

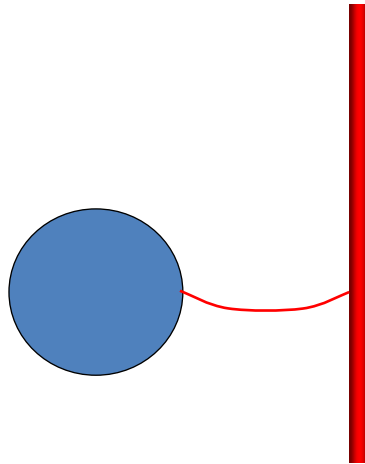
SURVEYING OF REMOVABLE PARITAL DENTURES

Feb, 11, 2015

Dental *Surveyor*:

It is a mechanical device used to determine the relative parallelism of the teeth surfaces and the undercuts areas in relation to the common path of insertion and removal of the denture.

Principles of dental surveyor



- The surveyor was first introduced to the dental profession in 1918 by Dr A.J.Fortunati. Followed by Ney surveyor in 1923, Jelenko and *Williams*.
- Ideally the clinician, rather than the dental technician, surveys the study cast in preparation for designing an RPD.
- Both acrylic and Metallic Removable Partial Dentures. Before designing the primary casts should be surveyed.

Different types of parallelometer



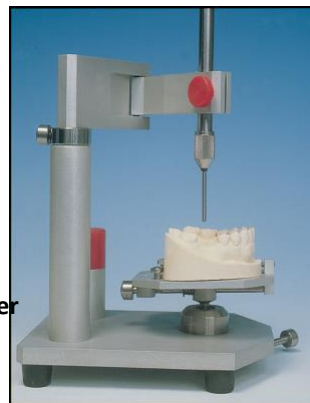
Components of Dental Surveyor

1. Base
2. Vertical arm
3. Analysing rod
4. Horizontal arm
5. Mandrel
6. Adjustable table

Accessories

Analyzing rod

- Carbon or graphite marker
- Wax trimmer
- Undercut gauges
 - ✓ 0.25 mm or 0.01 inch
 - ✓ 0.50 mm or 0.02 inch
 - ✓ 0.75 mm or 0.03 inch

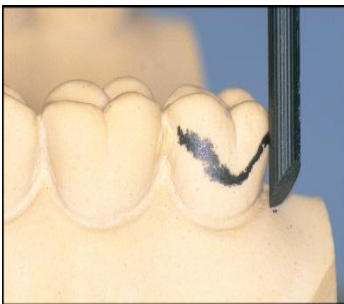


1. Analyzing rod



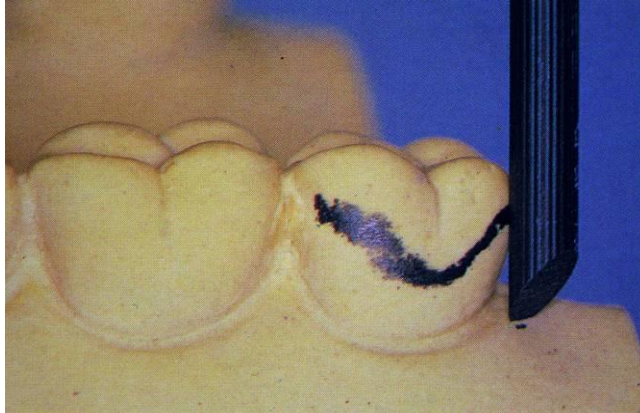
- This metal rod is placed against the teeth and ridges during the initial analysis of the cast to identify undercut areas and to determine the parallelism of surfaces without marking the cast.

2. Graphite marker

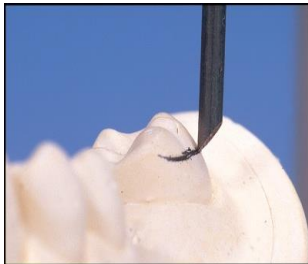


- The graphite marker is moved around the tooth and along the alveolar ridge to identify and mark the position of maximum convexity (survey line) separating non-undercut from undercut areas.
- When surveying a tooth, the tip of the marker should be level with the gingival margin allowing the side of the marker to produce the survey line as shown in the illustration.

