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RESEARCH ARTICLE

PERIO - PROSTHO: ENHANCING AESTHETICS FOR PATIENTS WITH ALTERED PASSIVE ERUPTION/GUMMY SMILE USING CAD/CAM TECHNOLOGY: A CASE REPORT

Soraya El Yaagoubi and Amal El Yamani

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Abstract

Periodontics and prosthodontics play crucial roles in enhancing the aesthetics of patients with altered passive eruption, commonly known as a gummy smile.Altered passive eruption refers to a condition where excessive gum tissue covers a significant portion of the teeth, resulting in a less aesthetic smile.The treatment approach for altered passive eruption typically involves a combination of periodontal procedures and prosthodontic interventions. One common technique is crown lengtheningoften followed by prosthodontic treatments to restore the function and aesthetics of the teeth.This work will mainly focus on the management of altered passive eruption in aesthetic anterior prosthodontic rehabilitations with the goal of improving the prosthetic and Aestheticoutcome through clinical case.

Introduction:-

Excessive gingival display, commonly known as a gummy smile, has been defined as a non-pathological condition in which more than 3 mm of gingival tissue is exposed when smiling, frequently causing esthetic disharmony and patient's concern. (1)

The differential diagnosis of this condition is broad since different clinical conditions including vertical maxillary excess, dentoalveolar extrusion, short upper lip length, lip hypermobility, gingival hyperplasia, altered passive eruption, may elicit excessive gingival display.(2)

Altered passive eruption is a condition where the dentoalveolar relationships do not properly achieve the process of passive eruption once the permanent dentition becomes fully functional. (3)

The esthetic treatment of APE is usually surgical, through crown lengthening procedures, although the results of these interventions are not highly predictable, with frequent incomplete results or with a high rate of recurrence. (1)(4)

If crown lengthening procedure will be unable tofully solve the patient's esthetic concern, a restorative treatment is required concomitant to crown lengthening procedures. (5)Technological advancements, such as 3D imaging techniques and computer-aided design (CAD), now offer precise planning of prosthetic restorations, opening up new avenues in managing gingival smile. (6)

This article delves into the complexities of these conditions and discusses approaches in periodontology and fixed prosthesis aimed at optimizing smile aesthetics in such cases.

Corresponding Author:- Dr. El Yaagoubi Soraya

Patient and Observation:-

Patient information:
A 27-year-old systemically healthy female attended the fixed prosthodontics department for treatmentof excessive gingival display in the anterior region and requested a restorative option that would provide improved aesthetics. (Figure1)

Clinical findings:
Upon exobuccal examination, facial proportions were found to be harmonious, and the vertical dimension of occlusion was correct. In intra-oral examination, clinical crown shape, size, and proportions were analyzed revealing abnormal ratios compared to those derived from natural unworn human dentition. (Figure 2)

In this clinical case, maxillary anterior clinical crowns were considered short, with gingival display and composite restorations on the maxillary central incisors and lateral appear to be defective. (Figure 3)

Diagnostic assessment:
Starting by analysing the anatomical structures including gingival contours and gingival margin position wich covers the maxillary incisors in this case, site phenotypeis thin and scalloped, keratinized tissue height sufficient. (figure 4)

Periodontal and bone sounding was performed to confirm the absence or presence of the altered passive eruption.

Retroalveolar radiographs show the presence of dental enlargements on the maxillary central incisors and left lateral anda periapical reaction on the left central incisor. (figure5)

Cemento Enamel Junctionandand alveolar bone crest are both examined on the retro-alveolar radiographs using the parallel plane technique and the cemento enamel junction is situated at the same height as the alveolar bone crest at the two central maxillary incisors but does not coincide at both laterals. (figure 5)

If the actual crown height detected on the radiographs is greater than the clinical crown heightthen the possibility of an incomplete passive eruption should be considered.

Diagnosis:
The combined photographic, radiographic and clinical diagnostic evaluation of both the intraoral and extraoral tissues diagnoses of Altered passive eruption resulting to short clinical crowns.

