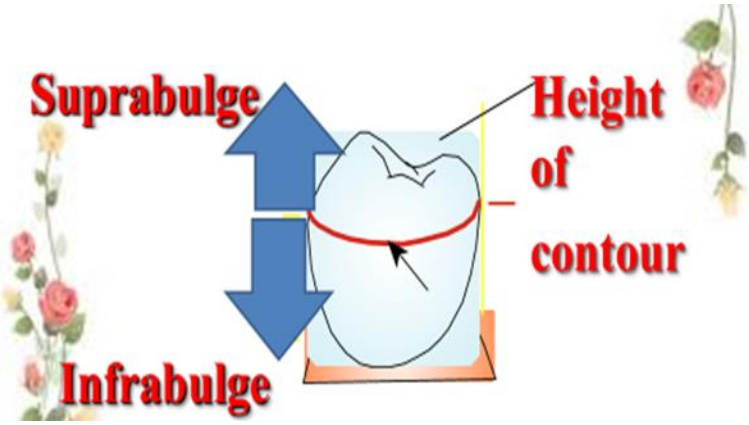
Surveying

Dental Surveyor

a paralleling instrument used in the construction of a dental prosthesis to locate and delineate the contours and relative positions of abutment teeth and associated structures.

To survey :

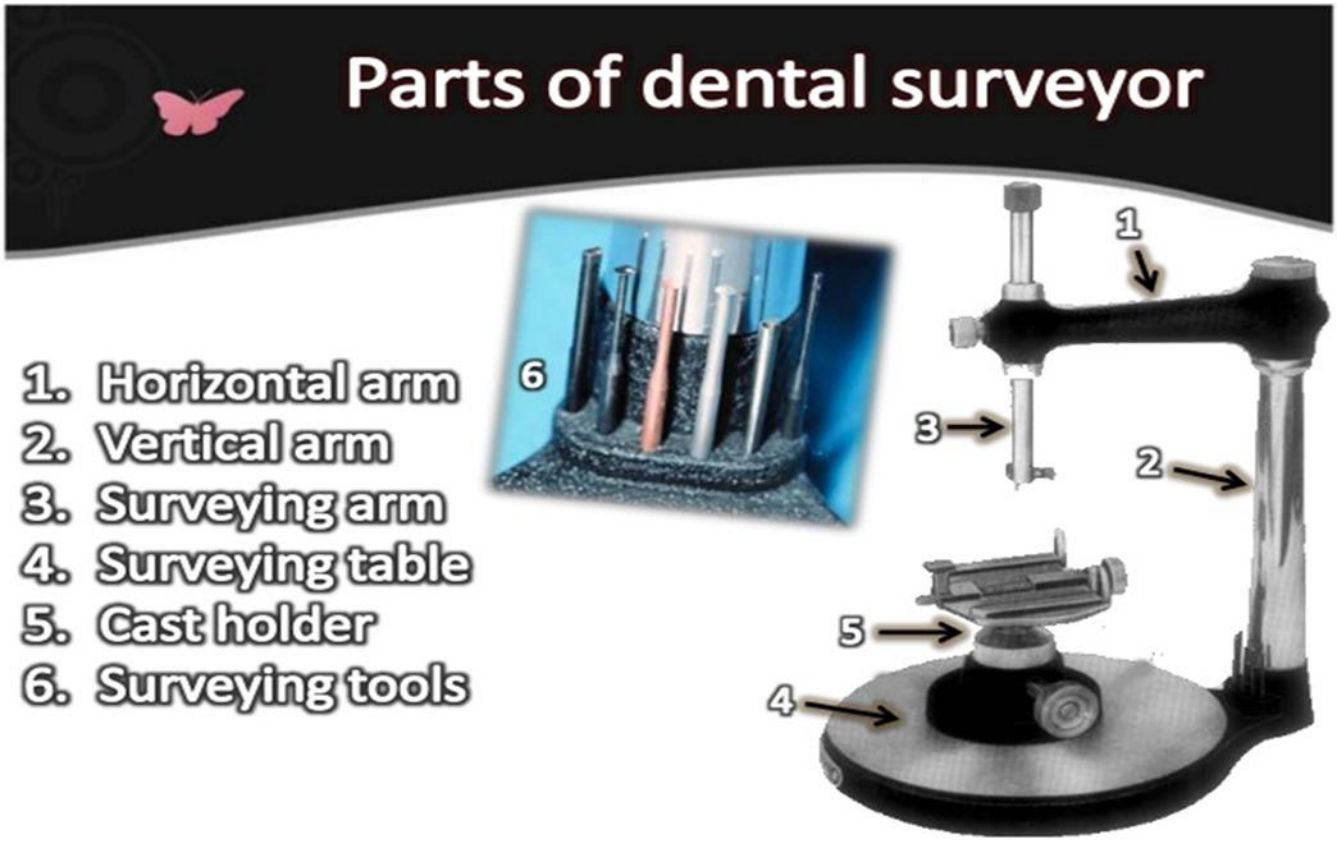
The procedure of locating and delineating the contour and position of the abutment teeth and associated structures before designing a removable partial denture.



