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# Interdisciplinary Approach For Management Of Gummy Smile And Wornout Dentition- A Case Report

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*Abstract:* Severe tooth wear causes great distress to many patients who can be classified into 2 groups on the basis of decrease or no decrease in the vertical dimension. The decrease in the vertical dimension not only affects the function but also affects the appearance of teeth and the temporomandibular joint symptoms. This paper reports the case of a patient with severe worn teeth and an excessive gingival display undergoing a fixed reconstruction. The protocol of the treatment process is described.

***Key words*** **– Gummy smile, Crown lengthening procedure, Vertical dimension of occlusion**

## I. INTRODUCTION

The widely known popular saying “The smile is our business card” must always be respected and considered, as smile is most important element of dentofacial aesthetics. Aesthetic smile determines not only the facial attractiveness, but also one’s psychological characteristics. Beautiful smile radiates health, personality and self-confidence. Patient’s self-esteem and quality of life can be improved after aesthetic treatment and hence, it is important to diagnose and treat the aetiology of unpleasant smile.

Patients’ aesthetic can be affected by missing, mal-aligned, discoloured, chipped of teeth, and gummy smile. The presence of a “gummy smile” can be bothersome for patients and clinicians alike. Approximately, 10% of patients have excessive gingival display when smiling, more common in women than men.[2] Exposure of maxillary gingiva more than 3 mm while smiling is referred to as "excessive gingival display" or "gummy smile."[1]

Identifying etiology is utmost important factor for treatment of “gummy smile”. Excessive gingival display or gummy smile can be a consequence of a skeletal deformity that results in vertical maxillary excess, dentoalveolar extrusion, a short or hypermobile upper lip, altered or delayed passive eruption and plaque or drug induced gingival overgrowth.[3,4,5,6]

Initially tooth erupts, by process of active eruption. This involves the tooth movement towards the occlusal plane until it contacts tooth opposing arch. Following this active eruption, the process of passive eruption occurs. During passive eruption there is continued exposure of the clinical crown as the gingiva moves apically toward the level of the Cementoenamel Junction (CEJ). Altered or delayed eruption results when either active and/or passive eruption is compromised (Chu, 2004; Gargiulo, 1961). When this occurs, clinicians may attempt to lengthen the patient’s clinical crown(s). Clinical crown lengthening is “a surgical procedure designed to increase the extent of supragingival tooth structure for restorative or esthetic purposes by apically positioning the gingival margin, removing supporting bone, or both” (AAP glossary of periodontal terms, 2001).[9]

Occlusal wear causes passive eruption of teeth. Occlusal wear is a prevalent phenomenon that is defined as flattening of cusp tips or loss of incisal edges by physiological or pathological processes.[7] The gradual wear of the occlusal surfaces of teeth occurs during the lifetime of a patient. However, excessive occlusal wear can result in pulpal pathology, occlusal disharmony, impaired function, and esthetic disfigurement. Tooth wear can occur in the form of attrition, abrasion, and erosion depending on its cause. it is important to identify the reason that contribute to excessive wear and to evaluate alteration of the VDO caused by the worn dentition.[8]

VDO should be conservative and should not be changed without careful approach. the rehabilitation of the severely worn dentition is challenging when the space for restoration is not sufficient. For this, Assessment of the vertical dimension is important and careful comprehensive treatment plan is required. study casts are articulated and diagnostic wax-up can provide important information which is helpful for the evaluation of treatment options. Acceptance of changes in vertical dimension of occlusion is usually confirmed with the clinical evaluation of the patient having a diagnostic splint or provisional prosthesis. This case report describes the treatment of a patient who was clinically monitored to evaluate the adaptation to the removable occlusal overlay splint during a 1-month trial period and the provisional restorations for 3 months.[8]
In this case report, we will focus on a combined treatment approach between the periodontology and prosthodontics for the patient, who visited the department to demand a more aesthetic smile, was diagnosed with excessive gingival display and excessive wear of dentition.

## II. CASE REPORT

A 34-year-old female reported to department of prosthodontics with the chief complaint of unpleasant smile and difficulty in chewing. Past medical history reveals GERD since last 5-6 years. Past dental history exhibits multiple extraction of teeth. On extraoral examination, midline diastema was noticeable in the frontal view, excessive gingival display during normal smile and loss of vertical dimension. Intraoral examination revealed generalized attrition with short clinical crown of entire dentition, anterior deep bite, missing 26, 46 and spacing with 11, 12, 21, 22. (FIG.1)

FIG. 1 A. preoperative frontal view

FIG. 1 B. preoperative right lateral view

FIG. 1 C. preoperative right lateral view

FIG. 1 D. preoperative maxillarry occlusal view

FIG. 1 E. preoperative mandibular occlusal view

On clinical examination, attached gingiva was 6 to 7 mm in width, and 3mm or less periodontal pocket depth. There was neither periodontal problems nor teeth mobility was detected. The primary concerns of this patient included excessive gingival display, anterior diastemas and dissatisfaction with the size and shape of teeth. The primary treatment plan was proposed to the patient with the crown lengthening of 13, 12, 11, 21, 22, and 23 and the installation of full coverage zirconia crown of entire dentition with increased vertical dimension of occlusion. The patient was informed and educated about the treatment and a written consensus was obtained according to local legislation.
Diagnostic impressions, models and mounting was done to evaluate occlusion. Orthopantomograph and routine blood investigations were completed. On the basis of history, clinical findings and investigations a

diagnosis of Generalized attrition with loss of vertical dimension (Turners and Missirlian Category-I) secondary to GERD was given. Treatment plan was formulated with a multidisciplinary approach in various phases as follows:

