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Case Report

A customized occlusal plane device for immediate denture patient

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ABSTRACT

The study focuses on developing a simple, easy-to-construct, sterilizable, and customizable occlusal plane device. With the increasing preference for immediate dentures in dentistry, ensuring an accurate occlusal plane orientation is crucial for achieving proper function, aesthetics, and form in prosthodontic rehabilitation. Traditionally, a fox plane is used alongside the Camper's plane or ala-tragus line to determine the occlusal plane. However, accurately assessing the occlusal plane before extracting remaining teeth when fabricating an interim immediate complete denture is challenging. A case involving a 69-year-old male patient with a partially edentulous maxillary arch and a completely edentulous mandibular arch highlights the application of a customized occlusal plane device. The technique involved modifying a conventional fox plane to evaluate the maxillary occlusal plane in immediate denture cases. The key advantage of this device is its adaptability, allowing for customization based on the patient's dentition. Self-cure acrylic resin can be used to adjust spaces as needed, accommodating existing teeth and ensuring better prosthetic outcomes.

Keywords: Immediate denture, Occlusal plane orientor, Occlusal plane

INTRODUCTION

The major key factor in the governance of occlusal balance is the inclination of the occlusal plane.^[1] Before the fabrication of a complete denture, the determination of the plane of inclination is an important step because bilaterally balanced occlusion is the occlusion of choice. The Fox plane is a typical device that is used in the determination of the anteroposterior inclination of the occlusal plane.^[2] This is placed such that its plane is parallel to the camper's plane.^[3,4] There are other devices that can also be used in the determination of the inclination of the plane. Along with the determination of the anteroposterior inclination of the plane, inclination with respect to the interpupillary line could also be established. Leary parallelometer^[5] is one such device to be used for both purposes. Lateral telerradiography^[6,7] can also be used in the determination of the inclination of the occlusal plane (IOP). However, there is currently no way of determining IOP directly in cases that have only a few anterior teeth without any centric stops. Furthermore, during the fabrication of an immediate denture, the conventional occlusal plane indicator would not be of much help as the supraerupted teeth would destabilize the Fox plane and not provide the ideal base for the placement of the device. This case report describes a simple technique and a modified conventional Fox plane to help in the evaluation of the maxillary occlusal plane in an immediate denture patient.

CASE REPORT

A 69-year-old male patient visited the Department of Prosthodontics at Saraswati Dental College with a chief complaint of missing and loose teeth. On examination, the maxillary arch had only

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three anterior teeth with grade III mobility [Figure 1]. The mandibular arch was completely edentulous. The patient wanted to retain the tooth till his prosthesis was fabricated. The treatment plan was discussed with the patient. Depending on the clinical situation and need of the patient, maxillary immediate denture and mandibular conventional denture were planned.

The mandibular denture was constructed in a customary way. Irreversible hydrocolloid (Zelgan, Dentsply, India) was used to make a primary impression of the maxillary arch. The primary cast was poured, and a custom tray was fabricated. This was followed by a dual tray or pick-up definitive impression. Occlusal rims were fabricated over the denture base. To record the plane of orientation, an acrylic fox plane was prepared. A metal Fox plate was duplicated using heavy body putty material (Aquasil, DENTSPLY/Caulk, Germany). The putty index was then filled with self-cure acrylic resin (DPI-RR Cold Cure, DPI Products and Services Limited, Mumbai, India) by placing it over a flat surface. Once the acrylization was over, the acrylic fox plane was removed from the putty index and finished [Figure 2]. The area corresponding to the maxillary teeth was drilled and removed from the acrylic fox plane [Figure 3]. This step made it easy for the Fox plane to get adapted to the maxillary occlusal rim. The maxillary occlusal plane was adjusted according to the Camper's plane and interpupillary line [Figure 4]. The jaw relation was completed by recording the centric relation. Cast modification was done followed by teeth arrangement. The maxillary teeth were extracted along with bone contouring, and a suture was placed [Figure 5]. Denture insertion was done carefully, and post-insertion instructions were given to the patient [Figure 6].

DISCUSSION

One major step required in the arrangement of the teeth and, finally, the fabrication of a complete denture lies in the determination of the maxillomandibular relationship. This could be accomplished by contouring the maxillary occlusal rim to accomplish an occlusal plane that lies parallel with facial aides, Camper's lines, and interpupillary lines. An occlusal plane indicator, for example, a Fox plane guide could be utilized to accomplish this goal.^[2] However, assessment of the inclination of the plane preceding the planned extraction of residual dentition during the construction of an interim immediate complete denture is a challenging task. The most difficult process is the placement of a fox plane to orient the maxillary plane. The presence of fewer anterior teeth or supraerupted teeth interferes with the ideal placement of the Fox plane. A considerable amount of research has been done related to the occlusal plane and occlusal plane indicators or about the intraoral and extraoral indicators of occlusion, but till now, not a solitary article has been published regarding the difficulties in the orientation of the Fox plane in immediate denture construction and



Figure 1: Pre-operative photograph.



Figure 2: Customized occlusal plane device made from heat cure acrylic resin.



Figure 3: Customized occlusal plane device in position.

solution to these problems. This case report describes a straightforward, prudent, simple, and altered technique for



Figure 4: Assessment of parallelism of occlusal plane to camper's plane.



Figure 5: Extraction of remaining dentition.



Figure 6: Post-operative photograph.

the assessment of the maxillary occlusal plane in immediate denture construction. The methodology portrayed in this article is non-invasive, brisk, and simple to perform and gives results immediately. The device is simple, easy

to construct, sterilizable, and customizable according to individuals need.

Clinical significance

A major advantage of this device is that it can always be customized according to individual needs. Based on the location of present teeth, new spaces can be created, and the previous space can be closed with the help of self-cure acrylic.

CONCLUSION

A customized Fox plane is a simple tool that assesses the parallelism of the Camper's plane and interpupillary plane with the inclination of the occlusal plane. It is a simple modification of the conventional fox plane to provide space for accommodating the remaining dentition. This helps in the accurate assessment of the plane of occlusion before the replacement of teeth, thereby reducing the chances of human error. The device is simple, easy to construct, sterilizable, and customizable according to individuals need.

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