Types of undercuts

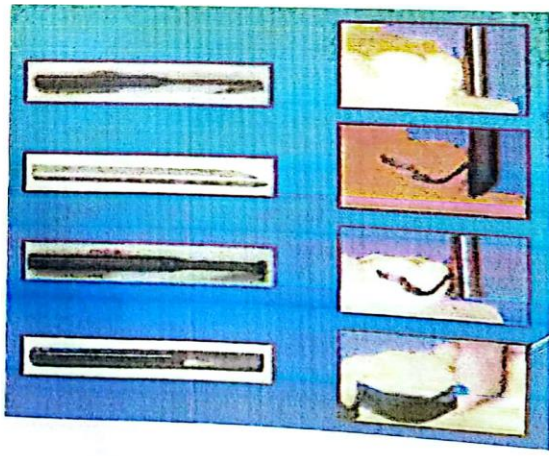
1-**Desirable Undercut**: used for retaining the RPD against the dislodging forces by incorporating a retentive flexible clasp arm, or by the denture bases engaging a tissue or bony undercut.

2-**Undesirable Undercut**: undercuts other than those used for retention are considered undesirable and should be eliminated and blocked.



Surveying tools

1. Analyzing rood
2. Carbon marker
3. Undercut gauge
4. Wax trimmer

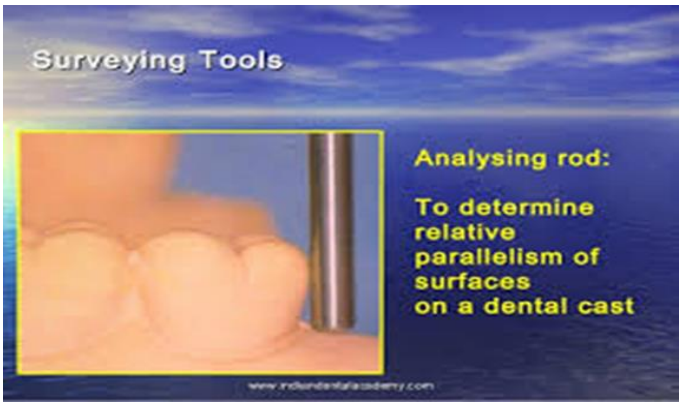


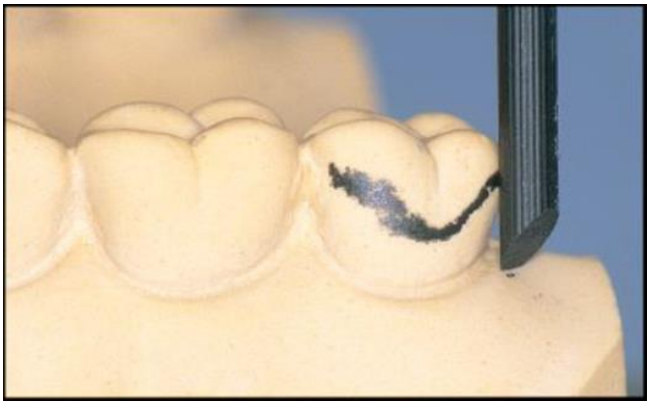
-Whenever possible, the cast should be surveyed with the occlusal plane parallel to the base of the surveyor so that the path of insertion is vertical to the occlusal plane. Most patients will tend to seat the partial denture under the force of occlusion. If the path of insertions is other than vertical to the occlusal plane such seating may deform the clasps.

Principles of surveying

- Surveying a tooth consists of locating accurately the height of its maximum contour to the plane in which the cast is positioned.
- Modifying the proximal tooth surfaces so that the prosthesis goes smooth in place without interferences.
- The fact that majority of the natural teeth crowns are bulbous in shape and have a Supra bulge region ,where this supra bulge region could occur anywhere between the occlusal surface and the gingival margin.

When a vertical arm is brought into contact with the convex surface, it will contact only at one point which is the point of maximum convexity, where this surface is rotated and is still in contact with the vertical arm, an imaginary line will be traced at the greatest circumference, when we substituted this vertical analyzing rod with a carbon marker then an actual line will be produced at the level of the maximum tooth bulge, this line is called the survey line.



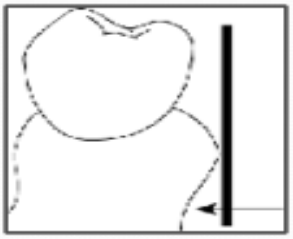


Path of insertion (placement):

The specific direction in which a prosthesis is placed on the abutment teeth or dental Implant.

Factors affecting the path of insertion are:

1- Interferences: certain area of the mouth may interfere with the insertion of the partial dentures. These are usually the proximal tooth undercut , to max. Or mand. , lingually or mesially inclined teeth , bony exesistoses , as well as tissue undercuts.



2-Retentive undercuts:

A retentive undercut must be present on the abutment teeth, both at the horizontal or zero tilt and at the selected path of placement tilt.

3-Esthetics:

The surveyor can be used to study the configuration of anterior edentulous spaces, and to evaluate the cosmetic opportunity and other problems if present or when faced; sometimes tilting the cast is used to

avoid interference that may result from putting a clasp in an unfavorable position for esthetics.