1. Phase I – Oral prophylaxis and oral hygiene instructions.
2. Phase II – Endodontic treatment for 17,15,14, 13, 12, 11, 21, 22, 23, 24, 25, 26, 27, 37, 36, 35, 34, 33, 32, 31, 41, 42, 43, 44, 45, 47.
3. Phase III – Pre-prosthetic surgery- Crown lengthening in the maxillary anterior segment.
4. Phase IV – Prosthetic phase – Full mouth rehabilitation.
5. Phase V- Maintenance phase

After completion of phase I and phase II, Patient's casts were mounted on a semi-adjustable articulator (Hanau vide vue Articulator; Whip Mix Corp., Louisville, USA) using a face-bow and an interocclusal record that was made with the aid of a Lucia jig and interocclusal registration material, at 3mm increased VDO. Occlusal splint therapy was carried out by fabricating a maxillary occlusal splint to re-establish vertical dimension (FIG.2). A Permissive full arch occlusal splint made up of heat cured clear poly methyl methacrylate was fabricated. The occlusal splint was fabricated to restore 3 mm vertical dimension of occlusion (VDO) deficit. The adjustments were made according to organic occlusion. The occlusal splint was used for 1 month, with regular clinical review appointments. Again, a diagnostic mounting was completed and a mock wax-up was prepared at increased vertical dimension simulating the treatment plan and desired results.

FIG. 2. occlusal splint

Opg showing enodontic treatment of all teeth

Following this the crown lengthening procedure for maxillary anterior segment was carried out as follows: After infiltration of local anaesthesia, new gingival margin was registered with an indelible pencil, The flap was designed by creating submarginal parabolic incisions, starting from the angular lines of the adjacent teeth and crossing at the level of the interdental papillae, thereby reproducing the natural scalloping of a patient's gingival margin. Thus, a full-thickness mucoperiosteal flap was elevated and the gingival collar extracted with a Gracey curette. Followed by osteotomy of 2mm was performed using carbide/diamond burs with adequate irrigation, for preventing bone necrosis followed by Osteoplasty with vertical grooving and radicular blending aimed at establishing physiologic osseous morphology and root prominence then, the flaps were sutured (FIG.3).

FIG. 3. A. new gingival margin was registered with an indelible pencil

FIG. 3. B.Full thickness mucoperiosteal flap relection was done

FIG. 3. C. osteotomy performed

FIG. 3. D. suturing

After crown lengthening procedure, prosthetic phase of treatment was carried out as follows:
In prosthetic phase, tooth preparation of all maxillary and mandibular teeth was done and for three months, interim restorations were given. During this period, the patient's condition and functions, such as muscle tenderness, discomfort of TMJ, mastication, range of the mandibular movements, swallowing, and speech, were evaluated. Improvement in mastication, speech, and facial esthetics confirmed the patient's tolerance to the new mandibular position with the restored.
Final tooth preparation and definitive impressions were made with polyvinylsiloxane impression material (NEOPURE; Kerr Corp., Romulus, Germany), (FIG. 4). Bite registration was taken using interocclusal registration material (ALUWAX).

FIG 4. A. final tooth preparation of maxillary arch

FIG 4. B. final tooth preparation of mandibular arch

FIG 4. C. final impression of maxillary arch

FIG 4. D. final impression of mandibular arch

FIG 4. E. Bite registration

Full coverage Zirconia crown were fabricated to restore canine guided and mutually protected occlusion and cemented with resin cement (FIG 5).
Oral hygiene instructions were given and regular follow up was done.

FIG 5. B. right lateral view of final prosthesis

FIG 5. A. frontal view of final prosthesis

FIG 5. C. left lateral view of final prosthesis

FIG. 5.E. canine guided occlusion in left lateral view of final prosthesis

FIG. 5.D. canine guided occlusion in frontal view of final prosthesis

FIG. 5.F. canine guided occlusion in right lateral view of final prosthesis

pre-operative smile

post-operative smile

## III. DISCUSSION

In 1984, Turner1 classified the treatment modality for a severely worn dentition by the amount of the loss of VDO and available space to restore. conventional treatment in his classification includes raising VDO with multiple crown-lengthening procedures.[8]

Crown lengthening is performed for aesthetic improvement in teeth; in addition, this surgical procedure can establish an accurate bone width and correct the gingival asymmetries. To have a harmonious and successfully long-term restoration, the distance between the crestal bone and prosthetic margins, which allows recreating the biological width, should be at least 3 mm, which is surgically achieved by crown lengthening, as presented in this case report. Immediately after crown lengthening procedure interim restoration was cemented. Several studies suggest that the biologic width re-establishes itself after crown lengthening procedures, in 6 months. For this reason, in this case the cementation of definitive prosthesis was carried out after the healing period of the gingiva, in order to obtain the aesthetic position of the prosthetic margin.[10]

Careful monitoring of patient was done for 1 month to evaluate the adaptation to the removable occlusal overlay splints. Also, the patient's adaptation to the provisional restoration was monitored for 3 months. The trial period is relatively shorter than the other case report, but discomfort, wear, and muscle fatigue were not observed during that period. The increase of VDO was determined by standardized esthetic golden proportion of anterior teeth and by patient's physiologic factor like interocclusal rest space and speech. Depending on the patient's comfort and adaptation ability, the interim period can be modified, and the careful evaluation and monitoring may shorten the overall treatment duration.[11]

## IV. CONCLUSION

The present case report was focused on combined endo-perio-prostho treatment modality for aesthetic and functional full mouth rehabilitation of patient.

In this clinical report, raising vertical dimension of occlusion using removable occlusal overlay splint, aesthetic crown lengthening and following fixed definite restoration based on accurate diagnosis showed successful full mouth rehabilitation for excessive gingival display and severely worn-down dentition.[8]

## IV. CONFLICTS OF INTEREST- none

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