

ORTHODONTIST, MAXILLOFACIAL SURGEON AND PATIENTS' PERCEPTION ABOUT UPPER TEETH EXPOSURE AFTER MAXILLARY ADVANCEMENT

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ABSTRACT

Purpose: The purpose of this study is to evaluate physicians and patients point of view about upper incisor show after maxillary advancement, using VAS measurement.

Methods: The maxillary incisor exposure was measured in 42 patients with skeletal class III deformity six months after maxillary advancement surgery. Postoperative photographs and videographs were taken and evaluated by an orthodontist and maxillofacial surgeon at rest as well as posed & forced smile posture based on the VAS. Patients satisfaction from incisor exposure at rest and posed smile were evaluated by using VAS. Data were analyzed by Spearman correlation

Results: The average amount of maxillary advancement and impaction equaled 5.02 and 0.47 mm; average tooth and gingival show before surgery were 2.18 and 1.59 mm; average tooth show after at least six months postoperation was 2.06 at rest and 6.38 and 9.345 mm at posed and forced smile. There are differences in perception of acceptable tooth show from the perception of orthodontist, surgeon, and patients. The orthodontist had the highest level of expectation and lowest level of satisfaction, on the other hand patients had the lowest level of expectation and the highest level of satisfaction with incisor exposure. There were statistically significant differences in the opinions of the surgeon and the orthodontist in tooth show at rest and posed smile (p-value=0.008, 0.009), but not for forced smile (p-value=0.069).

Conclusion: The differences in the level of expectations among the orthodontist, surgeon and patient at rest and posed smile indicates the need of special attention to the amount of incisor exposure in the treatment plan. Mutual cooperation between the surgeon and the orthodontist will Improve the outcome of the treatment.

KEYWORDS: Smile Esthetics, Maxillary Advancement, Teeth Exposure, Angle Class III, Malocclusion

I. INTRODUCTION:

The treatment plan in orthognathic surgery is based on the maxillary incisor position. An understanding of the impact of different surgical movements and adjunctive surgical procedures [1, 2] on the soft tissues and, in turn, the impact of these on incisor exposure are critical for an ideal result in the treatment plan [3, 4]. Generally, a LeFort I maxillary advancement would increase the maxillary incisor exposure, whereas an impaction would tend to decrease it [5, 6]. The esthetic outcomes of orthognathic surgery are influenced by the perception of patient, orthodontist, and surgeon. The question is, what is the most attractive vertical position of the maxillary teeth at rest and smile posture from the view of patients, surgeons, and orthodontists [7, 8]. The evaluation of tooth exposure requires standard and repeatable measurement. Maxillary incisor exposure in relation to the upper lip at rest posture, posed smile (advantage of reproducibility), and forced smile (advantage of displaying the actual degree of tooth exposure relative to the upper lip) has been suggested as the standard measurement in the literature [9, 10]. This study was designed to evaluate the perception of maxillofacial surgeon, orthodontist and patient about incisor show as one of the most important esthetic factors after orthognathic surgery. The null hypothesis was no significant difference between the orthodontist and surgeon's view, and higher expectation of maxillofacial surgeon and orthodontist compared to patient [3, 11-13].

MATERIALS AND METHODS

Ethical approval was granted by the Institute of Health Ethics Committee, Babol University of Medical Sciences (reference: IR.MUBABOL.HRI.REC.1398.364) in 2020. All participants in the study signed a form of free and