Therapeutic interventions:

Planning phase:
An anterior guidance registration was also done with a custom anterior guide table by moving the articulator through protrusive and lateral excursions. (figure 6)

Aline was drawn on the maxillary master model indicating the intended position of the gingival margin to be used as a reference for construction of the surgical guide, then the diagnostic wax up was used gaining the patient’s approval before commencing treatment. (figure 7)

An endodontic treatment was done for teeth number 11, 21 and 22. (figure 8)

Surgical phase:
In cases where APE significantly impacts esthetics, a combination of periodontal procedures aimed at correcting gingival architecture and dental prosthetic interventions can yield superior results. Periodontal procedures like crown lengthening or gingival recontouring can help expose more tooth structure, allowing for better prosthetic rehabilitation. This synergy ensures not only proper tooth display but also establishes a harmonious gingival contour, essential for a natural-looking smile.

A sheet of 0.30-inch vacuform material was thermoformed over the cast using a pressure former. (figure 9)

The constructed surgical guide was fitted over the existing dentition as guidance to mark the bleeding points and draw the outline before initial incision.

Incision of the gingival tissue was then carried out following the marked bleeding points.
After that, alveolectomy of the Alveolar Bone Crest(ABC) was carried out and a new distance of approximately 3 mm was established from the new ABC to the Cemento Enamel Junction. (figure 10)

Prosthetic phase:

Successful management of APE combined with dental prosthetics requires careful case selection and thorough treatment planning. Factors such as the severity of APE, the condition of the surrounding dentition and periodontium, patient expectations, and financial considerations must be taken into account. Collaborative efforts between periodontists, prosthodontists, and dental technicians are often necessary to achieve optimal outcomes.

A period of six months was allowed for stabilisation and maturation of the gingival zeniths, before proceeding with the restorative phase. (figure 11)

The restorative phase involved preparation of lateral and central incisors for a full coverage, all-ceramic crown.

After sealing post and cores (figure 12) and taking the impression (figure 13), a Zirconia framework was fabricated using CAD/CAM technology then layered with aesthetic ceramic. (figure 14,15,16)

The post-operative result shows a good integration of the restorations with the adjacent teeth, as well as a harmonious relationship with the surrounding healthy periodontium. (figure 17)

The dual treatment objectives, rehabilitation of pink and white aesthetics with a perio-restorative approach, are confirmed by the dento-facial view.

Discussion: -

Chasing after achieving optimal esthetic outcomes in dentistry, the interplay between various factors like altered passive eruption (APE) and dental prosthesis plays a pivotal role. This discussion focuses on exploring how understanding APE with dental prosthetic interventions can enhance esthetic results, particularly in the anterior region.

Altered passive eruption refers to a condition where the junctional epithelium and connective tissue attachment are located more coronally than normal, resulting in excessive gingival tissue covering the anatomic crown of the tooth. This condition can lead to short clinical crowns, a gummy smile, and defective aesthetic, affecting the harmony of the smile. (7)(8)

When dealing with APE in the esthetic zone, traditional treatment approaches, such as crowns, veneers, or bridges, are commonly used to restore the form and function of teeth in the esthetic zone (9)(10)and it may fall short in achieving desirable outcomes. Simply addressing the prosthetic aspect without considering the underlying soft tissue dynamics can result in suboptimal esthetics. Therefore, a understanding of APE is essential for successful treatment planning. (11)(12)

Conclusion: -

In conclusion, the combination of altered passive eruption correction and dental prosthetic interventions represents a powerful approach to achieving esthetic excellence in the anterior region. By addressing both the hard and soft tissue components comprehensively, clinicians can create natural-looking, harmonious smiles that enhance patient satisfaction and confidence.

Figure 1:- Facial lower third exam and smile analysis.