Survey line: Lines drawn around the most bulbous part of the tooth in relation to the common path of insertion and displacement.



Graphite marker



- A false survey line will be produced if the tip of the marker is incorrectly positioned. In this example there is no undercut area on the tooth although an incorrect surveying technique has indicated one. If this false line is used in designing an RPD, errors will arise in the positioning of components, especially clasps.



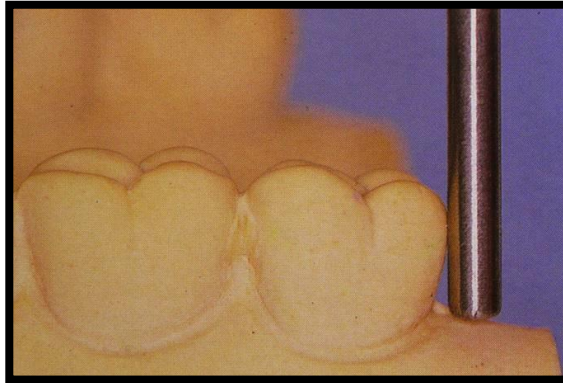
3.Undercut gauge



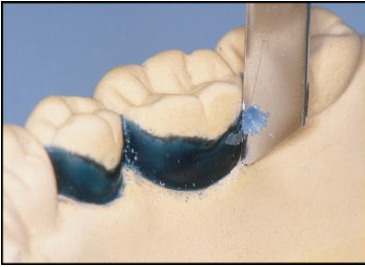
- Gauges are provided to measure the extent of horizontal undercut and are available in the following sizes: 0.25 mm, 0.50 mm and 0.75 mm. By adjusting the vertical position of the gauge until the shank and head contact the cast simultaneously, the point at which a specific extent of horizontal undercut occurs can be identified and marked. This procedure allows correct positioning of retentive clasp arms on the tooth surface .
- Other, more sophisticated, types of undercut gauge are available such as dial gauges and electronic gauges. These attachments fulfil the same function as the simpler type of gauge.

Undercuts: That part of a tooth, which lies between the survey line and the gingival.

1. Hard tissue undercut "teeth".
2. Soft tissue undercut.
3. True and false undercuts.



- This instrument is used to eliminate unwanted undercuts on the master cast. Wax is added to these unwanted undercut areas and then the excess is removed with the trimmer so that the modified surfaces are parallel to the chosen path of insertion.



Surveying:-

The procedure of analyzing and delineating the contours of the abutment teeth (Hard tissues) and associated structures (soft tissues) before designing an RPD.

Type of surveying:

- 1. Initial surveying on the primary or diagnostic cast.**
- 2. Final surveying on the master cast.**

Objective of Surveying

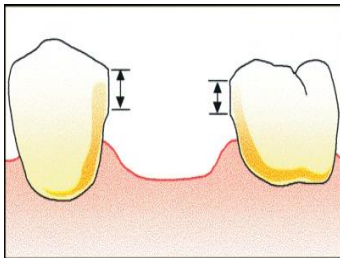
- 1. To mark the most bulbous parts of the teeth, where the terminal or the flexible part of the clasp should engage.**
- 2. To identify undercut areas on the teeth and alveolar ridge relative to any given path of insertion, removal and displacement of the RPD.**
- 3. To help in designing and locating the exact position of the clasp.**
- 4. To block out the unwanted undercuts on the cast before fabricating the duplicating cast.**

Objective of Surveying

- 5. It helps the clinicians to measure the depth of undercuts horizontally and in relation to the survey line, therefore, the dentist will decide which type of metal could be used regarding the clasps.**
- 6. To identify the proximal tooth surfaces that may serve as guiding planes "G.P are proximal tooth surfaces that should parallel to each other to determine the path of insertion, contribute in denture stability and to ensure positive clasp action"..**
- 7. To identify soft tissue undercuts that would act as interference.**

Surveying procedure

- Before discussing the functions of a surveyor in more detail it is necessary to explain the following terms:
 - Guide surfaces.
 - Path of insertion.
 - Path of displacement.



