

Egyptian Prosthodontic Association (EPA Newsletter)

Vertical tooth preparation as a new era of conservative tooth preparation part (2)



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One of the major clinical problems of fixed prosthesis around natural teeth is the undesirable results due to the apical migration of the gingiva. With the use of biologically oriented preparation technique (BOBT), clinicians and laboratory technicians can interconnect with adjoining tissues by altering the shape and scalloped structure of surrounding tissues without having to consider any pre-existing tooth or gum restrictions⁽¹⁾. It is known that gingival recession is related to different factors such as insufficient quantity and quality of keratinized gingiva i.e. gingiva with thin biotypes are more prone to gingival recession and the response to trauma while doing restoration work (tooth preparation, soft tissue isolation). Chronic inflammation caused by prosthetic errors i.e. open margins, violation of biological width, and excessive horizontal contour⁽²⁾. **Clinical and Laboratory Steps of vertical tooth preparation**

Armamentarium Variety of diamond burs permits the execution of all the steps concerned within the preparation of teeth, from proximal separation of adjoining teeth to preparation of the axial walls, conforming to the vertical preparation technique. Diamond burs with various shapes (flame drill, tapered drill and football drill (Figure 1) The various grits permit phased polishing of the tooth to achieve a favorable surface finish⁽³⁾.

2- Tooth Preparation Steps to be followed According to BOPT⁽⁴⁾ (Figures 2&3):

1. Proximal preparation
2. Incisal preparation
3. labial inclined reduction of incisal edge
4. Supragingival axial (labial/palatal) reduction
5. Intra-sulcular reduction
6. Finishing of the tooth preparation
7. Temporization
8. Fabrication of definitive prosthesis in lab.

1-PROXIMAL PREPARATION

Carried out with thin fine drill. The final separation should be slightly over tapered in terms of total occlusal convergence for iatrogenic damage to the adjacent teeth is less likely, and the slight initial over taper result in a voidness of undercuts.

2-Perform the **INCISAL PREPARATION** of 2 mm with coarse grit flame drill. 3- **45° LABILA INCLINED REDUCTION** from the incisal edge with the drill.



Fig.1: Grit size and color coding of various shapes of Diamond burs.⁽⁴⁾



Fig.2: Clinical steps for Anterior tooth preparation according to BOPT.⁽⁴⁾

4-SUBGINGIVAL AXIAL REDUCTION

Of labial and palatal surfaces with the coarse grit drill is carried out. The preparation is done in such a manner so as to avoid touching the gingival margin.

5- INTRASULCULAR PREPARATION:

The drills are designed in a manner so that they do not leave any indentations or rough surfaces and permit the fine adaptation of the gingival.

6- PALATAL/IINGUAL PREPARATION

The bur is then kept mesiodistally and palatally in the same way until axial reduction is finished.

7- Tooth preparation is finished with fine grit drills. The cervical area where the crown margins are to be placed should be highly polished.

Temporization Temporary crown relining is executed primarily based on a diagnostic wax-up of an acrylic crown with a contour that is in accordance with the marginal gingiva. After assessing the fit of the crown, it is adjusted with auto-polymerizing resin and relined properly. As soon as the material sets, the crown indicates two prominent edges: an inner one, which represents the intrasulcular part of the abutment and the thicker outer one illustrates the gingival margin. The area between these 2 margins is the negative replica of the gingiva. The extra material is eliminated, which connects the crown margin with the marginal gingiva. With this an angular element could be shaped together with a CEJ that will be located within 0.5 to 1 mm in the gingival sulcus, thereby maintaining the periodontal health and biologic width. After a precise finishing, the restoration is luted and the unwanted cement is cleaned (figure 4).

Impression Technique and Laboratory Procedure for Fabrication of Definitive Prosthesis

After not less than 24-28 days, the soft tissue position might be established and it will be viable to make the impression for the definitive restoration. To make the method quicker and trouble-free, there should be no finish line. Utilization of retraction cord is advised to have a proper demarcation of the gingival sulcus so that it assists the technician throughout the laboratory procedures. Final wax-up is done on the master cast acquired following the treatment plan and the dentist's instructions. different depths of the gingival pocket, depending on the available biological width.

Prime consideration for the lab protocol is to take up the wax-up of the cervical third prior to initiating the ditching of master cast, such that it acquires the gingival tissues as area of reference. There is a variance between horizontal and vertical tooth preparations. In the horizontal preparations, margin is prepared by the dentist as a rightly placed line on the tooth surface, which is then recorded in the final impression and ultimately transferred to cast. While in vertical preparations, the finish line is determined by the lab technician by taking the cervical margin revealed on the impression as an area of reference.

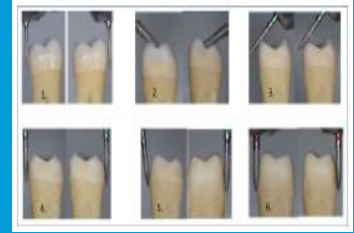


Fig.3: Clinical steps for Posterior tooth preparation according to BOPT.⁽⁴⁾

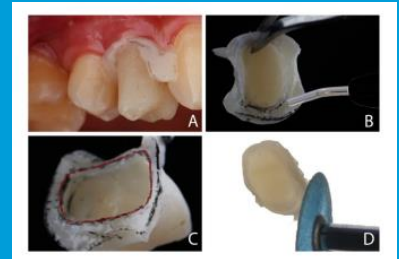


Fig.4: A Relined temporary crown was inserted in patient mouth. B The space between the two margins was filled by flowable composite. C The internal margin was evidenced by red marker. D The excess resin was trimmed by discs and the emergence profile was shaped to support the gingival margin.⁽⁶⁾



Fig.5: Photographs showing removable die after preparation and ditching.⁽⁷⁾



It is always better to have control over the gingival contours before uncovering the prepared region. 0.5 mm pencil of black color is utilized to trace over the gingival profile jutting it on the tooth's axial wall (black line). Then, the gingival element across the abutment is detached, displaying the subgingival region of the prepared tooth replicated on the cast. The apical section of the cast is then highlighted by using a blue pencil it is traced. The part lying between the two edges, i.e. black and blue, is now known as the "finishing area" and the lab expert will denote the "finish line" with a red color pencil (figure 5).

This particular line will be the placement of coronal margin. Apical or coronal placement of this line will rely upon the floor of gingival sulcus and the cosmetic outcome needed. However, the edge of the restoration should never encroach upon the junctional epithelium. The reference line is a red color line that should be considered for the ditching process and for removing the underlying section which is not useful to the technician. The emergence profile is obtained following the gingival tissue contours. The final wax-up is then processed followed by finishing and polishing of the definitive restoration⁽⁵⁾.

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