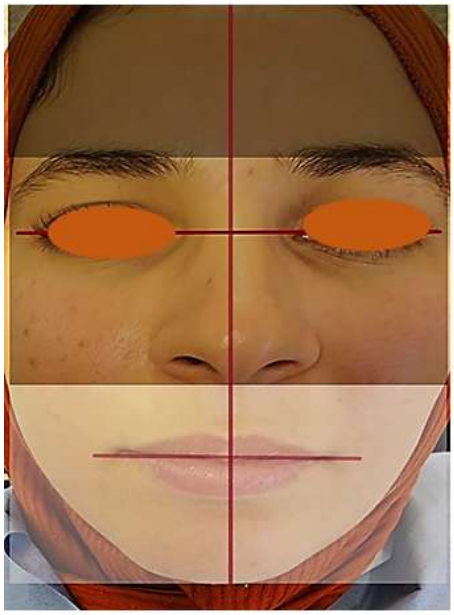

Figure 2:- Facial analysis.

Figure 3:-Intra oral examination and tooth shape analysis

Figure 4:- Gingival contour disharmony.

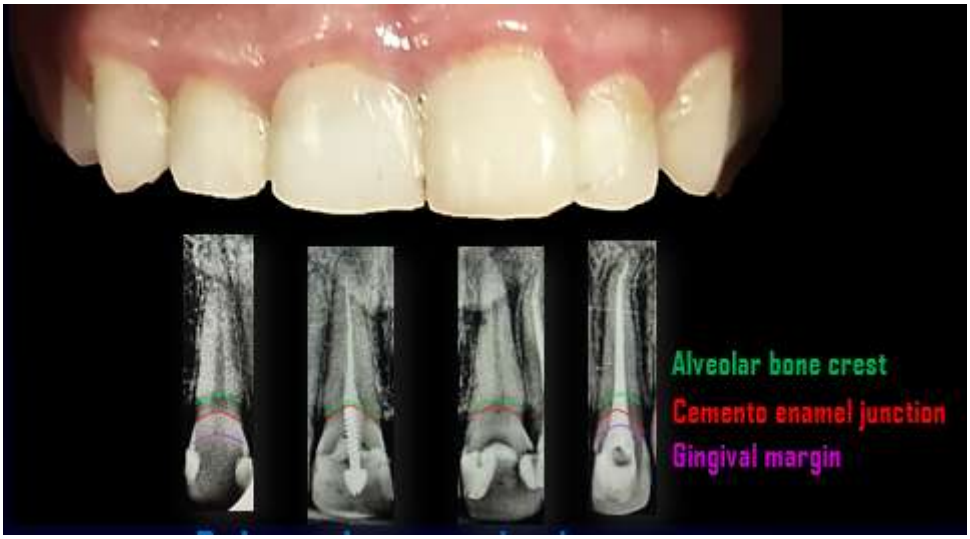

Figure 5:- Individualized tooth analysis of the difference between the anatomical crown and the clinical crown within the esthetic region.

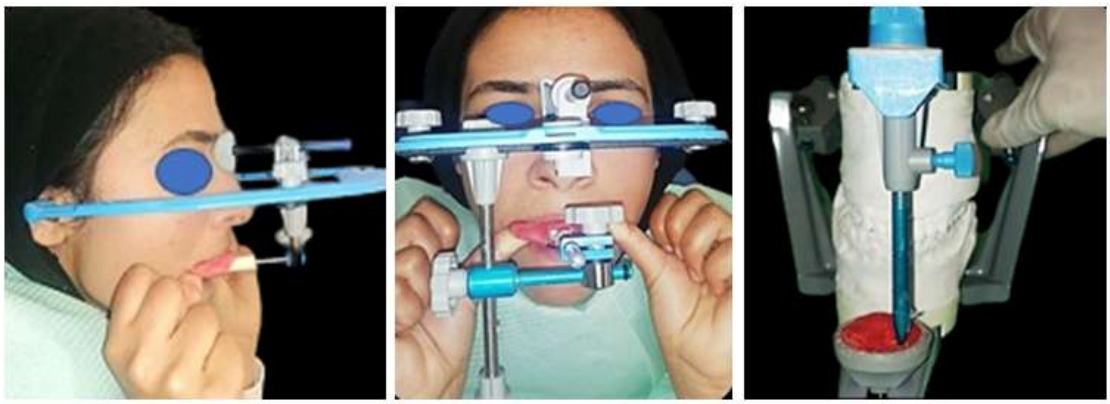

Figure 6:- Anterior guidance registration.

