RESTORATION OF SLIGHTLY INFRAOCCCLUDED PREMOLARS WITH CERAMIC ONLAYS

ABSTRACT
Infraocclusion is a clinical situation of teeth with occluding surfaces below the plane of occlusion. Treatment of infraocclusion depends on the severity of the situation. This article shows the results of a non-invasive prosthetic approach applied to a young female patient having two infraoccluded premolars. The choice of treatment was to raise the level of these teeth by closing the space with ceramic onlays. Ideal occlusion, esthetics and patient satisfaction were achieved owing to the chosen conservative treatment.

Key words: Infraocclusion, Onlay, Permanent Dentition

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INTRODUCTION

Infraocclusion is defined as malocclusion in which the occluding surfaces of teeth are below the normal plane of occlusion. Primary dentition is implicated more frequently than the permanent dentition. The incidence of infraocclusion in the mandibular arch is twice as high as in the maxillary arch. Most effected tooth has been reported as the mandibular first primary molar. The etiology is still unknown.

A simple classification of infraocclusion has been described by Brearley et al. They have classified infraocclusion into 3 groups. The first group represents the slight infraocclusion where the infraoccluded teeth are 1 mm below the occlusal plane. The second group represents the moderate infraocclusion where the occlusal surface of the infraoccluded teeth approximatively level with the contact point of one or both adjacent tooth surfaces. The third group is the severe infraocclusion group, in which the occlusal surfaces level with or below the interproximal gingival tissue of one or both adjacent tooth surfaces.

The treatment of infraocclusion is controversial. Treatment of these teeth aims at preventing malocclusions and periodontal defects from developing. Mostly orthodontic and orthosurgical managements were preferred in the previous reports. Artificially increasing the crown height with restorative material is indicated in adult patients if there is no tilting of the neighboring teeth and if infraocclusion is less than 4 mm.

The purpose of this clinical report was to present a case with 2 infraoccluded premolars treated by means of ceramic onlays.

CASE REPORT

A 24-year-old female presented with 2 infraoccluded premolars. Intraorally, she had a Class I occlusion with a normal overbite and overjet. The occlusal surface of the right mandibular second premolar was ~2 mm; and the left mandibular second premolar was ~1.5 mm below the other posterior teeth (Figures 1A and 1B). Her general health history was good. There was no evidence of parafunctional habits.

Three treatment options were discussed with the patient. No treatment, orthodontic treatment and treatment with ceramic onlays. No-treatment option might be considered in cases of slight infraocclusion without tilting of the neighboring teeth. Therefore, this option was also discussed with the patient. The final decision according to the patient’s requests was indirect restorative treatment of the teeth.

A chamfer margin was prepared supragingivally. The preparations were made using an inlay/onlay preparation set (Inlay Preparations Set 4261; Komet, Gebr. Brasseler, Lemgo, Germany). Care was taken not to reduce too much tooth structure in order not to cause hypersensitivity (Figures 2A and 2B). Retraction cords were not used because of the supragingival margins. A definitive impression of the tooth preparations was made using vinyl polysiloxane material (Brecision; Bredent, Senden, Germany). The impression of the opposing arch was made with an irreversible hydrocolloid (Xantalgin; Heraeus Kulzer, Hanau, Germany). A chromascope shade guide (Ivoclar Vivadent, Schaan, Liechtenstein) was used to select an appropriate shade and the prepared cavities were sealed with a temporary composite filling material (Voco Clip, Voco, Cuxhaven, Germany) and light cured.

The onlays were fabricated in the laboratory with a lithium-disilicate crystal content of 60% by volume that forms an interlocking structure which serves as a framework and veneered with sintered glass ceramic (IPS Empress 2; Ivoclar Vivadent, Schaan, Liechtenstein) which formed the fluorapatite crystals resembling natural enamel in shape and composition (Figure 3).

The cavities were cleaned and the onlays were tried for marginal adaptation. The intaglio surfaces of the ceramic onlays were sandblasted with 30- to 50-μm Al₂O₃ particles (at 80 psi), etched with 9.5% hydrofluoric acid for 20 seconds and silane treated for 1 minute (Monobond-S; Ivoclar Vivadent). A thin layer of bonding agent (Clearfil SE Bond; Kuraray Co. Ltd, Kurashaki, Japan) was applied on the cavity without curing it. The base and catalyst of dual cure resin cement (Nexus 2, Kerr Corp, Orange, Calif.) were mixed and applied to the cavities and the ceramic onlays. The onlays were inserted into the cavity and excess cement was removed. The restorations were light-cured for 10 seconds and the excess cement in the proximal areas were easily removed. The light-curing was applied for 60 seconds more according to the manufacturer instructions for each surface of the restorations. The occlusion was checked with an articulating paper (Swedent; Swedish Dental Supplies AB, Akarp, Sweden) and minor adjustments were made with a carbide bur. The surfaces were polished with silicone polishing points (Silicone polishers; Diatech Dental
Figure 1A. Infraoccluded right second premolar

Figure 1B. Infraoccluded left second premolar

Figure 2A. Preparation for ceramic onlays (right second premolar)

Figure 2B. Preparation for ceramic onlays (left second premolar)

Figure 3. Ceramic onlays

A 2-year follow-up examination of this patient revealed no postoperative hypersensitivity associated with the new ceramic restoration and excellent patient satisfaction was observed.

DISCUSSION

In cases of infraocclusion, diagnostic considerations include the age of the patient, occlusal status, condition of the infra-occluded teeth, the severity of infra-occlusion and the adjacent alveolar bone levels. The concepts of
minimally invasive dentistry combined with an adhesive technique have been suggested for the conservation of dental structure. For the cases with slight infraocclusion, this treatment method can be a more successful option than orthodontic treatment. Infraocclusion mostly affects the mandibular arch and the posterior teeth but not the esthetic anterior regions; that's why orthodontic appliances are not preferred by these patients. These patients mostly come, seeking ceramic crowns. However, treatment with metal-and-ceramic crowns or all-porcelain crowns was not considered for the presented patient because much more tooth reduction is necessary for making crowns and it is more time-consuming both for the patients and the practitioners. As for the conservative preparation, the onlay restorations provided a fully functional occlusion in the presented case. For the onlay material, IPS Empress 2 was preferred because it has a much higher flexural strength than that of IPS Empress and its increased flexural strength makes it suitable for the fabrication of inlays, onlays, and even 3-unit fixed partial dentures in the anterior region.

It can be concluded that treatment of cases with slight infraocclusion by means of ceramic onlays is an esthetic, easy and safe method.

REFERENCES