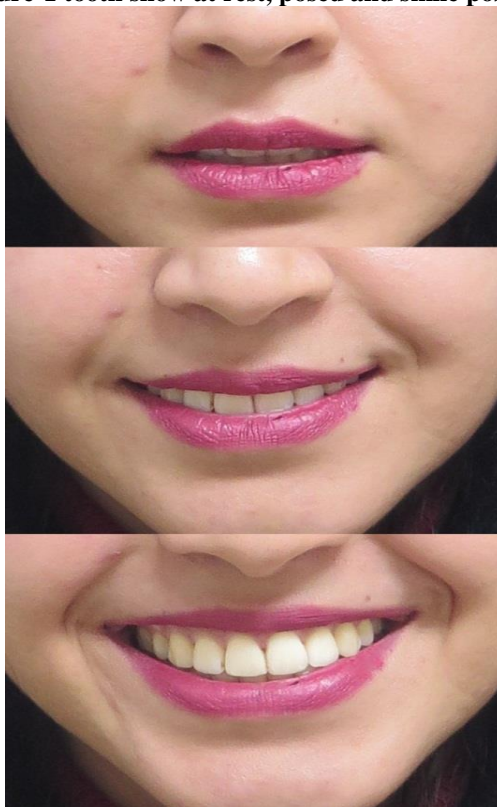
informed consent. Retrospectively 42 patients with skeletal class III malocclusion were studied (30 women and 12 men, mean (SD) age of 27.47(4.9) years, 22 to 32 years) between 1 January 2016 and 30 December 2019.

The inclusion criteria were class III malocclusion undergoing maxillary advancement LeFort I osteotomy, considering at least six months post operation follow up. Patients with extra intervention on lips (such as filler or surgery) or teeth (such as laminate) were excluded.

Patient's preoperative information, including the amount of tooth and gingival exposure and intraoperative record, including the amount of maxillary advancement, osteotomy technique (ramp or step) and adjunctive surgical techniques (cinch suture or VY closure) were collected based on patient's hospital records[14].

The analysis of maxillary central incisor exposure with a relaxed lip at rest posture and under posed and forced smile were performed. Patient underwent photography and twenty seconds videography with the resolution of 18 Megapixels(Canon EOS-60D camera) in natural head position and in a fixed distance of 150 cm with a tripod for evaluating the amount of tooth show (figure-1).

