

Esthetic Management of Bilateral Maxillary Schizodontism



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INTRODUCTION

Schizodontism, commonly known as gemination, twinning, or double teeth is an anomaly which affects primary and permanent human dentition. Their occurrence in primary dentition must be carefully monitored to avoid delayed or ectopic eruption of permanent successors.¹ When schizodontism occurs in the permanent dentition, appropriate management may be required in order to alleviate the possibility of functional, phonetic or esthetic deficits.

Several treatment approaches are currently used for schizodontism in permanent teeth. Among these are rare reports of successful surgical division that have been cited.²⁻⁶ In many cases, selective shaping with or without place-

ABSTRACT

A conservative approach is described for the esthetic management of bilateral schizodontism of maxillary central incisors. The method used combined gingival remodeling and anatomic recontouring of affected teeth, followed by final restoration with porcelain laminate veneers. The utilized approach was discussed in view of various traditional treatment modalities that are currently employed.

ment of full crowns was used. However, many patients exhibited pulpal or coronal anatomic features that were resistant to reshaping. Such conditions necessitated surgical removal followed by prosthetic replacement.^{2,4,6} Removable, fixed and bonded bridges, and implant prostheses are options for consideration. The selection of any or a combination of these treatment modalities depends on teeth affected, arch involved, occlusion, patient's age, tissue condition, esthetic demand, financial capability, and individual desire.

Orthodontic tooth repositioning may be required to compliment the aforementioned treatments.⁵

The majority of traditional treatment modalities are either insufficient to fulfill the patient's needs or are extensive, involved, time consuming, costly and may even be considered radical. The objective of this report is to present a simplified conservative treatment for geminated maxillary permanent central incisors, that fulfills both functional and esthetic requirements.

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CLINICAL AND RADIOGRAPHIC FINDINGS:

A bilateral schizodontism of the two maxillary central incisors of a 24-year old Caucasian male were featured as two twins (figure 1). Each of the twins looked like a mandibular incisor. The twins were separated at the incisal edge while their body appeared to be fused, forming a large bifid tooth. The arched gingival margin contour of each twin was individualized and separated by a small pseudointerdental papillae-like formation.



Fig. 1. Preoperative frontal view of two geminated maxillary central incisors.



Fig. 2. A radiographic image of the geminated maxillary central incisors demonstrates the anatomic features of the pulp chambers and root canals.

A slight narrowing of the maxillary arch across the canines was noticeable. This, along with the enlarged central incisors, led to significant crowding of the anterior segment that resulted in rotation and/or protrusion of central and lateral incisors, and increased overjet with reduced overbite. Radiographically, each crown of the two twins showed two pulp chambers leading to root canals that merged into a Y-shaped enlarged canal (figure 2). Both twins demonstrated normal vitality to pulp testing. Details of the clinical and radiographic findings, and diagnosis are described in a previous communication.⁷

TREATMENT PLAN

Based on clinical and radiographic findings, and the patient's desire to correct the esthetic appearance of the anterior segment of the maxillary arch, a plan of management was outlined, discussed, and implemented with the patient's consent. Three stages of treatment were planned. The first stage focused on the preliminary morphologic correction of the geminated teeth, to achieve the appearance of single yet enlarged-sized crowns. The second stage was to establish a proper gingival margin contour for each of the twin teeth. The third stage was to restore the maxillary anterior teeth to normal morphologic and esthetic harmony within the dentition.

CLINICAL PROCEDURES

Stage I. Utilizing enameloplasty combined with acid etch and composite techniques, the incisal edges of the two twins were restored, and the facio-lingual grooves were obliterated with preventive resin restorations. The distofacial ridges of the maxillary laterals were reshaped, along with their distoincisor angles. This brought the laterals into a better alignment with the canines. The pronounced facial ridges of the two centrals were tempered. No attempt was made to compensate for the facial prominence of the maxillary right central incisor.

Stage II. A minor gingivoplasty was undertaken to excise the pseudo interdental papillae between the geminated twins and correct the gingival margin contour. These papillae were also found to fill in depressions at the neck of the roots that limited optimizing gingival margin contouring (figure 3). The modified gingival outline gave the outlook of a single but enlarged tooth for each of the geminated incisors.



