Fernández et al. reported a 40.5% prevalence of microdontia of the maxillary lateral incisors in the city of Tepic, Nayarit [2].

Microdontia is a dental variation characterized by a reduction of the mesiodistal and cervico-incisal diameters (due to an alteration in the crown or the level of the gingival margins) of the tooth crown, therefore, they are considered small teeth with appropriate anatomy. It can be generalized or localized to a single tooth, and the upper lateral incisor is the one in which size and shape anomalies are most often found [5-6].

This anomaly can result in a lack of space or excess space, negatively affecting the length of the arch, which not only compromises aesthetics, but can also damage occlusion, because the tooth can be in the wrong position. Its etiology is linked to hereditary, environmental, genetic and epigenetic factors [5-6].

A possible criterion for diagnosing microdontia of the upper lateral incisor is if it is smaller, equal to or up to 0.7 mm wider than the lower lateral incisor, thus resulting in excess dental material in the lower incisor in relation to the upper incisor [2].

In any tooth, microdontia can lead to changes in the sagittal dimensions of the arch, which can be treated through restorative procedures to preserve aesthetics and occlusion, based on a multidisciplinary diagnosis that includes periodontal, orthodontic, rehabilitation and endodontic assessments. Therefore, it is necessary to consider different aesthetic, functional, social and cultural factors [4-7].

Kokich[8] conducted a study in Seattle, in which three groups of photographs were used to evaluate aesthetic discrepancies, selected based on their frequency and clinical significance to the smile, and found that orthodontists were more critical than the other groups.

The aim of this study was to evaluate the perception of microdontia of the right lateral incisor and the decrease in the vertical size of the left central incisor by first and last year students of the Dental Surgery Degree of the Autonomous University of Nayarit.

Methods

The study conducted was descriptive, observational and cross-sectional. The population studied consisted of students of the Dental Surgery Degree of the Autonomous University of Nayarit. The sample size included 64 students: 32 first year students and 32 of fifth year students, selected at random.

The images from Kokich's article were used in the research [8]. Both groups were asked to observe and assess 10 smile photographs, 5 of

which showed a reduction in crown size with an increase in the gingival level of the left central incisor and 5 showing microdontia (decrease of the mesiodistal size) of the lateral incisor, all of them with varying levels of alteration. After analyzing the photographs, the students were asked to fill in a survey rating each one on a scale of 0 to 10, with 0 being not attractive and 10 being attractive.

The images included control photographs with patients showing dental harmony, and photographs with alterations ranging from 0.5 mm to 2 mm. The data were recorded using Microsoft Office Excel 2007. Descriptive statistics and ANOVA, post hoc Tukey's tests ($p < 0.05$) were conducted using the StatCalc 8.2.2 software.

Results

The average age of the first year students was 18.52 ± 1.81 years, and the average age of the fifth year students was 22.53 ± 0.93 years. When evaluating the reduction in crown size and increase in the gingival level of the left central incisor, we found that both groups rated the control photograph the highest. However, first year students gave the image with the 0.5 mm decrease a very similar rating to the 1 mm one, and fifth year students gave the image with the 1.5 mm one a very similar rating to the 2 mm one. The descriptive statistics are shown in Table 1.

Table 1. Descriptive statistics of the decrease in the vertical size of the crown

		Mean	Standard Deviation	Maximum	Minimum
First year	Control photograph	8,67	1,31	10	5
	0,5 mm	7,10	2,07	10	2
	1 mm	7,16	1,93	10	0
	1,5 mm	6,59	2,04	9	0
	2 mm	6,37	2,22	10	0
Fifth year	Control photograph	5,62	2,60	10	0
	0,5 mm	4,75	2,34	8	0
	1 mm	4,18	2,48	9	0
	1,5 mm	3,46	2,26	7	0
	2 mm	3,5	2,27	7	0

The ANOVA test showed statistical differences in the first year group with $F = 10.77$ and $p = 0.0001$, and statistical differences were also found in the fifth year group with $F = 9.45$ and $p = 0.0001$. When comparing the result for the control photograph to each of the photographs showing the increments (Table 2), Tukey's test showed significant results; no statistically significant differences were found among the photographs with alterations. We only found statistical differences in the fifth year group ($p< 0.01$) when comparing the control photograph to the ones with the 1.5 mm and 2 mm alterations.