- Two or more parallel axial surfaces on abutment teeth which can be used to limit the path of insertion and improve the stability of a removable prosthesis. Guide surfaces may occur naturally on teeth but more commonly need to be prepared.

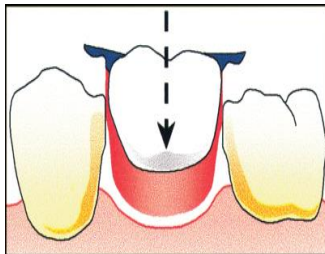
Guide surfaces or guide planes

COMMON Path of insertion

All possible paths along which an RPD can be inserted and removed from the mouth.

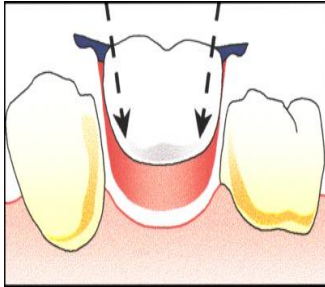
OR

The path followed by the denture from its first contact with the teeth until it is fully seated. This path coincides with the path of withdrawal and may or may not coincide with the path of displacement. There may be a single path or multiple paths of insertion.



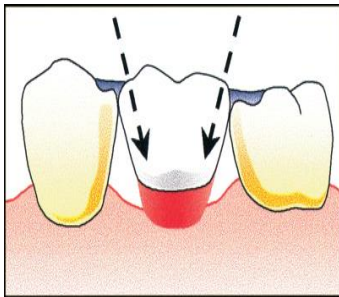
- **A single path of insertion may be created if sufficient guide surfaces are contacted by the denture; it is most likely to exist when bounded edentulous areas are present.**

Single path



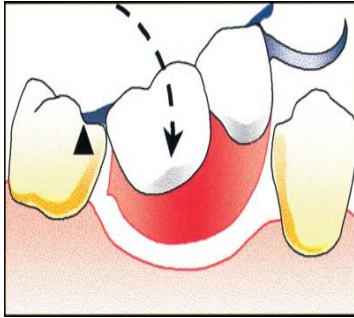
- **Multiple paths of insertion will exist where guide surfaces are not utilized, for example where the abutment teeth are divergent.**

Multiple paths



- **Multiple paths will also exist where point contacts between the saddle of the denture and the abutment teeth are employed in the 'open' design of saddle.**

Multiple paths

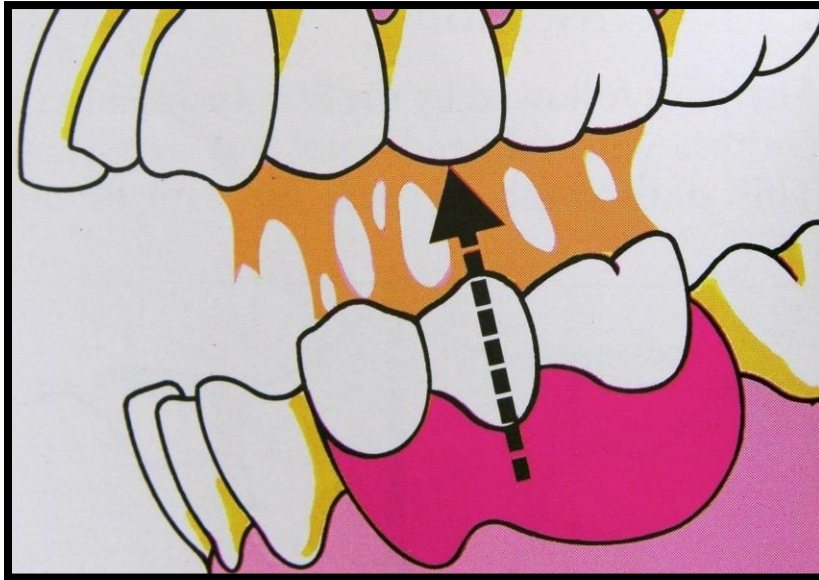


- A rotational path of insertion can be used.

