



Gummy Smile Correction Using Different Techniques

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Codex : 04/1810

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KEYWORDS

Gummy smile,
Laser assisted technique,
Intrusive technique.

ABSTRACT

Objective: To compare and evaluate two different techniques used to correct the gummy smile cases.

Methods: This study was carried out upon 14 patients. The studied cases were divided into 2 groups, the first group included 7 cases were underwent intrusive technique only, the second group included 7 cases were underwent intrusive technique in addition laser assisted lip repositioning procedure. Pre-and post-treatment extraoral frontal view photographs during smile were taken and the amount of gingival displays(GD) were measured.

Results: Data of the study showed that the laser assisted lip repositioning procedures with intrusion were more effective than intrusion technique only in treatment of gummy smile cases, $P < 0.05$.

INTRODUCTION

One of the most important aspects of dental and facial esthetics is the vertical anterior tooth display.

Esthetic judgment is made by viewing the patient from the front in dynamic states like conversation, facial expressions, and smiling.^{1,2}

According to Hulsey, "A smile is one of the most effective means by which people convey their emotions." People with dental deformities often make every effort to cover the displeasing portion with their lips. Gingival health and appearance are essential components of an attractive smile. The amount of visibility of the periodontium depends on the position of the smile line, which is defined as the relationship between the upper lip and the visibility of gingival tissues and teeth. The trademark of a pleasant smile as envisioned by most dentists is full length exposure of the maxillary teeth with a 1mm visibility of the mid facial gingiva, which is considered favorable. However, a gingival

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display of more than 3-4 mm is unpleasant, paving way to the term “gummy smile” or “excessive gingival display” (EGD).³

Selection of the most appropriate laser for orthodontic applications is ideally determined by examining four important factors: procedure specificity, ease of operation, portability, and cost. However, it is the diode laser that seems most ideal for incorporation into the orthodontic specialty practice. With regard to procedure specificity, the diode laser’s sole purpose is soft tissue surgery. It safely removes tissue without risk to adjacent tooth structure and provides excellent hemostasis.^{4,5}

Intrusion is defined by Nikolai as “a translational form of the tooth movement directed apically and parallel to the long axis”, whereas Burstone defined it as “apical movement of the geometric center of the root in respect to the occlusal plane or a plane based on the long axis of the tooth.” Labial tipping of an incisor mound its center of resistance produces pseudo intrusion, which can also correct the deep bite. Dental intrusion often constitutes an integral part of orthodontic treatment in order to improve sagittal and vertical incisor relationships, to correct interincisal angle and consequently, the gingival line and restore the esthetics of smiling.⁶

Lip repositioning procedure was an alternative treatment for the EGD, the procedure is accomplished by removing a strip of mucosa from the maxillary buccal vestibule and creating a partial thickness flap between the mucogingival junction and the upper lip musculature, the lip mucosa is then sutured to the mucogingival line, resulting in an narrower vestibule and restricted muscle pull, which reduces the gummy smile. The objective of lip repositioning is to limit the retraction of elevator smile muscles. Lip repositioning resulted in shallow vestibule restricting the muscle pull thereby limiting the gingival display during smiling.^{7,8}

PATIENTS AND METHODS

This study was carried out upon 14 adult patients. All patients were characterized by the following inclusion criteria; Age group above 20 years had a chief complaint gummy smile (GS), Gummy smile patients had above 4 mm gingival display (GD) with deep bite, and good oral hygiene. The studied cases were divided into 3 groups:-

Group I: The first group included 7 cases were underwent intrusive technique only. An 50 g of intrusive force was applied from each miniscrew to the upper four incisors on (0.016×0.022 stainless steel) arch wire until the fully corrected and the teeth were well aligned with a good intercuspal relation Fig (1).



Fig (1) Showed the intrusive technique.

Group II: The second group included 7 cases. As group 1 where intrusion of upper anterior teeth was carried out in addition to laser assisted lip repositioning procedure. A 320 μm laser tip in a continuous mode at 1.5 W was first used to demarcate the area to be scrapped in the surgical area. The inferior demarcation was outlined at the mucogingival junction and the superior demarcation at about 10 mm (twice the gingival display) parallel to the inferior demarcation. Both these outlines were connected at the mesial line angle of maxillary first molars. Laser ablation was carried at an energy setting of 1.5 W in a continuous mode, using light brush strokes to maintain the depth of ablation to scrape the epithelial mucosa and expose the underlying connective tissue Fig(2).





