Gummy smile - A dilemma

R.K. Nizaro siyo[1], Naseem K.T[2], Sudhi Krishnan[3], Amrita Ashok[4], Anju Ramachandran[5*]

[1,2]Professor, [3]Former PG, [4]Senior Lecturer, [5]PG Student, [1-5]Dept. of Orthodontics, KMCT Dental College Manassery, Mukkam, Kerala, India

***Corresponding Author: Anju Ramachandran**
Email: dranjurchandran@gmail.com

Abstract
Gummy smile patients have always presented orthodontist with a huge dilemma. Gum tissue visible in the smile line should have balanced, even contour that are in harmony with upper lip. It is for this reason, that many people with a gummy smile /excessive gingival display feel their smile to be unattractive, often times feeling reluctant to smile at all.
Gummy smile is usually characterized by overgrowth of anterior maxillary vertical excess, the outcome may not always be successful with conventional orthodontic therapy alone. In such cases, surgical therapy, lefort impaction/maxillary gingivectomies are often chosen to gain a good smile. However, the patient may not be willing to undergo surgical treatment, an alternative method must be considered to treat the gummy smile. This is a case report on non-surgical treatment for correction of gummy smile using mini-implants in which patient has achieved satisfactory results.

Keywords: Gummy smile, Mini implants.

Introduction
Gummy smile also known as an excessive gingival display is a common unaesthetic clinical condition. It can have a negative effect on the esthetics of your smile. Gummy smile is defined as a continuous band of gingival display of more than 3 mm, during spontaneous smile. Gum tissue visible in the smile line should have balanced, even contours that are in harmony with the upper lip. It is for this reason that many people with a gummy smile or excessive gingival display feel their smile to be unattractive, oftentimes feeling reluctant to smile at all. The causes of gummy smile are all related to the teeth, gums, lips and jaws, which are the key parts that affect the way we smile. Gummy smiles exist for a variety of reasons and proper diagnosis is critical. There is often a combination of factors that create the effect of gumminess. There may also be a variety of ways to treat a gummy smile.

The purpose of this article is to contribute to the simplification of orthodontic treatment by preventing side effects while offering an alternative approach to gummy smile correction.

Smile Esthetics1
Smile is one of the most important expression contributing to facial attractiveness. With patients becoming increasingly conscious of a beautiful smile, smile esthetics turns to be an important objective in orthodontic treatment. Often, the main reason people seek orthodontic treatment is to improve dental esthetics.

Smile esthetics are defined by the teeth, framed by the lips and are contoured by the gums. An esthetically pleasing smile is not only dependent on components such as tooth position, size, shape, and color, but also on the amount of gingival display . Precisely, the harmony and symmetry of an aesthetic smile is determined by the extent of exposure of the gingiva when smiling, the arc of the smile, the proportions of the teeth, and the buccal corridors . All of these components are supposed to form a harmonic and symmetric entity

Accordingly, smile line may be of 3 types (Fig. 1). A low smile line which displays <75% of the maxillary anterior teeth, a medium line which exposes 75– 100% of maxillary anterior teeth and a high smile line in which all of the clinical crowns are exposed along with a contiguous band of gingival tissue.

Fig.1: Different types of smile line

Treatment of Gummy Smile
Correcting gummy smile may be an especially complex objective for the orthodontist. Only moderate gummy smile of alveolar origin responds to isolated orthodontic treatment. Several treatment options have been proposed to enhance the smile display and to reduce the gingival exposure.[2] Gummy smile of alveolar origin is generally associated with supra-occlusion limited to the incisor group. In vertically normal gummy smile, intrusion of the maxillary incisors is the treatment of choice.

Treatment can be undertaken at a very early age to prevent onset of supra-occlusion. Once gummy smile has emerged, there are orthodontic mechanisms to improve the relation between upper lip and teeth, reducing gum exposure.

Conventional techniques can be used: e.g., Ricketts' basal arch to achieve superior incisor intrusion. This intrusion, however, is difficult to obtain and is often accompanied by molar extrusion, which may not be desired, especially in hyperdivergent subjects with gummy smile.

Most recently, the development of mini-screw bone anchors has extended the possibilities of orthodontic

treatment in anterior vertical excess found in adults which has been corrected by intrusion with limiting unwanted side effects in the posterior sectors by appropriate mini-screw positioning. Direct application of intrusive forces from miniscrews offers an efficient alternative to 2 × 4 arches and true intrusion can be achieved.[3]

Orthodontic intrusion is a common treatment approach in managing orthodontic esthetic and functional problems, including gummy smile and deep bite. An important factor for successful incisor intrusion is the anatomical position of tooth roots in relation to the cortical plate. Maintaining roots in a proper position within spongeous bone and avoiding their displacement in cortical bone are considered to increase treatment effectiveness and limit the risk for root resorption.[4]

Case report

A 21-year-old female patient was referred to Department of Orthodontics, KMCT Dental College, Calicut. Her chief complaint was excessive display of gingiva while smiling.

