An Evaluation of Upper Lip Length and Thickness Changes on Smiling in Patients with Class I, Class II Div1, 2 of Malocclusion According to Angle's Classification

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Abstract

The objective of this study was to evaluate upper lip length and thickness changes in the vertical dimensions at maximum smile in patients with class I and class II div 1, 2 of malocclusion According To Angle's Classification.

Participants the present study was conducted on 120 subjects randomly selected from the students and staff of faculty of dentistry in Hama University. It was explained to the subjects that this was a study on lip movements involving a short questionnaire followed by a (5- 10 second) video clip capturing only a small part of the face (chin to nose). Video graphic records of these 120 subjects, who willingly consented to participate in the study, were taken to study the perioral zone at rest and on smiling. The subjects were divided into three groups, namely, group 1 (class I), group 2 (class II div1), group 3 (class II div2), with each group containing 20 males and 20 females. Inclusion criteria:
 • Age range between 18 and 28 years.
• No active orthodontic treatment
Selection Criteria for the Class-II Sample
 Class II div 1:
• Bilateral Class-II Buccal segments "molar and canine" with convex facial profile. (The skeletal classification was not considerable)

• Proclination of maxillary front teeth with an overjet of > 4 mm.
 Class II div 2:
• Bilateral Class-II Buccal segments "molar and canine". (The skeletal classification was not considerable)
Exclusion criteria:
• Missing tooth visible on smiling
• Prosthodontics /Restorative work on tooth/ teeth visible on smiling
• Gross facial asymmetry
• Visible periodontal disease, caries, excessive dental attrition
• history of orthodontic treatment
• Lip irregularities, or history of lip surgery. Smile Recording and Measurements The subjects were explained that this was a study on smile involving a 5- to 10-second video clip of a small part of the face. An informed consent was obtained from each subject who agreed to participate in the study voluntarily. A video camera (SONY DSC-H200) was set on the tripod 4 feet from the subject. The subjects were seated on the adjustable stool and instructed to hold the head in natural head position by looking straight into an imaginary mirror. If head position required correction, the researcher helped the subject into natural head orientation. The camera lens was adjusted to be parallel to the apparent occlusal plane and the camera focused only on the

mouth (from nose to chin) so that the person could not be identified. Included in the capture area (frame) were 2 rulers with millimeter markings. The rulers were secured in a cross configuration so that if the subject accidentally rotated 1 ruler, the other could be used to analyze the frame. The relaxed lip position was achieved by asking the subject to lick the lips and then swallow. Then, the subjects were instructed to say ''Subject number __'' and then smile. Recording began 1 second before the subject started speaking and ended after the smile. The video clip was downloaded to a computer (LG RD590) and uploaded to ScenalyzerLive (version 4.0, Andreas Winter, Vienna, Austria), a video-editing software program. Each frame was analyzed, and 2 frames were captured for the study. Each frame was then analyzed, and finally two frames were selected for the study. The first frame represented the subjects' lips at rest or relaxed lip position, and the second frame represented the subjects' natural unstrained posed smile. The widest commissureto commissure posed smile frame was selected as one of 10 or more frames showing an identical smile. Thus, the selected smile image represented a sustained and hence repeatable smile position. Each frame was opened in Adobe Photoshop 6.0 (Adobe Systems, San Jose, Calif) and adjusted by using the millimeter ruler in the frame. Calibration of the software was done in accordance with the previous study of Desai et al

Measurements on Rest Frame (Figure 1) 1. Upper lip length- from subnasale to stomion superius 2. Upper lip thickness- vertical distance from the most superior point of cupid's bow to the most inferior portion of the tubercle of the upper lip

Figure 1 Measurements made on rest position photograph.

(1) Upper lip length (2) Upper lip thickness
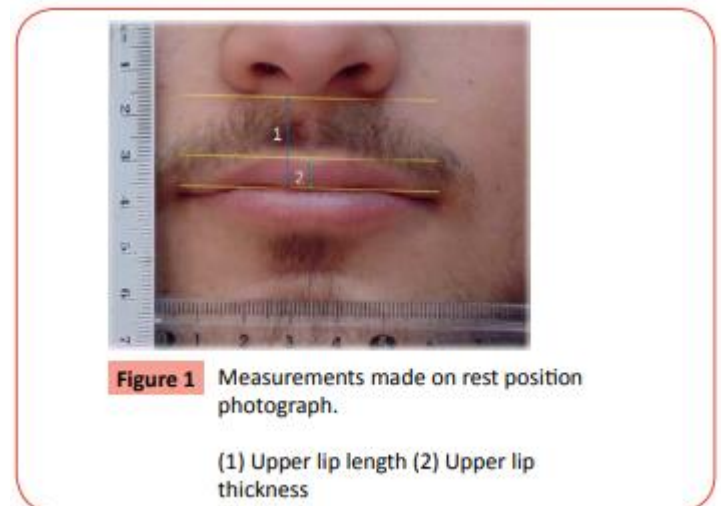
Measurements on Smile Frame (Figure 2) 1. Upper lip length- subnasale to stomion superius 2. Upper lip thickness- vertical distance from the most superior point of cupid's bow to the most inferior portion of the tubercle of the upper lip The measurements were made on rest and the posed smile photograph as shown in Figures 1 and 2

Figure 2 Measurements made on smile photograph.

(1)Upper lip length (2) Upper lip thickness

Statistical Analysis

Minitab 15 (Minitab Inc, State College, PA, USA) was used to perform the statistical analysis. With alpha set at 5%, Data were summarized as mean 6 SD. Groups were compared by two-factor (class of malocclusion and sex) analysis of variance (ANOVA) using general linear models. If the ANOVA showed statistical significance, the Bonferroni post hoc test

was done to determine which groups were significant from the others.

Results: Statistically significant differences were apparent in most of the measured variables. Changes in upper lip length and upper lip thickness were higher in class I followed by class II div2 then class II div1. The upper lip in the smile of patients with Class II division 1 was positioned downward, and the upward movement of the upper lip (changes in length and thickness) was smaller in comparison with the other groups. Changes in upper lip length and upper lip thickness on smiling were greater in males as compared with females in all groups.

Conclusions: Data from this study clearly indicate that malocclusion effects on the changes in upper lip length and thickness on smiling, and the changes differ between males and females.

Keywords: Smile; Digital video; Malocclusion; Lip length; Lip thickness

Biography

Rabab Al-Sabbagh is currently working as a Professor in Hama University in Syria. She completed her PhD and Master's in Orthodontics in Cairo University, Cairo, Egypt. She has published lots of research works and wrote number of books, organized several conferences and workshops, and supervised several masters & PhD students. She is interested in the area of orthodontics.