Figure-1 tooth show at rest, posed and smile posture

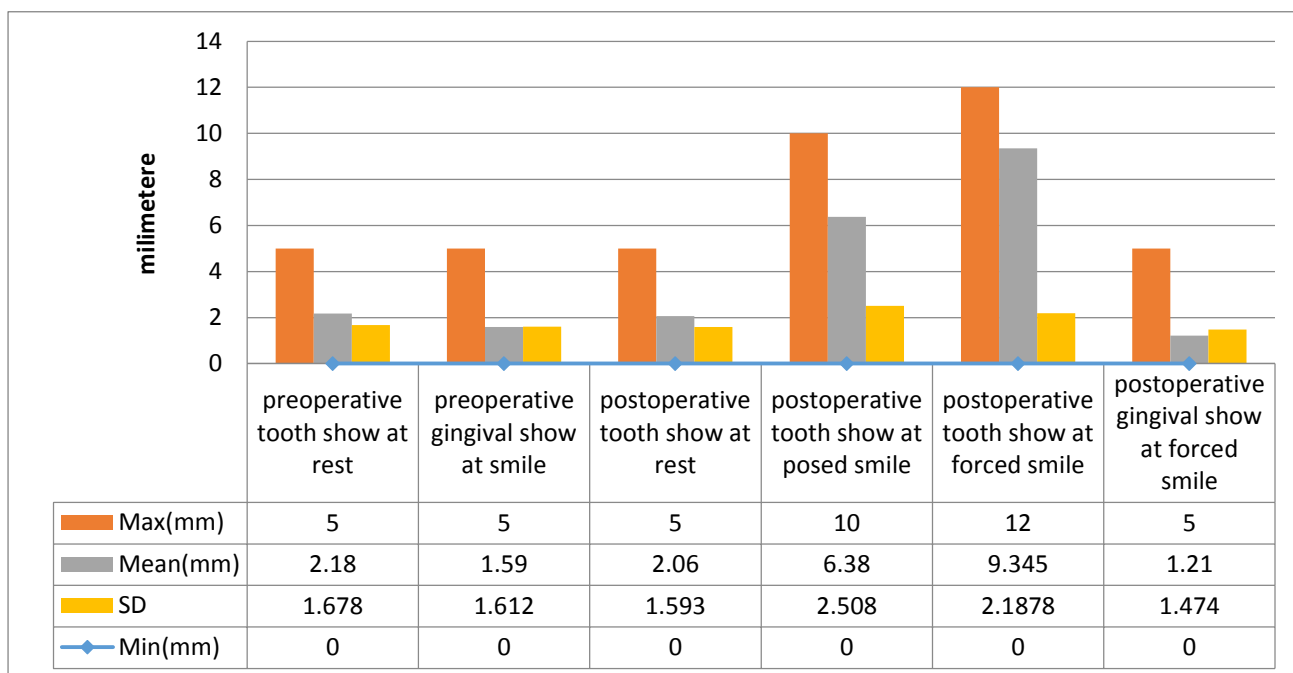


Photography and videography were evaluated by an orthodontist and maxillofacial surgeon by using the VAS score (1(very bad) – 5(very good)) based on satisfaction from amount of incisor exposure. This study used the complete sampling method, and the specialists were blind to the patient's data. Patients satisfaction from incisor exposure at rest and posed smile were evaluated by using VAS score. Data analysis was performed in SPSS 20.0. Spearman correlation, Mann-Whitney U, and Kappa tests were performed to analyze statistical differences between the groups[1, 15].

RESULTS

The average maxillary advancement was 5.02 mm, with a standard deviation of 1.16 mm (range: 2–7 mm), and the average maxillary impaction was 0.47mm, with a standard deviation of 0.95 mm (range: 0– 2 mm). Maxillary advancement was performed in thirty three cases, and nine cases underwent maxillary advancement and impaction. Preoperative tooth and gingival show equaled 2.18 and 1.59 mm, average tooth show after at least six months post operation was 2.06 at rest and 6.38 and 9.345 mm at posed and forced smile. Step osteotomy technique was performed on 28 cases, and ramp osteotomy technique on 14 cases.(table-1)