Extraoral examination revealed a convex profile. Frontal view at rest showed prominent premaxillary segment and vertical maxillary excess. There was an increased maxillary incisor display and gummy smile. Soft tissue examination revealed an acute nasolabial angle and incompetent lips (Fig 2).

Fig.2: Extra oral photographs

Intraoral examination revealed upper and lower anterior crowding with proclination, buccally rotated upper left lateral incisor and lower left canine. Bilateral Class I molar relation. Oral hygiene condition was fair (Fig 3).

Fig.3: Intra oral photographs

Fig.4: Study models

Cephalometric examination showed Class II Skeletal base. (Table 1) Maxilla showed an increase in vertical plane. Fig 4 shows the study models

Treatment

Orthodontic treatment was started after extraction of all 1st premolars. 0.22-inch slot MBT brackets were bonded. Wire sequence followed 0.014-inch NiTi, 0.016-inch NiTi ,17x25 NiTi ,19x25 SS over 6 months for leveling and alignment.

After alignment, 2 mini screws, (Fig 5) 1.4 mm in diameter and 6 mm in length was placed on the inter radicular area between upper lateral incisor and canine region in the attached gingiva. Before the insertion of mini implants, radiographs were taken to locate the position of implant placement. If a mini implant is inserted into a narrow space between the inter radicular area, intrusion will cause implant root contact, which is bound to result in mini implant failure.

After a week, E chains were engaged to mini implants and tied to main arch wire which provided a force of 80 gms per side.

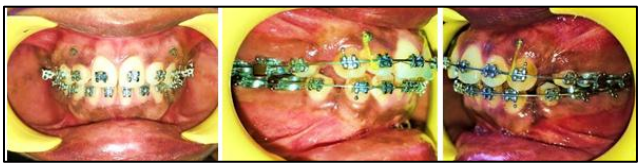

Fig.5: Mini implants placed and engaged to E-chain

Intrusion was achieved within 4 months followed by retraction of anterior segment for space closure. Patient was advised to wear Class II intermaxillary elastics (¼ inch, 3.5 oz). A counter clockwise rotation of mandible compensated the open bite tendency. Duration of the entire treatment was 1.5 years.

Table 1

	SKELETAL ANALYSIS	
PARAMETERS	**PRETREATMENT**	**POST TREATMENT**
SNA angle	79	79
SNB angle	73	73
ANB angle	6	6
Go-Gn to SN	39	38
Y axis angle	65	65
	DENTAL ANALYSIS	
U1 -NA angle (degree)	28	20
U1 -NA (mm)	5mm	-1mm
U1 -SN angle (degree)	103	101
L1-NB angle (degree)	47	33
L1-NB (mm)	10mm	7mm
L1-A pog (mm)	7mm	4mm
IMPA	106	101
Interincisal angle	107	120
U1-NF (mm)	26mm	24mm
	SOFT TISSUE ANALYSIS	
S line-U lip (mm)	2mm	1mm
S line -L lip (mm)	7mm	6mm
Nasolabial Angle	95	104

Results

Gummy smile correction was achieved satisfactorily within the treatment duration by use of mini implants.

Fig. 6 shows post treatment radiographs and superimposition.

Fig. 7 Profile was improved with ideal overjet and overbite.

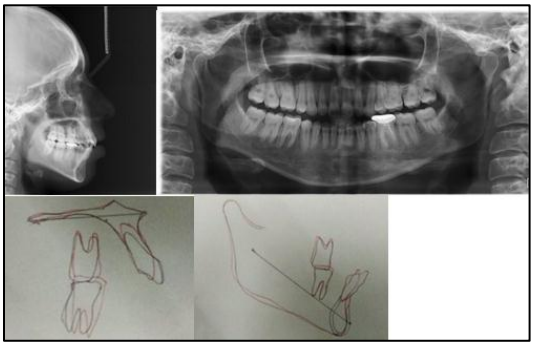

Fig. 6: Post treatment radiographs and superimposition

Fig.7: Extra oral and intraoral photographs

Conclusion

This case report highlights important clinical application of mini implants for correction of excessive display of gingiva and the case study revealed that if we intrude anterior teeth without extruding the posteriors, orthodontic treatment is rendered more effective and stable.

Source of Funding: None.

Conflict of Interest: None.

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How to cite this article: Siyo R.K.N, Naseem K.T, Krishnan S, Ashok A, Ramachandran A. Gummy smile - a dilemma. *Indian J Orthod Dentofacial Res* 2019;5(4):147-9.