

# Occlusal Plane Determination With Broadrick Occlusal Plane Analyzer

**Dr. Sunil Dogra**  
PG student

**Dr. Maya Dalaya**  
Professor

**Dr. Mahesh Ghadage**  
PG Student

**Dr. Geeta Hatte**  
PG Student

**Dr. Nikita BK**  
PG Student  
Department of Prosthodontics  
Bharati Vidyapeeth Dental College & Hospital  
Navi Mumbai

## Abstract

Establishment of a proper plane of occlusion is one of the most misunderstood aspects of restorative dentistry, but in simplest of terms an occlusal plane is acceptable if it permits the anterior guidance to do its job. An occlusal examination is not complete unless it includes an analysis of the occlusal plane. That is a basic goal in any posterior occlusal treatment. A correct plane of occlusion allows protrusion without posterior interference. There are three practical methods for establishing an acceptable plane of occlusion in which the use of Pankey Mann Schuyler method of occlusal plane analysis is used. This case report will highlight the technique of determination of occlusal plane by using Broadrick occlusal plane analyzer (BOPA).

**Key Words:** Broadrick Occlusal Plane Analyzer, Plane of Occlusion, Semi adjustable Articulator, Pankey Mann Schuyler method.

## Introduction

When posterior teeth or tooth is lost and the patient is allowed to go without a replacement, it is almost inevitable that undesirable changes will take place in the plane of occlusion. Teeth posterior to edentulous area have a tendency to lean into the space while unopposed teeth in the opposite arch supraerupt until they meet opposition which results in a collapsed arch that prohibits protrusive or lateral excursion because of the interference from the tilted or elongated teeth<sup>[1]</sup>. The term "Plane" is better explained in the glossary of prosthodontic terms<sup>[2]</sup>. It defines the occlusal plane as 'the average plane established by the incisal or occlusal surfaces of the teeth'<sup>[2]</sup>. The occlusal plane has its own benefits both anteriorly and posteriorly. It helps in mastication posteriorly and anteriorly it helps in phonetics and aesthetics<sup>[2]</sup>. There are two curves that determine the plane of occlusion in posterior. The curve of spee which is antero-posterior curve and curve of Wilson which is medio-lateral curve. It was based on an anthropological study in 1919, that Monson proposed the antero-posterior curve of the teeth which forms a sphere with the center of the rotation located in the region of the Glabella. The estimated radius of the sphere is said to be 4 inches<sup>[3]</sup>. There are three ways in which acceptable plane of occlusion can be

achieved. These methods are of direct analysis of the natural teeth which is through selective grinding and indirect analysis which is on the face mounted casts with properly set condylar paths. There is also another indirect analysis which is used when the restoration and rehabilitation of most or all posterior teeth is needed<sup>[4]</sup>. This method is known as PankeyMann Schuyler (PMS) method with Broadrick Occlusal Plane Analyzer or Broadrick Flag. The Broadrick occlusal plane analyzer (BOPA) has only been adapted to a few articulators as it is an expensive instrument which limits its use universally<sup>[5,6]</sup>. This article will demonstrate the determination of occlusal plane by using Broadrick flag on semi adjustable articulator.

## Case Report

A 31-year-old male patient reported to the Department of Prosthodontics, Bharati Vidyapeeth Dental College and Hospital, Navi Mumbai with a history of missing teeth for 5 years and wanted to rehabilitate. On oral examination, the adjacent tooth was mesially tilted in the missing space and opposite teeth were supraerupted (FIG. 1). Visual examination confirmed that the occlusal plane on the right was deranged. After complete examination, it was found that patient requires fixed restorations in both right upper and lower arches. Diagnostic casts were mounted in semi adjustable articulator (Hanau wide

view articulator).The maxillary cast was removed from the articulator and the custom-made flag was attached on top of the upper member of the articulator. The anterior survey point (ASP) was chosen on the midpoint of the disto-incisal edge of the mandibular right canine, from which a long arc of 4-inch radius was drawn on the flag with a compass. The posterior survey point (PSP) was located on the anterior border of condylar element on articulator, and a short arc was drawn from the posterior survey point on the flag to intersect the long arc of anterior survey point. The needle of the compass was placed on the point of intersection of both the arc and a 4-inch radius line was drawn on the buccal surfaces of right mandibular and maxillary teeth (FIG. 2). Crown preparations were done first on the diagnostic casts and diagnostic wax up was made on the prepared crowns on the diagnostic casts according to the plane of occlusion traced by the Broadrick plane analyzer (FIG.3). Putty index was fabricated from the diagnostic wax up for temporary restorations to restore the teeth after crown preparation in patient's mouth and to check the plane of occlusion (FIG. 4). Final restorations were cemented at the determined plane of occlusion on Broadrick flag in patient's mouth (FIG. 5).