Fig (2) Showed laser assisted lip repositioning technique.

RESULTS

This study was carried out upon 14 adult patients. Extra-oral and Intra-oral photographs during smile were taken before and after treatment.

The amount of gingival display (GD) was measured in millimeters at 2 weeks (postoperatively).

The collected data were revised, organized, tabulated and statistically analyzed using statistical package for social sciences (SPSS) version 23.0 for windows. Data was presented as the Mean \pm standard deviation (SD).

Table : Comparison of means of gingival displays before and after treatment in groups I and II and between group I and group II after treatment.

	Intervals	Mean	\pm SD	t-test	P-Value
G I	Before	6.26	1.15	10.65	<0.001 S
	2 Weeks	1.043	0.6294		
G II	Before	6.271	1.1842	10.65	<0.001 S
	2 Weeks	0.383	0.4576		
G I VS G II After treatment	2 weeks	-	-	2.024	0.044S

SD: Standard deviation, S: Statistically significant difference, $P \leq 0.05$.

Table: showing statistically significant difference before and after treatment of in groups I and II. There was statistically significant difference between group I and group II after treatment regarding gingival displays, $P \leq 0.05$

DISCUSSION

One of the most important aspects of dental and facial esthetics is the vertical anterior tooth display. Esthetic judgment is made by viewing the patient from the front in dynamic states like conversation, facial expressions, and smiling. People with dental deformities often make every effort to cover the displeasing portion with their lips. They rarely smile or laugh, and thus might be viewed by others as unfriendly. This might not only affect a person in their personal life, but also professionally. According to Dale Carnegie, one of the most important ways to win friends and influence people is to smile.^{1,2}

The current study was carried out upon adult patients because the altered passive eruption and physiologic gingival recession which occurred in the childhood periods.

In this study, two different techniques which regard non surgical or minimally invasive techniques which were considered very important. These techniques can resolve a dangerous problems especially in a fear patients because there is no a great orthodontic surgery which associated with significant morbidity and requires hospitalization.

In this study, the techniques used characterized by the simplicity, low cost and more rapidity when compared with orthodontic surgery techniques. These benefits have very important values specially the adult patients.

In this study, a miniscrews used for intrusion of incisors were placed between the roots of the anterior teeth. In this case, we inserted the miniscrews in the maxillary bone above the root apices because the patient had sufficient space for miniscrew placement superior to the incisor apices.

Miniscrew placement superior to the incisor apices has some advantages. It does not hurt the root of tooth, and it was more effective because the distance to the incisors was greater than the distance between the roots. On other hand Creekmore and Eklund⁹ and Ohnishi et al.¹⁰ proposed the placement of a single miniscrew between the roots of the maxillary incisors, providing direct anchorage for incisor intrusion to reduce excessive gingival display.

In group I, where the patients were treated by intrusive technique only, the results indicated there was statistically significant difference before and after treatment and this means that there was decrease in the gingival displays and considered effective technique in treatment of gummy smile patients.

In group II, where the patients were treated by intrusive technique plus laser assisted lip repositioning procedure, the results indicated there was statistically significant difference before and (postoperatively) 2 weeks this means that there was decrease in the gingival displays and considered effective technique in treatment of gummy smile patients.

Also in the current study, a comparison of gingival displays after treatments between the studied groups demonstrated that there were statistically significant difference between group I and group II regarding gingival display. This indicates that laser assisted lip repositioning procedures with intrusion were more effective than intrusion only in treatment of gummy smile cases.

CONCLUSION

The intrusion only using the anterior miniscrews as anchorage was effective in the treatment of gummy smile cases, but not as the intrusion plus laser assisted lip repositioning procedures which were more effective. The intrusion plus laser assisted lip repositioning procedure relatively has bloodless surgery with coagulation and reduced bacteremia with minimal discomfort postoperatively.

RECOMMENDATIONS

Contraindications to make lip repositioning procedures in the patients with inadequate width of attached gingiva in maxillary anterior sextent. Insufficient amount of tissue poses difficulty in flap reflection, stabilization and suturing. Patients with severe vertical maxillary excess cases are also not the ideal candidates for lip repositioning and should be treated with orthognathic surgery. Further studies with longer follow up periods are required to investigate the stability of cases.

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