4-Guiding planes:

These are areas present on the enamel surface of the teeth that are created so that they are almost or approximately parallel to the path of insertion.

High of contour: circle line in the tooth at greatest circumstances at the selective position.

Undercut area: The portion in the tooth according to location, on the lingual side between the height of the contour and the gingival margin, while on the labial side at the incisal edge.

survey lines: lines which drawn on the cast by the surveyor make the greatest prominence of restoration, this line is drawn on the height of the contour of the tooth.

Objectives of surveying

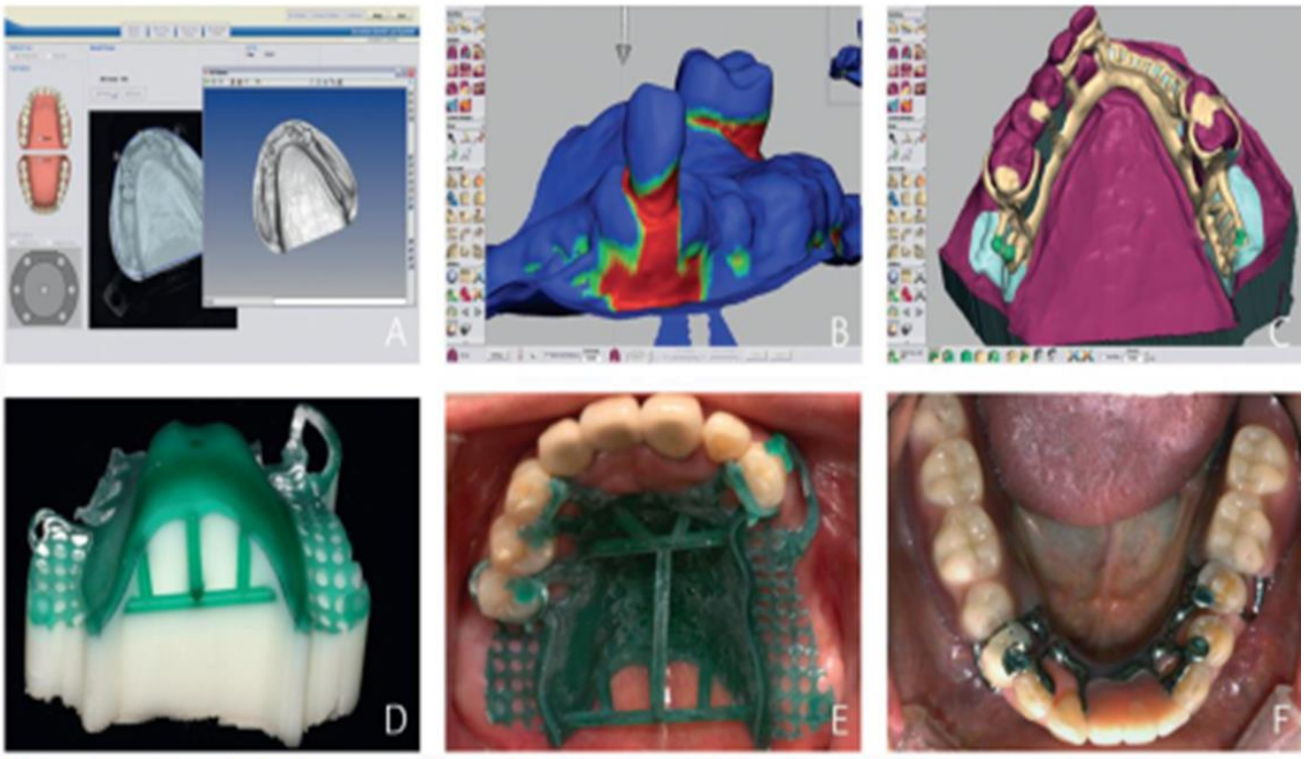
1. To identify the modifications of oral structures that are necessary to fabricate the RPD that will have a successful prognosis. (modification of tooth surfaces)
2. To accommodate placement of parts of PD in their designated ideal position on the abutment tooth.
3. To develop the design and construction of PD.
4. To parallel internal rest and intra-coronal retainers.
5. To make guiding plane surfaces of abutment restorations parallel.
6. To recontour the abutment teeth on the diagnostic cast.
7. To contouring wax pattern.
8. To measure a specific depth of undercut.

Aims of surveying

1. To design an RPD such that its rigid–flexible components are appropriately positioned to obtain good retention.
2. To determine the path of insertion.
3. To mark the height of the contour of the tooth (survey line).
4. To mark the undesirable undercut into which the prosthesis should not extend.

Computer aided designing and manufacturing (CAD - CAM) of removable partial dentures: **Digital surveying:**

The framework of the RPD was designed by setting a surveying axis and computing the undercut to determine an ideal path of insertion and removal (B).



Procedure for digital removable partial denture fabrication. A, Model scanning. B, Electronic surveying. C, Definitive framework design. D, Pattern built with 3-dimensional printer. E. Intraoral view of pattern resin framework. F. Definitive prosthesis.

Thank you