## Discussion

In 1963, Dr.Lawson Broadrick developed



an instrument to provide a guide to the most suitable position and orientation of posterior occlusal scheme where the natural curve of spee has been deranged. This instrument is commercially marketed as “Broadrick occlusal plane analyzer” often referred as the “Broadrick flag”. Its purpose is to permit reconstruction of the curve of spee in harmony with anterior and condylar guidance<sup>[7]</sup>.

Esthetics and function place a considerable demand on the design of the occlusal plane. Compromise can be achieved by the length of the radius of the curve. In patients with retrognathic mandible, a standard 4-inch curve would result in a flat posterior curve, causing posterior protrusive interferences. Such 'low' mandibular posteriors would also lead to extrusion of the opposing maxillary teeth. If the maxillary posterior teeth were to be restored to this low occlusal plane, the crown-to-root ratio would be less than ideal. Hence a 3.75-inch radius is more appropriate when a class II skeletal relationship exists. Conversely, 4-inch curve would create a steep posterior curve in patients with class III skeletal relationship, leading to further posterior interference. A 5-inch radius would be more suitable in this situation<sup>[8]</sup>.

**Conclusion**

The custom made occlusal plane analyzer is a valuable tool in Prosthodontic and Restorative dentistry that locates the center of the curve of Spee. Extensive restorations designed with this tool permit mandibular excursions free from posterior interferences. Proper planning is required, but the predictability of a successful result can be enhanced by the use of a diagnostic wax-up, the transfer of records with an acrylic template, and the duplication of provisional restorations from the wax up. With use of custom made occlusal plane analyzer, the Prosthodontist can predictably produce high-quality restorations in harmony with the incisal and condylar guidance and avoid possibly harmful sequelae to the patient.

**References**

1. Dawson PE. Evaluation Diagnosis and Treatment of Occlusal Problems. St Louis. Mosby: 1999. p. 374-81.
2. S.V. Bedia, S.P. Dange and A.N. Khalikar, Determination of the occlusal plane using a custom-made occlusal plane analyzer: A clinical report, Journal of Prosthetic Dentistry, 98(5), 2007, 348-352.
3. R. Gupta, Occlusal Plane Analyzer: A customized Device for Determining the Occlusal plane, International Journal of Prosthodontics and Restorative Dentistry, 1(2), 2011, 97-100.
4. S. Manvi, S. Miglani, C.L. Rajeswari, G. Srivatsa and S. Arora, Occlusal Plane Determination using Custom Made Broadrick Occlusal Plane Analyzer: A case control study, International Scholarly Research Network Dentistry, 2012, 373870.
5. S. Chaturvedi, A.K. Verma, M. Ali, and M. Shah, Full Mouth Rehabilitation using a custom-made Broadrick flag: A case report, International Journal of Case reports and

images, 3(5), 2012, 41-44.

6. Small B.W. Occlusal Plane Analysis Using the Broadrick Flag. General Dentistry. 2005. 53; 250-2.
7. Bowley J.F, Stockstill J.W., and Attansio R. A Preliminary Diagnostic and Treatment Protocol. Dental Clinics of North America. 1992. 36; 551-568.
8. Lynch C.D and McConnell R.J. Prosthodontic Management of the Curve of Spee: Use of the Broadrick Flag. Journal of Prosthetic Dentistry. 2002. 87; 593-7.



Fig. 5



Fig. 1

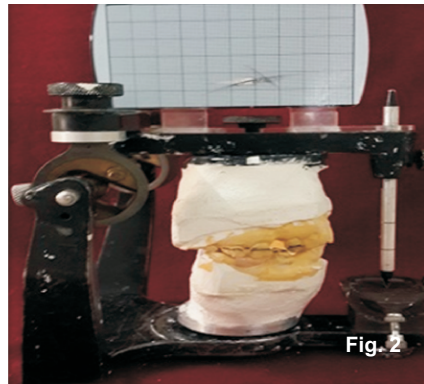


Fig. 2



Fig. 3



Fig. 4