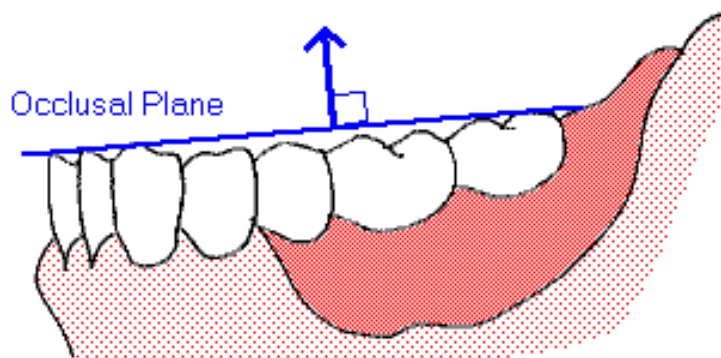
A rotational path of insertion

Common path of Displacement:

The path along where a RPD is most likely to be displaced during function. The path is at right angle (90°) to the occlusal plane.

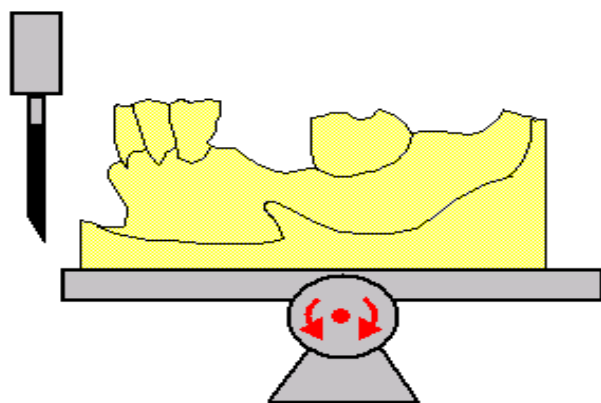
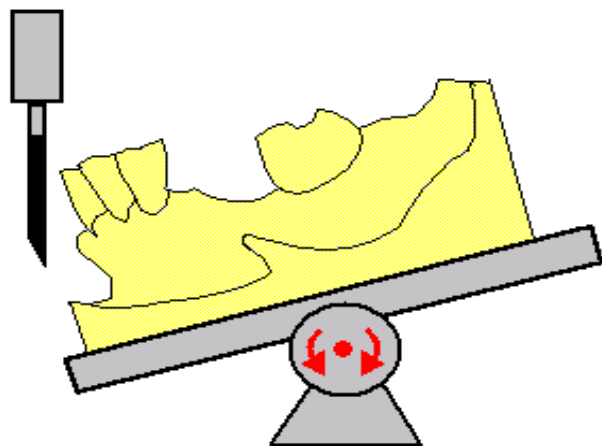


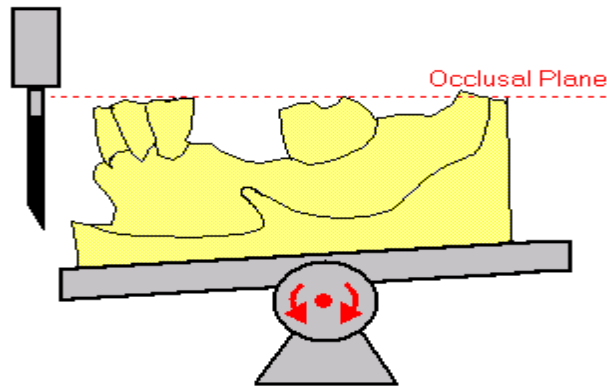
- Displacing forces are directed at nearly 90 angle to the occlusal plane.
- Displacing forces are generated as a direct effect of consumed sticky foodstuff.
- Magnitude of displacing forces vary according to the type of the consumed sticky foodstuff.
- Displacing forces will dislodge the denture if their magnitude becomes greater than the retention force obtained by the various components of the RPD retentive elements.