Table-1 preoperative and postoperative tooth show

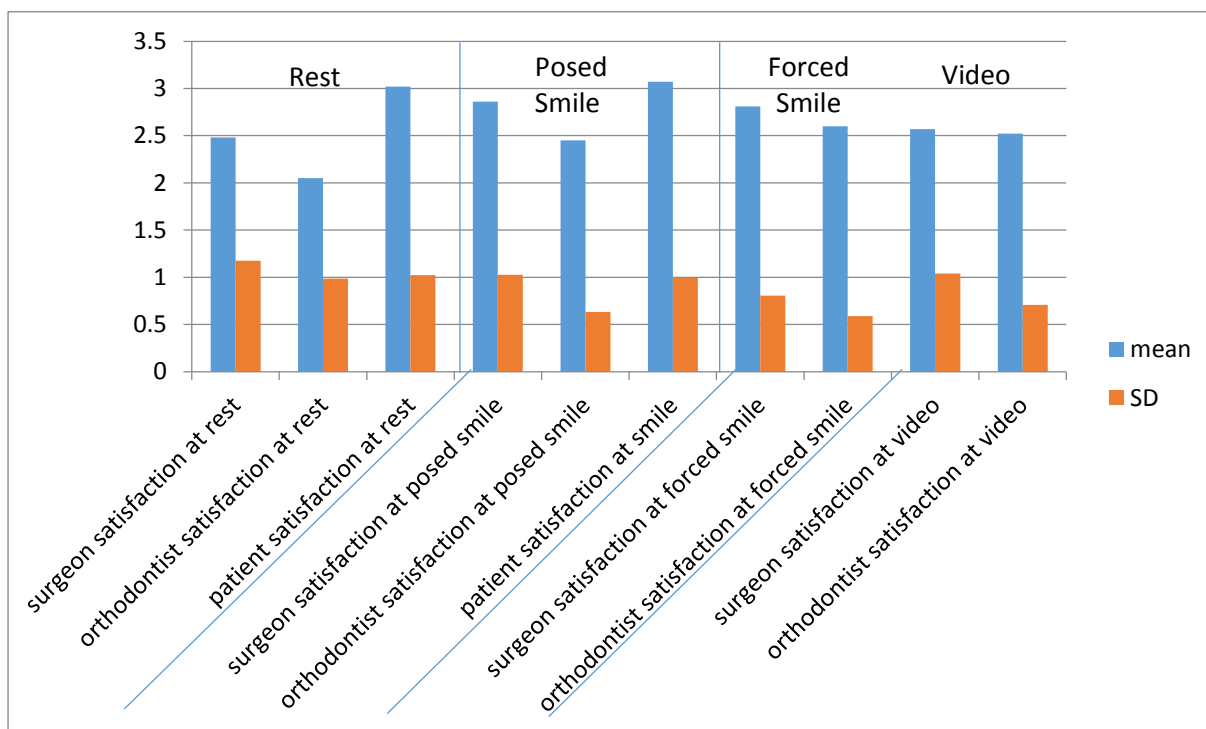


The average patient satisfaction based on the VAS score on maxillary tooth show was 3.02 (good) at rest and 3.07 (good) at posed smile. The average orthodontist satisfaction with tooth show was 2.05 (moderate) at rest, 2.46 (moderate) at posed smile, 2.6 (moderate) at forced smile, and 2.52 (moderate) at videography. The average maxillofacial surgeon satisfaction with tooth show was: at rest 2.48 (moderate), at posed smile: 2.86 (moderate), at forced smile: 2.81 (moderate), and at videography: 2.57 (moderate). The orthodontist had the highest level of expectation and lowest level of satisfaction, on the other hand patients had the lowest level of expectation and the highest level of satisfaction with incisor exposure.

The greatest satisfaction of patient, surgeon and orthodontist from tooth show at rest were 2.2mm, 2.7mm, 2.9 mm. and The greatest satisfaction of patient, surgeon and orthodontist from tooth show at (posed) smile were 5.4mm, 6.9mm ,7.4 mm.

There were no statistically significant differences between age, sex, and patient satisfaction of maxillary tooth show at rest and smile (posed and forced). There were statistically significant difference between the opinions of patients, the orthodontist, and the surgeon. There were statistically significant differences in the opinions of the surgeon and the orthodontist in tooth show at rest and posed smile (p-value=0.008, 0.009), but not for forced smile and videography (p-value=0.069, 0.61).(table-2)

Table-2 satisfaction based on Visual Analog Scale



DISCUSSION

Scores measured by the VAS method showed a significant difference between the opinions of patients, orthodontist and surgeon in most variables, between the orthodontist and the surgeon at rest and posed smile posture [15, 16].

The patients had the highest satisfaction, followed by the surgeon and the orthodontist. Based on literature attractive maxillary incisor exposure at rest posture of lips was 2-5 mm, and at posed smile was the whole crown with 1 mm or less of gingival display. Although the postoperative result of toothshow was less than ideal, the patients were satisfied. Considering the literature, patients may be less sensitive than physicians and may have different perceptions of incisor exposure at rest and smile posture. Previous studies have shown that the patients are capable of identifying most factors that detract from a smile (Wang), and orthodontists are more sensitive to detecting deviations in smile esthetics and orofacial characteristics [5, 6].

The orthodontist had the higher expectation and lowest satisfaction than surgeon, thus to achieve a greater result in the orthognathic surgery, a collaboration between the orthodontist and the surgeon in all stages of treatment including preoperative workup (treatment plan, model surgery) and postoperative followup is important.[7, 11] The ability of an orthodontist and a surgeon to coordinate their perception and performance in orthognathic treatment will lead to a successful outcome.[17]

CONCLUSION

The differences in the level of expectations among the orthodontist, surgeon and patients indicates the need of special attention to the amount of incisor exposure in the treatment plan. Mutual cooperation between the surgeon and the orthodontist will Improve the outcome of the treatment. The best result of orthognathic surgery cannot be achieved unless the orthodontist and surgeon jointly reviewing the case for designing the treatment plan and evaluating the outcome after orthognathic treatment.

CONFLICT OF INTEREST

The authors report no commercial, proprietary or financial interest in the products or companies described in this article.

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