

Esthetic problem with dysfunction of temporomandibular joint

Hasan Ali, Md. Mujibur Rahman Howlader, Mozammal Hossain, Md. Joynal Abdin, Md. Shamsul Alam and Mohammad Ali Asgor Moral

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Department of Conservative Dentistry and Endodontics, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University, Shahbag, Dhaka, Bangladesh

For Correspondence:

Mozammal Hossain
hossainresearch@hotmail.com

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Presentation of Case

Dr. Hasan Ali (MS Resident): A 32 year old female came to the Department with the complaint of the bad appearance of her both maxillary central incisor teeth. The patient gave the history of pain, discomfort during mastication in the posterior region and several times loss of existing restoration in the anterior teeth. The medical history of the patient also included the gastric irritation for 5 years and used to take proton pump inhibitor (omeprazole 20 mg) irregularly. On clinical examination, the central incisors had no carious lesions but the dentine was found to be exposed both in the anterior and posterior teeth resulted in reduced vertical height (Figure 1A). Vitality test showed that the teeth were vital and non-tender on percussion. The teeth were symptom-free but she was unhappy about its appearance and wanted to correct it. After considering the esthetic and structural integrity of the teeth, the treatment plan was fixed to correct occlusion followed by restoration of the anterior teeth by direct componeer lamination.

At first visit, mouth preparation was done by scaling and polishing of the teeth in both jaws. The patient was advised to start omeprazole capsule 20 mg twice daily. On the second visit, the clinical examination revealed left-sided mandibular deviation with midline shifting. Periapical X-ray, orthopantomogram and impression for the model analysis were taken.

Dr. Md. Mujibur Rahman Howlader: The periapical radiograph showed that there was gross tooth tissue loss including incisal edges but there were no pulpal and periodontal involvement. Interproximal periodontal ligament space and lamina dura were within the normal limit. Cementum and crest of the alveolus were intact and quite healthy. The orthopantomogram revealed the variation of temporomandibular joint architectures due to left-sided mandibular deviation (Figure 1B).

Dr. Mozammal Hossain: The occlusion analysis by the model revealed that the patient had an edge to edge bite. Furthermore, there was reduced vertical height and a deviation of the mandible to the left and midline was shifted

due to parafunctional habit. It was revealed that the absence of canine guidance was the reason of mandibular deviation to the left (Figure 1C). This condition was not favorable for the retention of restorative material in these teeth for a longer period. Therefore, it was considered that the occlusion needed to be corrected before the placement of restoration of the affected teeth.

Dr. Ali: On the next visit, canine guidance was made by the application of light-activated ceramige restorative material on the posterior molar teeth to increase the vertical height. There was an intraincisor clearance of 2.5 mm. The patient was recalled after 6 weeks. At 6th week, the clinical examination showed correction of midline shifting (Figure 2A). Then



Figure 1: Pre-operative photographs of midline shift (A), Variation of temporomandibular joint architectures due to left-sided mandibular deviation (B) and Deviation of the mandible to the left (C)