Fig. 3. Postoperative facial view following morphologic correction with enameloplasty, composite bonding, and gingivoplasty.

Stage III. The final course of management for this case was the esthetic restorative treatment of the maxillary anterior teeth with porcelain veneers. The goal of this stage of treatment was to improve the form and over-all esthetics of the maxillary arch by 1). Decreasing the mesio-distal width of the two geminated teeth; 2). Correcting the discrepancy in labial inclination of the two centrals; 3). Aligning the lateral incisors within the arch in relation to the canines, and reducing their distoincisor prominence; 4). Enhancing the facial prominence of the two canines in the arch alignment to coincide with the patient's gender; 5). Utilizing shade modification to create the illusion of a balanced tooth size within the anterior segment of the maxillary dental arch; and 6). Blending the color gradation from the veneers to the natural tooth structure of the adjacent premolars.

Preparation for the Veneers

After thorough prophylaxis of the maxillary and mandibular dentitions, the desired shades for veneers were selected in consultation with the patient.

Shade A1 was selected for the veneer body of the maxillary central and lateral incisors and A2 for their cervical third. A slightly darker shades, A2 and A3, were chosen for the canines.

Selective grinding was undertaken to modify both the shape and relative position of each individual tooth, along with partially achieving the desired alignment of the maxillary anterior teeth in relation to the premolars. The facial aspects of the centrals and laterals was reduced more at the incisal and middle third than the cervical third. However, the facial aspect of the canines was left intact, since the intention was to boost their prominence in the arch with the veneers. All cervical finish lines were terminated in a light chamfer, except for the distal surface of the geminated teeth where a thick chamfer was placed to avoid the increase in the reduced tooth width.



Fig. 4. Maxillary six anterior teeth prepared for porcelain veneers.

The interproximal surfaces were included in the preparations, while the distal aspect of the two centrals were further reduced to minimize the width of these teeth. The plan to decrease the crown width at the cervical region of the central incisors encountered anatomic limitations. This was due to the enlarged root trunk and the morphologic abnormality of the root canal/pulp chamber complex that left little thickness of dentin wall, mesially and distally. All incisal finish lines of the six anteriors were terminated at the lingo-incisal line angles (figure 4).

Gingival retraction cord was placed and a full arch impression was taken using Vinyl Polysiloxane (figure 6). A primary alginate impression was taken for the

lower arch and the occlusal relationship was recorded. No temporization was necessary since teeth color was not objectionable and reduction was limited to enamel, except for few areas.

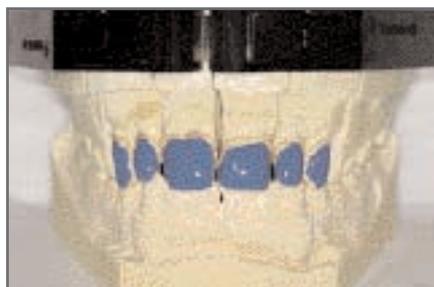


Fig. 5. The mounted sectioned stone cast with spacer applied.



Fig. 6. An investment model replica of the stone master cast.

Laboratory Technique

Instructions related to arch form, tooth alignment and size were conveyed to the ceramic technician along with shade selection. The impressions were cast in dental stone and inverted into the "Accu-Tray" to allow for the use of single dies. The geminated teeth dies, numbers 8 and 9, were individually separated while those for teeth numbers 6-7, and 10-11 were maintained together to avoid interruption of their proximal contacts that were not separated during the preparation. The dies were trimmed, sealed and a die-spacer was applied (figure 5). The sectioned portion was duplicated and refractory investment dies were fabricated (figure 6). Once sintered, the refractory dies were sealed in the usual fashion.



Fig. 7. The finished porcelain veneers positioned on master cast.

The porcelain veneers were built up according to instructions. In order to create the illusion of smaller central incisors, shade A1 was used for the body of the two centrals and laterals, while shade A2 was used for their necks. This shade was extended to the mesial and distal aspects creating a shadowing effect. Furthermore, the mesial aspect of the laterals were extended slightly to overlap the distal of the centrals, while attempting to create as regular an arrangement as possible. Due to the prominence of the upper right central incisor, the corresponding porcelain laminate was kept to a minimum thickness of 0.4 mm in some areas. The left central incisor was built out mesially to create more arch harmony for an esthetically pleasing arrangement. Slightly darker shades were used for the canines.

