

Perio-Prosthetic Combination Therapy in the Management of Anterior Aesthetics — A Case Report

Introduction

Prosthodontic management of the anterior region requires a treatment strategy that meets biological, functional, and aesthetic criteria. The precise proportions between the length and width of the upper central incisors and, subsequently, the laterals and canines can be determined using dental and dento-gingival studies. Additionally, the agenesis of one or more teeth and excessive exposure of the gingival component can affect radiant symmetry and a good incisal margin (gummy smile). Finally, these variables can affect the aesthetics of a smile in the context of a dentofacial examination.

Combined periodontal and prosthetic therapy using a minimally invasive approach makes it possible to re-establish the regular interaction between teeth and gums by acting on the form and position of the affected pieces.

In the present case, periodontal surgery therapy was combined with veneer fabrication to restore the right tooth form in the upper anterior region. The computerized design and minimally invasive procedures enabled us to meet the therapeutic objectives.

Case Presentation

The 28-year-old patient presented with unilateral agenesis of the upper left lateral incisor, mesial transposition of the canine, and a fractured temporary crown on deciduous tooth 64, which was still present in the arch, as well as a desire to improve the aesthetics of her smile (Figs. 1 to 4).

Aside from the prosthetic preparation of deciduous tooth 64 and the placement of an aesthetically and functionally insufficient resin provisional, there were no previous interventions on the anterior teeth during the proximal and distal histories



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(Figs. 5 and 6). The initial profile, radiating symmetry, and altered tooth proportions (Figs. 7 to 9). In these cases, the initial step is collecting radiological and photographic data to determine a diagnosis and offer a treatment plan that fulfils the patient's biological, functional, and cosmetic requirements.

After completing a periodontal chart (Fig. 10) and intraoral radiography evaluation of sextant 2, an impaired passive eruption category 1 subtype B, characterized by the bony ridge approximating the cemento-enamel junction and diminishing supra-crestal tissue, was diagnosed.

Digital Smile Design (Fig. 11) validated the requirement to perform resective surgery from 13 to 64 to re-establish the natural clinical crown



Fig. 1

Figs. 1 to 4 — Initial presentation

Figs. 5 and 6 — Prosthetic preparation of deciduous tooth 64

Figs. 7 to 9 — The initial profile, radiating symmetry, and tooth proportions appeared altered



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8

length of the dental components in conjunction with manufacturing two veneers on elements 12, 23, and 64 to restore correct tooth proportions and smile harmony.

Surgical phase

The patient underwent osseous-resorptive surgery to restore the correct relationship between the bony ridge and enamel junction following replacing the provisional crown on the deciduous element. The flap design consisted



Fig. 9



Fig. 10

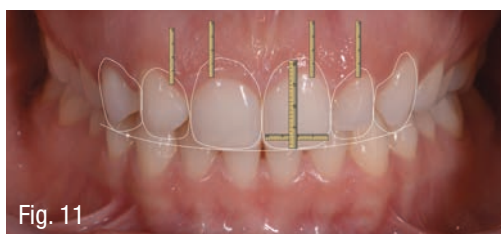


Fig. 11



Fig. 12



Fig. 13



Fig. 14



Fig. 15



Fig. 16



Fig. 17



Fig. 18



Fig. 19



Fig. 20



Fig. 21

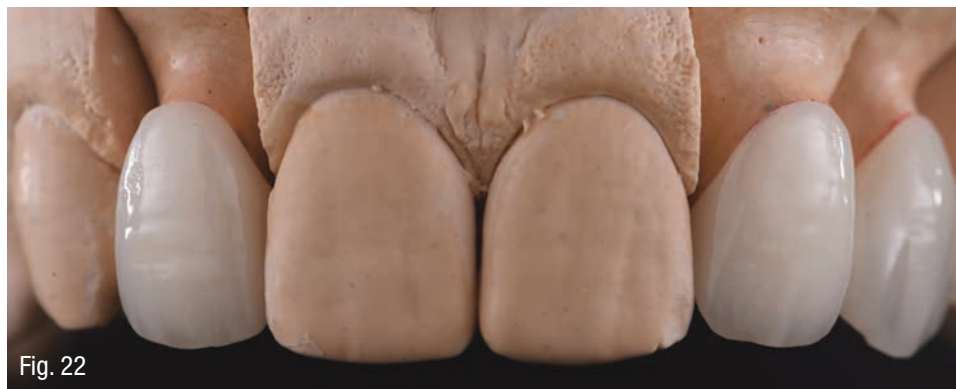


Fig. 22

Fig. 10 — Periodontal chart, associated with examination and radiography

Fig. 11 — Digital smile design

Fig. 12 — Para-marginal incision at 15 to 25 extended envelope

Figs. 13 and 14 — Osteotomy and osteoplasty of sextant 2 dentition

Fig. 15 — Bone anatomy parallel to the course of the CEJ and 3 mm from it

Fig. 16 — Stitch removal

Fig. 17 — Patient monitored for 9 months

Fig. 18 and 19 — Teeth 12 and 23 were prepared

Figs. 20 to 22 — Prosthetics made of pressed and layered lithium disilicate

Prosthetic phase

Upon completion of tissue maturation, a diagnostic case wax-up was done to specify the forms and volumes of the prosthetic dental pieces following the new tooth relationships resulting from resective surgery. The goal of the prosthetic treatment was to achieve harmony and radiant symmetry in the smile; to this end, the canine in quadrant 2 was changed into a lateral incisor, and the deciduous tooth took on the appearance of a canine.