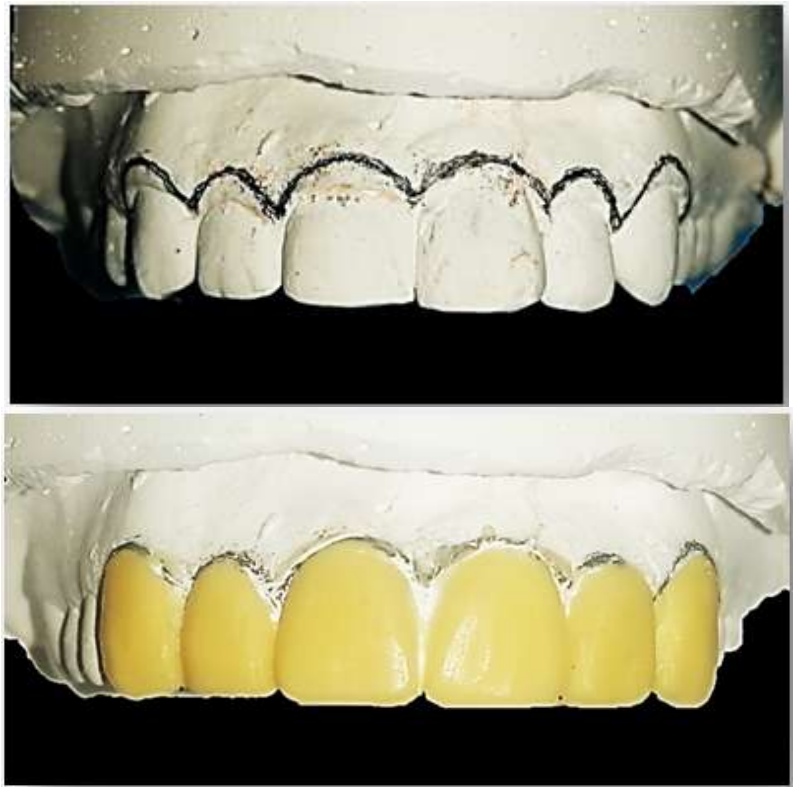

Figure 7:- The intended position of the gingival margin and diagnostic wax up.

Figure 8:-Xray showing endodontic treatment on teeth 11,21 and 22.

Figure 9:-Thermoformed surgical guide making.

Figure 10:- Crown lengthening with alveolectomy and gingival recontouring.

Figure 11:- Patient's smile 3 months post surgical.

Figure 12:- After sealing post and cores.

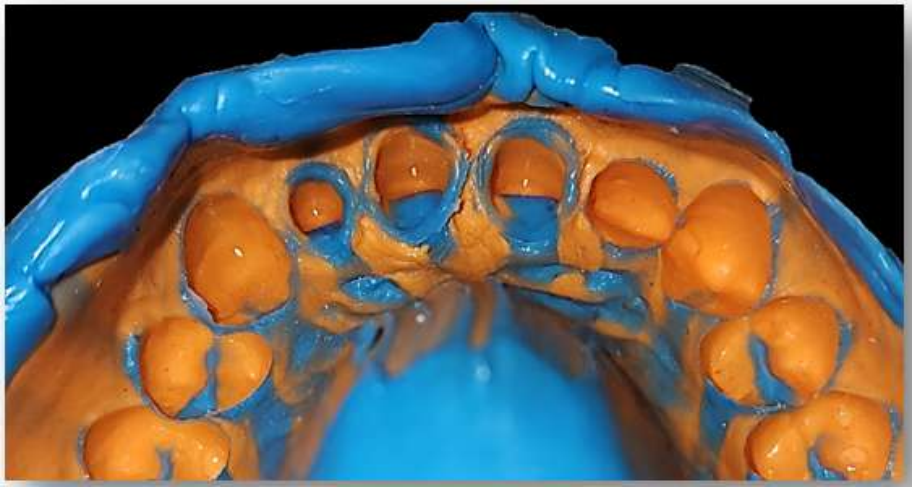

Figure 13:- Conventional impression.