Surveying The Diagnostic Cast

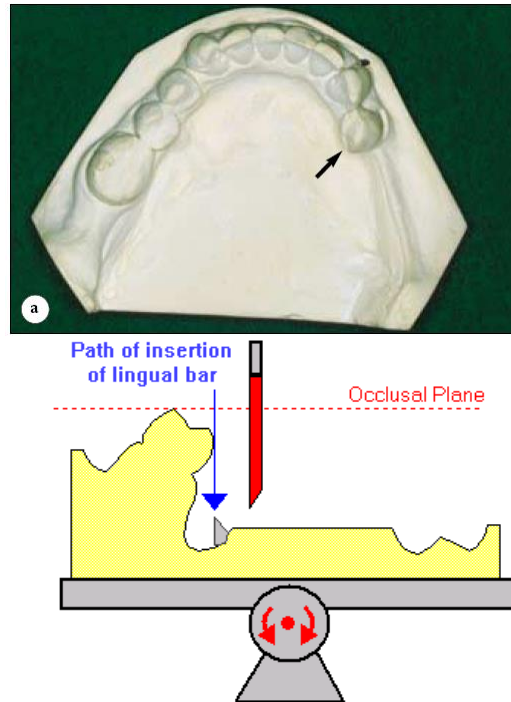
1. Cast should be oriented onto the table of the surveyor at zero tilt.
2. Zero tilt is the tilt of the cast when the occlusal plane assumes parallelism with the horizontal plane.



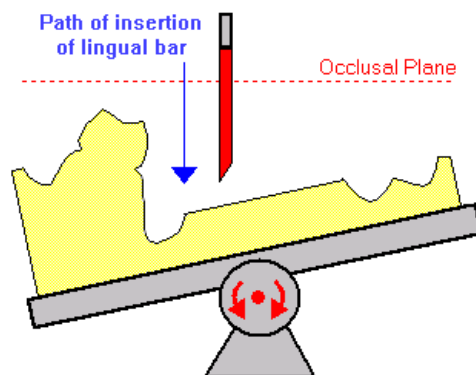


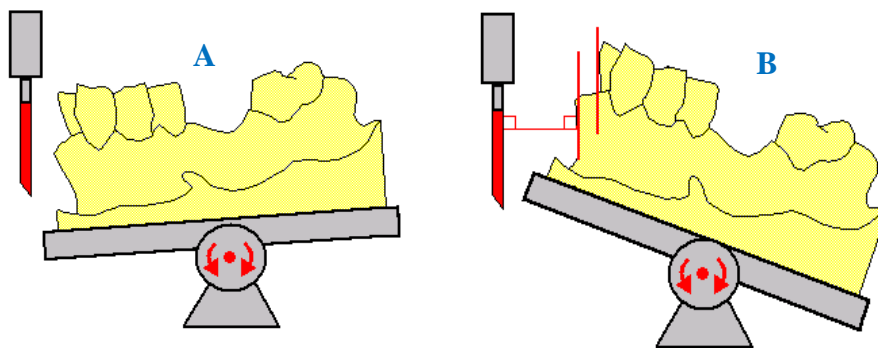
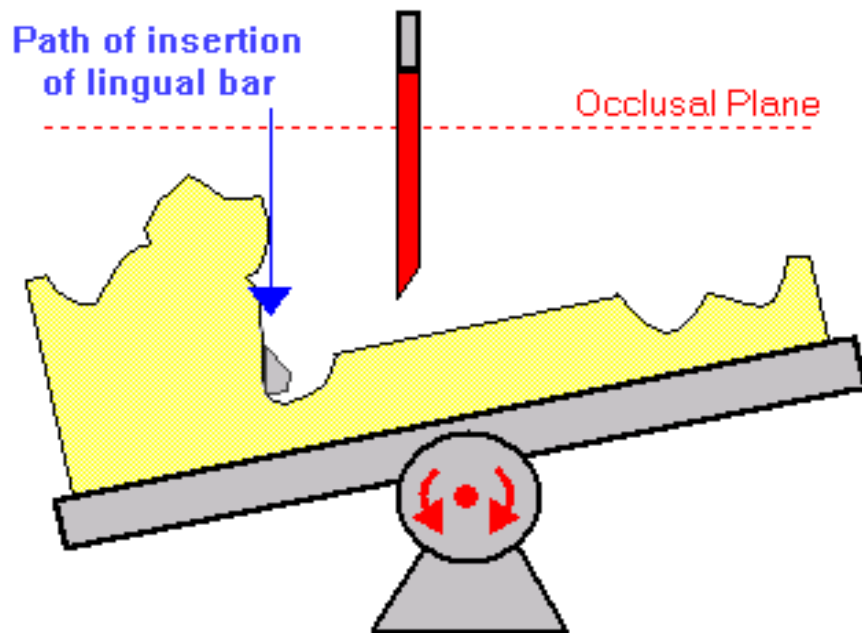
A partial denture can be designed on a cast which has been surveyed with the Occlusal plane horizontal (i.e. so that the path of insertion is = the path of displacement). However, there are occasions when tilting of the cast is indicated so that the paths of insertion and displacement differ. Once the tilt has been indicated, the carbon marker should be changed for an analyzing rod, trying different positioned without marking the teeth.