Table 2. Results of the ANOVA post hoc Tukey's test between the control photograph and the altered photographs.								
Alteration	0.5 mm		1 mm		1.5 mm		2 mm	
	Tukey's	p	Tukey's	p	Tukey's	p	Tukey's	p
Reduction in crown, first year	4,83	0,0069**	4,66	0,0101*	6,41	0,001**	7,08	0,001**
Reduction in crown, fifth year	2.03	0.591	3.33	0.1318	5	0.001**	4.93	0.005**
* p<0,05 ** p<0,01								

In the microdontia of the lateral incisor, the fifth year students rated the control image 5.5 on average, and when it showed a 2 mm reduction, the average was 4.65. The first year group rated the control photograph higher than the other photographs, but the image showing the 1.5 mm reduction was rated more attractive than the ones showing the 0.5 mm and 1.5 mm reductions. The descriptive statistics are shown in Table 3. Statistically significant differences were found in both groups with the ANOVA test (for the first year, $F = 9.45$, $p < 0.01$ and for the fifth year, $F = 2.484$, $p < 0.045$). Applying Tukey's test in the first year group, we found statistical differences when comparing the control photograph to the 0.5 mm reduction ($p < 0.05$), the control photograph to the 1 mm reduction ($p < 0.01$) and the control photograph to the 2 mm alteration ($p < 0.01$) (Table 4). No significant differences were found in any of the images for the fifth year group.

Table 3. Descriptive statistics of the microdontia of the upper left lateral incisor					
		Mean	Standard Deviation	Maximum	Minimum
First year	Control photograph	7,91	1,19	10	6
	0,5 mm	6,72	1,63	9	0
	1 mm	6,62	1,54	9	2
	1,5 mm	7,27	1,55	10	3
	2 mm	6,16	1,88	9	1
Fifth year	Control photograph	5,5	2,26	9	1
	0,5 mm	4,81	2,09	8	0
	1 mm	4,53	1,8	8	0
	1,5 mm	5,56	2,13	10	1
	2 mm	4,65	2,4	9	0

Table 4. Results of the ANOVA post hoc Tukey's test between the control photograph and the altered photographs with microdontia								
Alteration	0.5 mm		1 mm		1.5 mm		2 mm	
	Tukey's	p	Tukey's	p	Tukey's	p	Tukey's	p
Microdontia, first year	4,51	0,014*	4,93	0,005**	2,46	0,411	6,67	0,001**
Microdontia, fifth year	1.76	0.696	2.49	0.401	0.16	0.899	2.16	0.536**
* p<0,05 ** p<0,01								

Discussion

Ideally, upper central incisors are equal in length and lateral incisors are slightly shorter. The gingival margin of the lateral incisor is located more incisally than on the central incisor. Therefore, selecting the most suitable treatment option depends on the relative length of the crowns of the central and lateral incisors, and the level of the upper line during smiling [9].

In a study conducted by Kokich et al. [10], a 2 mm alteration in relation to the ideal crown length was required for the general public to classify the image as noticeably less aesthetic. Orthodontists identified a 1 mm discrepancy from the ideal, whereas dentists made the distinction when the crown length was 1.5 mm longer than the ideal. When evaluating the crown width, a mesiodistal dimension 3 mm narrower than the ideal crown width for the lateral incisor was required for orthodontists and dentists to find it significantly less attractive. However, a 4 mm narrowing of the mesiodistal width of the lateral incisor was required for the general public to rate it as less attractive [10].

Kokich et al.[8] mentioned that orthodontists were more critical than dentists and the general public when evaluating asymmetric crown length discrepancies. The orthodontics group was the first to detect a 0.5 mm reduction in crown length. The groups of dentists and the general public were unable to detect unilateral crown length discrepancies unless the crown was 1.5 to 2 mm smaller than the contralateral incisor. Nevertheless, all groups identified a unilateral crown width discrepancy at the same level, which was 2 mm narrower.

A study conducted in the city of Tepic, Nayarit, found that orthodontists detected the reduction in the incisor until 3 mm, and the most unattractive microdontia was the 4 mm one. Dentists noticed the 1 mm change in the incisor, and found the 3 mm reduction to be the least attractive. The general public was able to detect microdontia up to 4 mm [11].

It should be noted that the teeth most commonly affected by microdontia are those that tend to disappear during the phylogenetic evolution, although localized microdontia is sometimes associated with certain syndromes, such as ectodermal dysplasias, Down syndrome or hemifacial microsomia. Microdontia can cause aesthetic disorders, resulting in the presence of diastemas [12].

Conclusions

The reduction in the size of the crown of the left central incisor was detected by both groups. However, first year students were able to perceive the change starting at 0.5 mm and fifth year students at 1 mm.

For microdontia of the lateral incisor, students in both groups rated the control photograph higher, because they perceived the reduction in the mesiodistal size as an unattractive feature in the smile.

The information gathered showed the qualities that need to be assessed to make a correct diagnosis so that the alterations present can be treated.

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