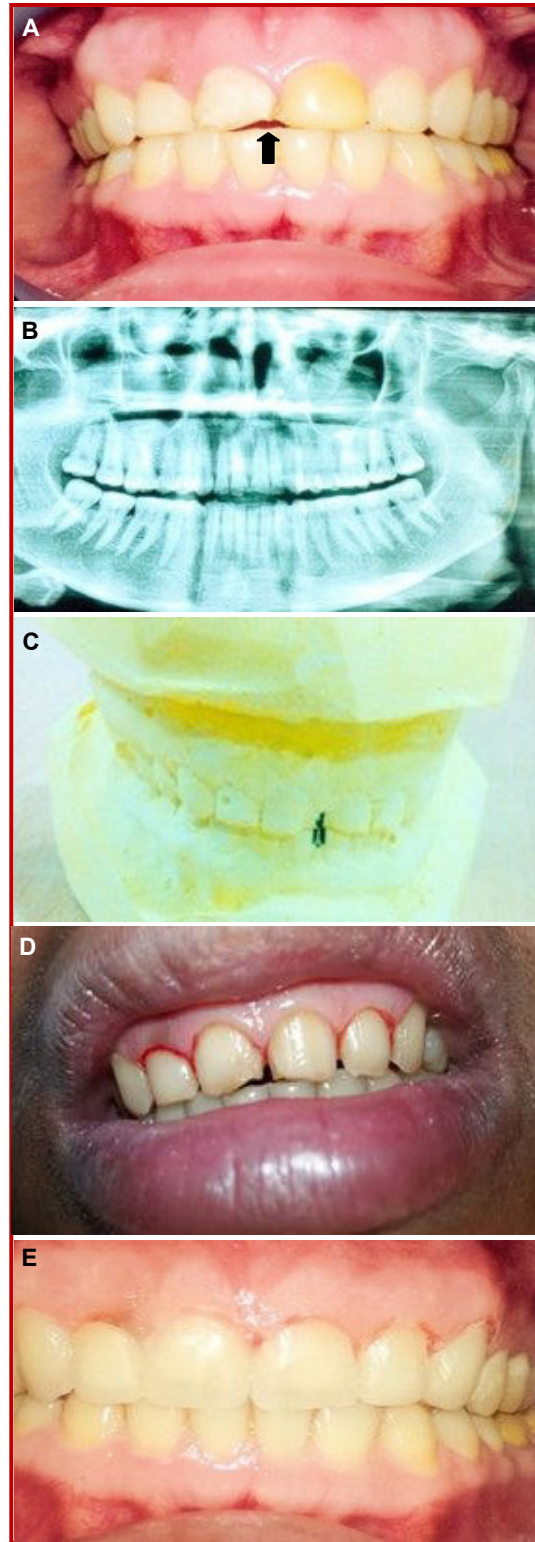


Figure 2: Post-operative photographs of correction of occlusion and midline shifting. The intraincisor clearance was shown by arrow (A), Gaps between the head of mandibular condyle and articular surface of temporal fossa were reduced on the left side (B), Correction of deviation of mandible (C), Tooth preparation (D) and Final restoration (E)

the radiograph and the model analysis were performed.

Dr. Howlader: Radiographic examination showed that gaps between the head of the mandibular condyle and the articular surface of temporal fossa were reduced on the left side (Figure 2B).

Dr. Hossain: Occlusion analysis at 6th week revealed correction of the deviation of the mandible and midline shifting and 2.5 mm intraincisor clearance was achieved (Figure 2C). This condition was favorable for the restoration of the affected teeth.

Dr. Ali: The esthetic correction by direct compomer lamination was performed as follows: At first, the shade was selected with the use of the compomer shade guide. The size of the compomer was measured by the compomer contour guide, although a longer and wider size were recommended rather than a shorter and narrower.

The tooth preparation was kept uniform and limited to the enamel by A#2 round bur up to the cervical margin (Figure 2D). Subsequently, the buccal surface was prepared by using a tapered-cylinder and round-ended diamond bur. Metal abrasive strip was used to create a separation between the teeth in the proximal area. The prefabricated composite shells were kept on the teeth for a few min. Abrasive aluminum oxide disks and extra fine, tapered-cylinder, round-end diamond bur were used to smoothen the preparation and round the angles. After making adjustments to the prefabricated composite veneer, the final trial was carried out. The teeth were then etched with 35% ortho-phosphoric acid for 15 sec. The etchant was thoroughly rinsed for 20 sec. The bonding substrate was gently applied to the tooth surface followed by adhesive treatment. Similarly, adhesive material was also masked to the concave surface of the compomer. While holding the veneer in position, the excess material was removed and the composite smoothly adapted to the compomer with a brush. The entire restoration complex was light cured of the lingual side for at least 40 sec and from the facial side for 40 sec cervically and 40 sec incisally. Finishing and polishing strips were used for the interproximal areas. Flexible disc was used to adjust the incisal angle and silicone disc for polishing of the restoration (Figure 2E).

Differential Diagnosis

Dr. Ali: This female presented with anterior discoloration of the central incisors along with midline deviation and temporomandibular joint disorder due to parafunctional habits. To determine why this patient had anterior tooth discoloration and midline deviation, it is critical to look for clues in her history and findings from the radiographs and model analysis. It is also important to identify the precise cause of tooth discoloration.

Non-carious Tooth Surface Loss

Dr. Md. Joynal Abdin: Patient had discoloration of the affected teeth. According to the medical history of the patient, the causes of discoloration may be due to the chemical erosion. As the patient had a history of gastric reflux that might be the possible cause of tooth erosion followed by discoloration. Another cause may be due to exposure of the underlying dentin due to loss of enamel tissue by parafunctional habits. The effect of chemical erosion must be discriminated from the tooth wear caused by abrasion, and attrition due to parafunctional habits such as tooth clenching or grinding habit (bruxism). Excessive tooth wear more frequently recognized in the bruxism may be due to faster progress.^{1,2} Furthermore, the severe loss of tooth structure was found due to chemical erosion^{3,4} and gastric reflux.^{5,6} Moreover, bruxism might accelerate the tooth tissue loss.⁷ Therefore, it can be considered that the examination of the patient who presents with a history of bruxism, or temporomandibular dysfunction need to be directed towards ascertaining if acid demineralization is the underlying causes of their tooth wear.