- In this case lower teeth are tilted lingually, this implies inappropriate placement of the major connector if a vertical path of insertion was chosen.

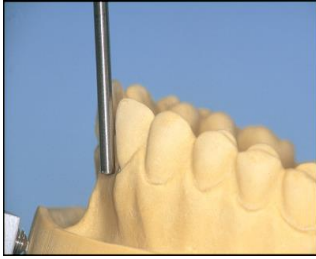


- Tilting the cast laterally, will enable better placement of the major connector.





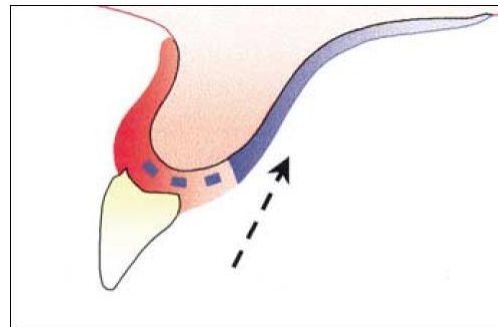
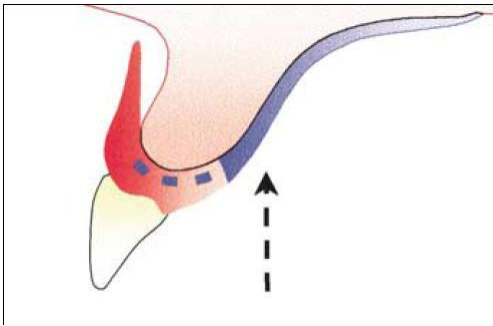
In this case esthetics were of importance in relation to an anterior saddle to fill the space anterior to the canine teeth SUCH AS IN CLASS iv AND CLASS iii WITH ANTERIOR MOD..



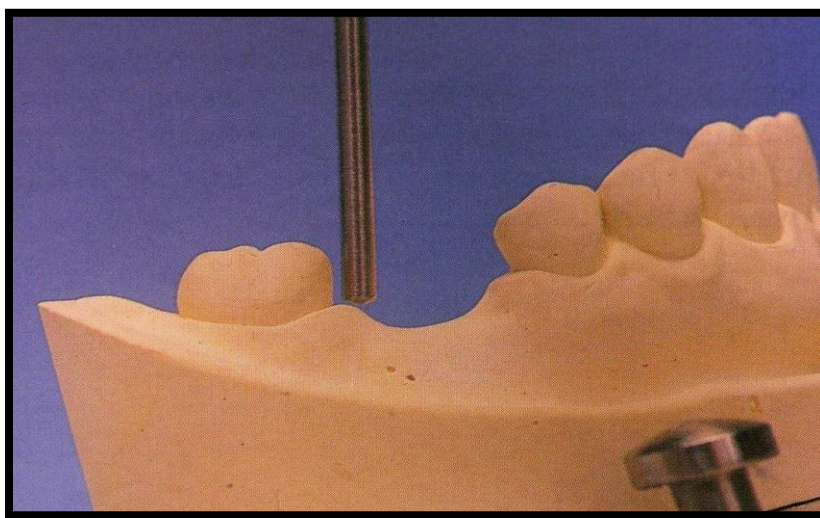
- This unsightly gap can be avoided by giving the cast a posterior (heels down) tilt so that the analysing rod is parallel with the mesiolabial surface of the abutment tooth.

