Case Report

Customized Template for Occlusal Correction in Full Mouth Rehabilitation: A Case Report

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Reestablishing the occlusal plane involves multidisciplinary approach with extensive restorative procedure to accomplish “equilibration.” Broadrick occlusal plane analyzer (BOPA) provides an easy and practical method to commensurate for curve of Spee and establishing the occlusal plane. Transferring the new occlusal plane from the diagnostic model to patients mouth needs to be precise. To achieve controlled conservative reduction, customized acrylic template was a vital tool used in this case to transfer the exact plane correction achieved by the BOPA.

Keywords: Acrylic stent, Broadrick flag, curve of Spee, occlusal plane

INTRODUCTION

In prosthetic rehabilitation, treatment planning plays a vital role in diagnosing and sequencing multiple fixed restorations in conjunction with the removal of prosthesis. In most cases, natural curvature of the occlusal plane plays an eminent role in achieving the desired aesthetics.[1] Flat occlusal plane can cause compromised aesthetics and can create stressful crown–root ratios, deteriorating forces on temporomandibular joint.[2] The determination of a functional and aesthetic occlusal plane was the key in determining the success of a restorative procedure. In a complete rehabilitation of multiple missing or malaligned posterior teeth, it was important that the teeth are positioned in the most ideal place to restore form and function. In this article, a simple customized acrylic template prepared using a Broadrick occlusal plane analyzer (BOPA) mounted on a Hanau Wide-Vue articulator aids as a tool to determine the occlusal plane.

CASE REPORT

A 36-year-old woman reported with the chief complaint of multiple missing teeth. On intraoral examination, partially edentulous mandible in relation to 36, 45, 46, and 47. Ceramic crowns in relation to 22, 23, and 24. Reduced interarch space due to supra eruption of 15, 16, 17, 26 in posterior maxilla on both the sides [Figures 1 and 2]. Radiographic examination revealed endodontically treated teeth in relation to 15, 16, 17, 22, 24, 26, and 38.

PROCEDURE

The treatment was carried out in the following two steps:

Phase I: pre-prosthetic phase

Endodontic treatment was performed in 12. Gingival zenith was recounted in 17, 16, 15, and 26 to compensate for the supra eruption of the maxillary
arch to achieve aesthetics. Owing to reduced inter-arch space, alveoplasty was carried out in relation to missing teeth in 45, 46, and 47.

**Phase II: prosthetic phase**

Face bow transfer was performed, and the casts were mounted after recording centric relation on a Hanau Wide-Vue articulator aid [Figures 3 and 4]. A custom-made BOPA flag was fabricated and fastened with screws on the top of semi-adjustable articulator. Graph paper was pasted in the flag on both the sides. The anterior survey point was chosen at the midpoint of the distoincisal edge of the mandibular canine from which a long arc with a 4-inch radius was drawn on the flag with a compass. The retromolar pad/
midpoint of the condylar guidance in the articulator was used as posterior survey point on the right side and the distobuccal cusp of the lower last molar on the left side. With this point, a short arc was drawn on the flag to intersect the long arc [Figure 5]. The point of the compass was placed at the intersection of anteroposterior curve on the flag, and a 4-inch radius was drawn through buccal surfaces of mandibular arch, passing through supra erupted tooth (15, 16, 17, and 26). Mock preparation was carried out on the diagnostic model (15, 16, 17, and 26) to establish the occlusal

Figure 6: Customized acrylic stent

Figure 7: Customized acrylic stent positioned in patient mouth

Figure 8: Temporary crown cemented, after occlusal plane correction

Figure 9: Corrected occlusal plane

Figure 10: Final restoration of maxillary arch

Figure 11: Final restoration in mandibular arch
plane; a template was prepared using autopolymerizing resin to be used as an index to transfer to the patient [Figure 6]. The acrylic index was oriented clinically in the left and right side, after which occlusal reduction was done to the level of the acrylic template [Figure 7]. Tooth preparation was completed and temporary crowns were cemented in the determined occlusal plane [Figures 8 and 9]. Cast partial denture was fabricated in the lower arch, permanent crowns were cemented in relation to 15, 16, 17, and 26 [Figures 10 and 11].

**DISCUSSION**

The BOPA has been adapted to only a few articulator systems such as Hanau and Denar. For those manufacturers of semi-adjustable articulators who do not offer such occlusal plane analyzer for use with their instruments, a custom-made BOPA may be fabricated. Other options are clinical evaluation and examination by Cooks method, Camper’s line and retromolar pad relationship, cephalometric analysis, and mounted diagnostic cast.[3]

Other treatment options for this case could be removable partial dentures in mandibular arch for missing teeth and correction of supra erupted teeth. But as the patient was young, she was not willing for removable prosthesis. Second option was replacement with implants as it was invasive, and the patient was not willing for expensive procedure. Third option was cast partial denture in mandible. A relatively small divergence was observed between the arcs of 3.75, 4, and 5 inch radii over the functional occlusal surfaces on the lower posterior teeth. The radius of sphere in the curve of Spee was suggested to be at 3.75 inches in skeletal Class II relationship, whereby a 5-inch radius was more appropriate in a skeletal Class III relationship. A 4-inch radius was considered normal and most often used in the majority of cases, especially in Class I relationships.[4,5]

**CONCLUSION**

Determination of occlusal plane is the key to successful prosthetic rehabilitation. BOPA aids in determining initial mandibular occlusal plane in diagnostic casts, and it acts as a guide for the actual tooth preparations. Broadrick occlusal plane analyser helps in restoring form, function, and esthetics. This simple custom-made occlusal plane analyzer enables the clinician to determine the occlusal plane with ease in a semi-adjustable articulator.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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