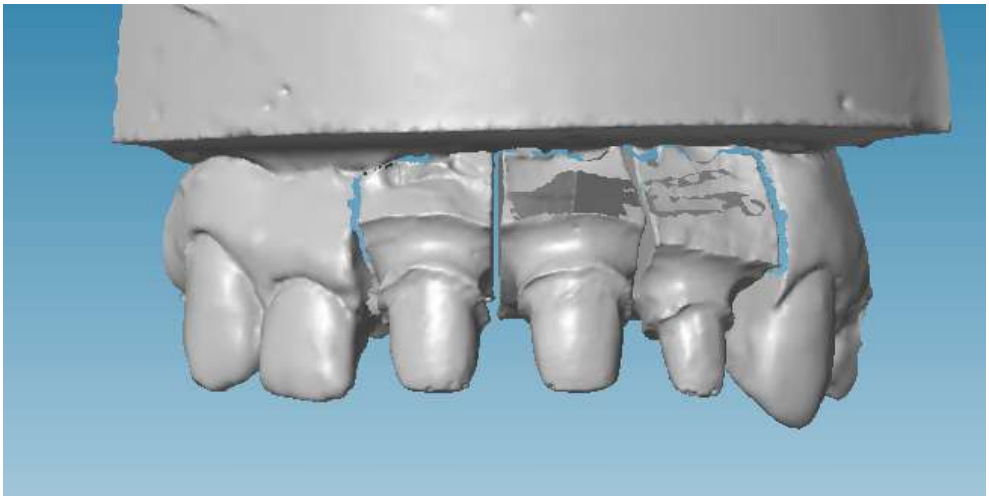

Figure 14:- Scan of the master model.

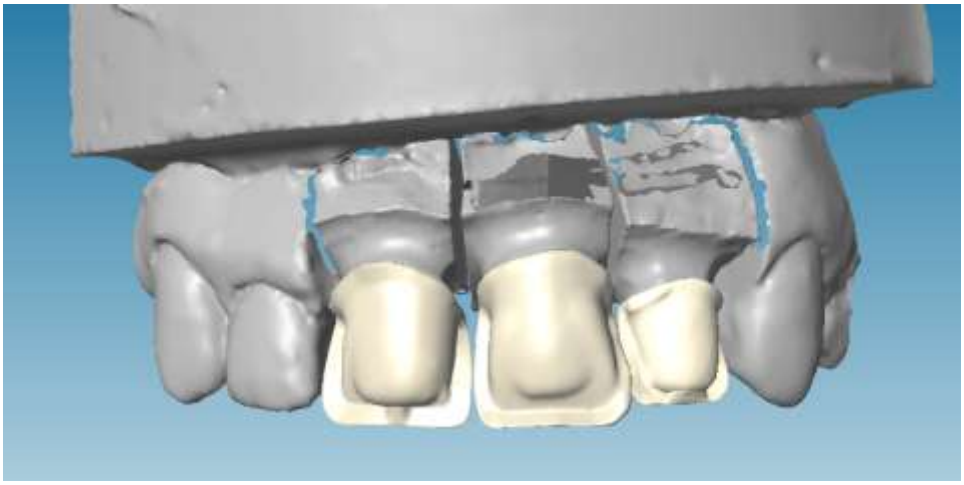

Figure 15:- Conception of virtual zirconia frameworks on teeth 11,21 and 22.

Figure 16:-Zirconia frameworks fitting after been fabricated on 11,21 and 22.

Figure 17:- Final result after sealing crowns.

Figure 18:- Dento-facial view after treatment.

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