Appearance.

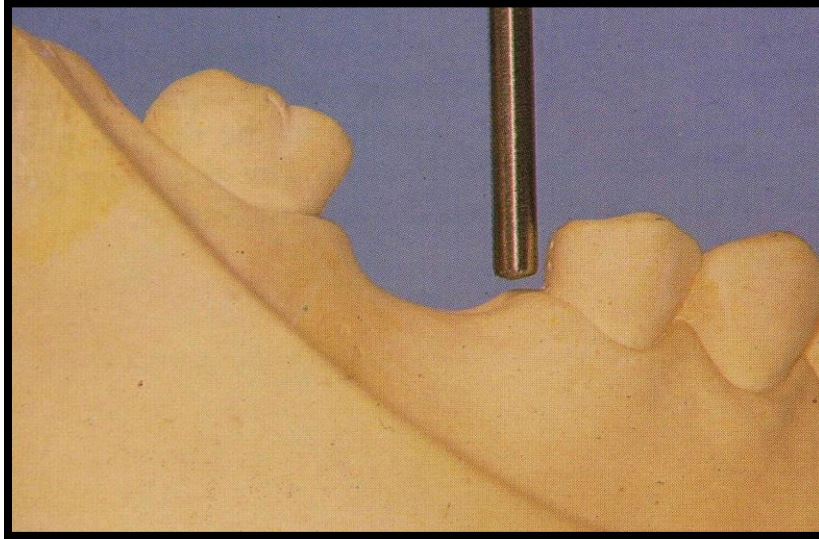




Anterio-posteriorly (Heels Down)



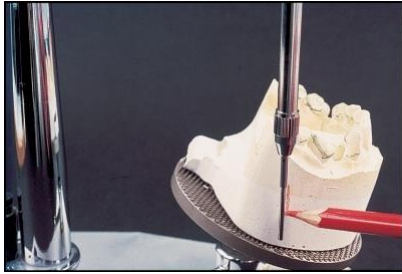
Posterioro-anteriorly (Heels Up)



Recording the Degree of Tilt

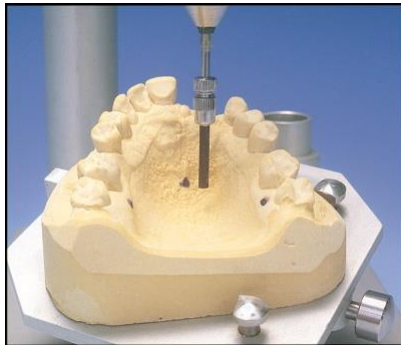
- If the cast has been tilted for the final survey, the degree of tilt must be recorded so that the position of the cast can be reproduced in the laboratory. There are two methods of recording the degree of tilt.
 1. Recording the degree of tilt by marking the cast from three side
 2. Tripod method

The Analyzing Rod Method



- Alternatively, the analysing rod is placed against one side of the base of the cast and a line drawn on the cast parallel to the rod. This is repeated on the other side and at the back of the cast so that there are three widely spaced lines parallel to the path of insertion.

The Tripod Method



- Using the tripod method, the vertical arm of the surveyor is locked at a height that allows the tip of the marker to contact the palatal surface of the ridge in the molar and incisal regions. Three points are marked with the graphite marker, one on each side posteriorly and one anteriorly. The points will then be ringed with a pencil so that they are clearly visible.