Once satisfactory contours and surface textures were achieved, veneers were separated and margins finished. The laminates were glazed after the application of the required surface staining to enhance the desired shades. Refractory investment was blasted off the fitting surface using glass beads. Veneers were fit to their corresponding dies individually on the master model. The 6 veneers were then tried together on the master model by adjusting the interproximal contacts, to ensure fit (figure 7). The anatomic surfaces of the veneers were etched with 20% hydrofluoric acid for ten minutes, washed with distilled water, then placed in an ultrasonic cleaner for an additional ten minutes.

Try in and Bonding

After thorough prophylaxis of the teeth, the patient was placed in a semi-recumbent position with a 4x4 gauze across the dorsum of the tongue, guarding the oropharynx. Each veneer was individually seated to check the accuracy of marginal fit, gingival relationship, contact relationship with adjacent veneers or teeth. Color, esthetics and occlusion were checked to the patient's satisfaction. The veneers were removed, washed and cleaned with alcohol, and thoroughly dried, before the application of silane primer to their anatomic surfaces.

Teeth were etched using phosphoric acid gel, washed with water, and dried. Mylar strips were placed to secure separation at the contacts. A thin layer of dentin adhesive was applied to etched teeth and the silane-treated veneers and subsequently light-cured. Composite luting agent was applied to the anatomic surface of each veneer before seating in place and light-activated. A sickle scaler was used to remove gross excess. Fine grit tapered diamond point, finishing strips, and discs were used for initial finishing. This was followed by 20-fluted tungsten carbide burs, and rubber-incorporated abrasive points with polishing paste for final finish. Occlusion was checked before polishing (figure 8). The patient received instructions in proper oral home care and subsequent follow up.



Fig. 8. Facial view of maxillary teeth, treated with porcelain veneers, in occlusion.



Fig. 9. The appearance of the completed case demonstrating the improved esthetics and relaxed labial musculature.

Discussion

The present case management consisted of three sequential and interdependent stages. By implementing these, the esthetic appearance was enhanced (figure 9) and Bolton's discrepancy was corrected.⁸ Proper gingival outline for the united twins was improved; however, optimization of the contour was limited due to the extent of pseudo-papillae that were found to fill depressions at the neck of the roots.

Like any dental treatment, the time consumed, cost effectiveness, and efficacy are major considerations for determining proper approach to manage geminated teeth. The treatment modality presented in this report fulfilled both functional and esthetic requirements to the patient's satisfaction. It was achieved in a reasonably short period of time with minimal effort and comparatively low cost. Perhaps the most attractive aspect of the treatment rendered was the conservatism. Thus, surgical procedures, edentulous space problems, and subsequent committal of adjacent teeth as abutments for fixed or removable prostheses were avoided.

The efficacy of this treatment was successfully proven during the five-year observation period. The question of longevity over a longer duration understandably remains a concern, although clinical observation of porcelain veneers placed 15 years ago still proves to be positively encouraging.⁹ Unlike the composite resin used by Denyer in 1982, porcelain veneers were selected because of their superior wear resistance, luster, vitality, ability to induce illusion with color, and excellent esthetics.³

Evidently, not every case of a geminated tooth can be considered as a viable candidate for the mode of treatment utilized. In special circumstances, due to location, individual morphology, anatomic limitations, and radiographic findings, surgical removal of geminated teeth might be a recommended course of treatment. Surgical removal of the affected teeth and orthodontic repositioning of adjacent dentition followed by construction of a fixed partial appliance was suggested by Cullen and co-worker, for severely crowded or malformed geminated teeth.⁶ It should, therefore, be pointed out that each individual case must be critically analyzed prior to deciding on a given therapeutic approach with consideration given to all factors involved.

Conclusion

In the presence of favorable circumstances as described in this case, the conservative approach suggested could be the treatment of choice to deliver a functionally fit and cosmetically pleasing result that satisfy both patient and dentist. It is recommended that the prescribed therapeutic modality could be added to the clinician's working repertoire for treatment options of geminated anterior teeth.

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