Temporomandibular Joint Disorder

Dr. Abdin: Temporomandibular joint disorder is a multi-factorial complication which is related to the trauma, malocclusion, bruxism and non-nutritional sucking.^{8,9} However, the relationship between the oral parafunctional habit and temporomandibular disorder is still controversial. Occlusal discrepancy is considered to be the most common cause of bruxism, inverse overjets and overbites.^{10,11} Furthermore, bruxism might develop due to neurochemical factor, medication and smoking.¹²⁻¹⁴ The immaturity of the masticatory neuromuscular system, altered brain chemistry, alcohol, trauma, disease, medication as well as nutritional deficiency and endocrine dysfunction are also responsible.^{15,16} Therefore, the ultimate effects of bruxism are dentin hypersensitivity, tooth hypermobility, injury to the periodontium and pulpitis/pulp necrosis.¹⁷ However, in the present case, although patient complained of dentin hypersensitivity of the central incisor teeth due to erosion, there was no history of tooth hypermobility as well as injury to the periodontium. Therefore, it can be considered that occlusion correction can be possible with the increase in the vertical height which might be helpful for the correction of midline deviation.

Clinical Diagnosis

Dr. Md. Shamsul Alam: Midline deviation and temporomandibular joint disorder due to parafunctional habits.

Dr. Ali's Diagnosis

Esthetic problem with dysfunction of temporomandibular joint due to parafunctional habit

Discussion

Radiological

Dr. Howlader: Orthopantomogram is a method of choice for the detection of degenerative bony changes, diagnosis of unspecific pathological changes, classification of the degree of pathological changes, and primary diagnostic technique of temporomandibular joint dysfunctions. In this present case, before treatment, orthopantomogram revealed the variation of temporomandibular joint architectures due to the left-sided mandibular deviation. Following an increase in vertical height (>2.5 mm), the gaps between the head of the mandibular condyle and articular surface of temporal fossa were reduced on the left side. Increasing the vertical height was reported effective in generalized and complex dental abnormalities.¹⁸⁻²⁰

Malocclusion

Dr. Hossain: In the present study, the occlusion analysis by the model revealed that there was a deviation of the mandible to the left and the midline was shifted due to parafunctional habit. Furthermore, there was an absence of canine guidance due to mandible deviation to the left. This condition was not favorable for the retention of restorative material in these teeth for a longer period. There were some similarities and dissimilarities of the effect of parafunctional habit with that of malocclusion. Bruxism is responsible for involuntary rhythmic, spasmodic nonfunctional grinding or teeth clenching as well as deep bite, overjet and dental wear.^{21,22} On the other hand, bruxism may have several adverse effects on the masticatory system.²³ It can be concluded that there might be the limited relationship between the bruxism and the bite.

Esthetic Correction by Componeer

Dr. Ali: The patient had discoloration of the anterior tooth. The conventional dental crown is usually used to cover the teeth for the treatment of esthetic disorder.²⁴ However, excessive tooth preparation and damage to surrounding tissues are the disadvantages of this method of crowning. Therefore, laminate veneer restorations have been suggested by many investigators and is considered as more esthetic and more conservative treatment option than that of crown.²⁴ Laminate veneers are capable of correcting the existing abnormalities, esthetic deficiencies and discolorations.

Two types of laminate veneer restorations have been recommended. Direct laminates are applied on

the prepared surfaces directly in the dental clinic. There is no need for tooth preparation and its cost is low for patients compared with indirect techniques and other prosthetic approaches. Furthermore, intraoral polishing of direct laminate veneers is easy. Cracks or fractures on the restoration may be repaired intraorally as well as better marginal adaptation might be achieved.^{25, 26} However, the main disadvantages of direct laminate veneers are low wear resistance, discoloration and fractures.^{24, 26, 27} Indirect laminate veneers, on the other hand, have high resistance to attrition, fractures, and discolorations than the direct laminate veneer restorations.^{26, 28} The use of an adhesive cementing system is inferior to the indirect laminate veneer restoration.²⁴ Therefore, direct laminate veneer restorations have been recommended for anterior teeth.²⁴