The wax-up was duplicated to create a silicone template that served as a guide for tooth preparation and the creation of a direct temporary (Fig. 18). The dental elements 12 and 23 were selectively prepared (Fig. 19) by removing 0.8 mm

of a para-marginal (Fig. 12) envelope incision extending from 15 to 25 with osteotomy and osteoplasty of the second quadrant dentition (Figs. 13 and 14) until bony anatomy matches the path

of the cemento-enamel junction (CEJ) and 3 mm from it (Fig. 15). The sutures were removed after 14 days (Figure 16), and the patient was observed over the subsequent nine months (Fig. 17).



Fig. 23

Fig. 23 — Etching with 9% hydrofluoric acid applied for 45 seconds, then rinsed with running water and vibrated for 3 min in an ultrasonic bath with ethyl alcohol



Fig. 24



Fig. 25



Fig. 26



Fig. 27



Fig. 28

Figs. 24 to 28 — Full biological functional and aesthetic integration of prosthetic components

of enamel from the buccal surface so that the veneers composed of layered lithium disilicate would have suitable thickness. Because it had previously been reduced to an abutment, tooth 64 was prepared to receive a prosthetic crown.

After taking a polyether impression, the interim resin restoration was moulded, completed, and polished chairside. The three prosthetic restorations were built of pressed and laminated lithium disilicate (Figs. 20 to 22).

After in situ testing with try-in pastes imitating the final colour of resin cement after cementation, the prosthetics were processed with 9% hydrofluoric acid for 45 seconds, rinsed with running water, and vibrated in an ultrasonic bath with ethyl alcohol for 3 minutes (Fig. 23).

At 1 atmosphere, dental preparations were cleaned with diamond and erythritol powders. Next, the tooth surface was etched using an etch-and-rinse method and bonded using an adhesive. After applying photo-activatable resin cement, photopolymerization was accomplished.

At 6-month and 1-year follow-ups, the prosthetic restorations demonstrated complete biological, functional, and aesthetic integration (Figs. 24 to 28).

Discussion

Agensis of one or more teeth is the most common numerical abnormality in deciduous and permanent dentition and produces alterations in the patient's appearance, function, and psychology. Robertson et al. (2000) state that canine replacement is indicated for patients with the following characteristics:



Fig. 29



Fig. 30



Fig. 31



Fig. 32

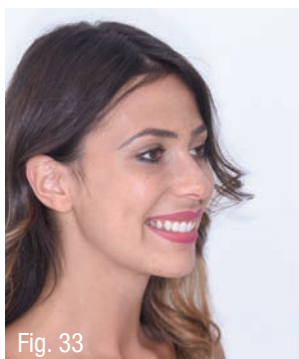


Fig. 33



Fig. 34



Fig. 35



Fig. 36

Figs. 29 to 31 — The convex incisal profile and radiant symmetry of the smile implied a change of shape of 12 and 23 with ceramic veneers

Figs. 32 and 33 — Minimally invasive treatment, through calibrated preparation, combined with highly aesthetic even thicknesses of 0.8 mm such as pressed lithium disilicate, for this treatment

Figs. 34 to 38 — Final result

In this instance, Digital Smile Design allowed us to convey to the patient the necessity to address the altered passive eruption and the form of elements 12 and 23 to restore smile harmony. In addition, the computerized design provided clinicians and dental technicians with a better understanding of the treatment objective.

Consequently, the biological goal of osseoresective surgery was to restore

Angle's Class II with no crowding in the lower arch; Angle's Class I with severe crowding; protrusion involving extractions in the lower arch; the presence of teeth with correct anterior tooth inclination and absence of spaces; severely protruded upper anterior teeth

in which orthodontic opening of the space would exacerbate the situation. Using photographic aids, digital previsualization enables the correct tooth forms to be framed with genuine proportions and establishes a standard treatment plan.



the correct proportions of the gingival components without affecting the patient's biotype. The optimal ratios of a woman's upper central incisors are a length between 10.4 mm and 11.2 mm and a width between 8.3 mm and 9.3 mm, with 75-80% of these values. We re-proportioned the two central incisors through surgery, restoring the correct tooth ratios. The convex incisal profile and radiating symmetry of the smile suggested that ceramic veneers be used to alter the shape of teeth 12 and 23. (Figs. 29 to 31). In such circumstances, minimally invasive treatment utilizing calibrated preparations and highly aesthetic materials, such as pressed lithium disilicate, is the treatment of choice (Figs. 32 and 38).

Conclusion

The utilization of digital tools permits a unified and transparent approach to the treatment strategy. Minimally invasive surgical and prosthetic procedures enable the attainment of pleasing aesthetics with minimal biological sacrifice. 

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