In this case, direct composite laminate veneer technique, for the patient with an esthetic problem related to discolorations and an old prolapsed restoration is described. Prefabricated composite resin veneers have been recently introduced. Componeer prefabricated veneers are made of a pre-polymerized hybrid composite resin shell (0.3 mm cervically and 0.6-1.0 mm to the incisal edge). These prefabricated veneers are made of a pre-polymerized hybrid composite resin. The veneers are cemented with the same hybrid composite resin that they are made from, which has the potential of making the complete restoration as a monoblock unit. The direct composite veneer system adds a new and interesting dimension to existing treatment options and gives dentists and patients new economic perspective. Patients can be given a naturally esthetic smile in just a single session. Componeer has many advantages such as easy to use, quality esthetic dental restoration in just a single session, easy to customize, a wide range of uses in esthetic and clinical applications. A recent bond strength study reported that componeer prefabricated veneers resulted in microshear bond strengths statistically similar to those of etched ISP e.max press (Ivoclar Vivadent, Schaan, Liechtenstein).²⁹

Follow-up

The restoration was then assessed clinically and checked the occlusion by bite paper after every 6 months. Furthermore, shade guide was used to check the color matching of the restoration and the patient was pleased esthetically. The patient was advised to use a soft toothbrush, avoid highly abrasive toothpaste and another hard object that can cause fracture of the restoration.

Dr. Md. Fida Hasan Talukder (MS Resident): Dr. Ali, would you please tell us what happened with this

patient?

Dr. Ali: The patient is satisfied following occlusal and esthetic correction of upper central incisors. She was being monitored at the Department. After completion of the treatment, she eventually returned to work and maintained a healthy life. She took omeprazole once daily in the night. A follow-up OPG X-ray at 6th month follow-up showed that the midline was properly maintained centrally and two central incisor restorations kept their natural tooth color and texture.

Dr. Kazi Hossain Mahmood (MS Resident): Would you please tell us about the treatment of bruxism for this patient?

Dr. Howlader: She had not given any treatment of bruxism because she had nothing contributory of the neuromuscular disorder. She had only parafunctional habit due to disharmony which was corrected by the restorative method by increasing vertical heights with ceramag (Densply, Germany).

Dr. Mir Md. Mofazzal Hossain (MS Resident): How did you correct the midline shifting of this patient?

Dr. Abdin: In this patient, midline was shifted towards left. Here vertical height was increased by adding ceramag restorative material and the posterior or molar relationship was corrected. Gaining corrected molar relationship revealed the correction of midline shifting and turned into central position.

Dr. Rozina Akter (Medical Officer): Dr. Hasan Ali, would you please tell us about the longevity of this newly developed componeer materials in this case with TMJ dysfunction and parafunctional habit?

Dr. Ali: The concept of one-visit prefabricated resin-based veneers is not new. In the early 1980's, prefabricated acrylic veneers were introduced as Mastique laminate veneer system (Caulk, USA). The intaglio surface of Mastique veneers was etched with polyacrylic acid and then adapted to acid-etched enamel using a light-curing composite and an unfilled bonding resin. Mastique veneers had limited success because of technological limitations and poor surface qualities.³⁰ Clinical studies have confirmed good performance of porcelain veneer restoration, with excellent esthetics, overall patient satisfaction, and no adverse effects on the periodontal tissues.³¹ Eighty percent survival rate was found in direct composite veneer in 3.5 years.³² In another study, direct composite veneers showed good result in esthetics.³³ However, the sealing ability of laminate veneer depends on the luting cements used.³¹ Therefore, it can be considered that the clinical outcome of veneers depends on the strength of two interface- the tooth/resin cement and the veneer/resin cement interface. Prefabricated composite veneers have some of the advantages of direct composite restoration, as only

one session is required without the need to make impression or laboratory work. Additionally, the restoration can be customized (color and shape) and are more affordable than other indirect restoration.

Dr. Hossain: When the respective adhesive and luting composite were applied to the intaglio surface, the high bond strengths obtained between the compomer intaglio surface and the respective hybrid composite.³⁴⁻³⁵ The clinical technique described in this case used to mask discoloration of upper anterior teeth and the patient is very happy after the end of the treatment. The technique can also be used to restore extensive caries lesions and tooth fractures, especially when other treatment options are out to reach for the patient.³⁴⁻³⁵

Dr. Alam: Although laminate veneer has shown promising results, controlled clinical studies are essential to validate its use in clinical practice. Temporomandibular joint dysfunction is considered as multifactorial and still controversial. It can be suggested that there should be long-term evaluation to know the success of restorative material in case of temporomandibular disorder and bruxism.

Dr. Mohammad Ali Asgor Moral: Temporomandibular disorder and parafunctional habit were responsible for midline shifting. This condition markedly reduced the longevity of a restoration. Therefore, it is important to correct the occlusion before placement of a restoration.

Final Diagnosis

Esthetic problem with temporomandibular joint dysfunction

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