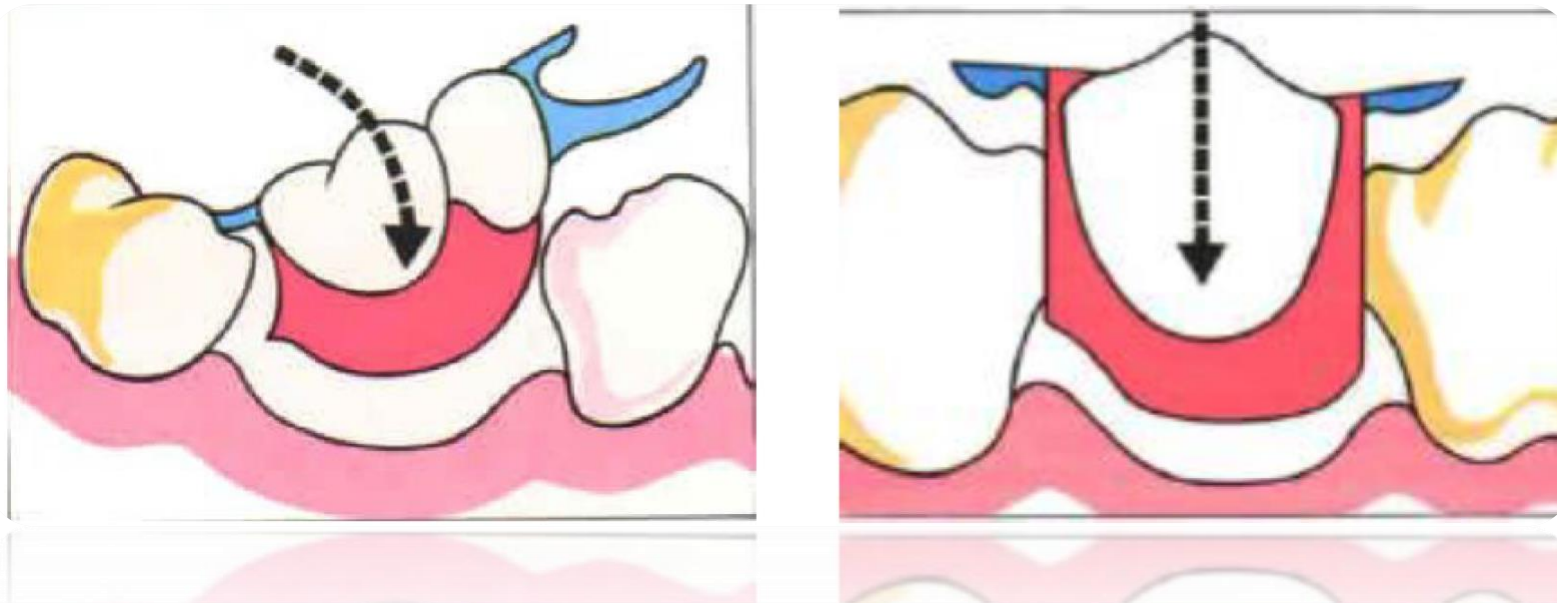


dental cast surveying

Surveying

A path of insertion (or removal) or path of placement:
is the path along which a prosthesis is placed (or removed)
intraorally.



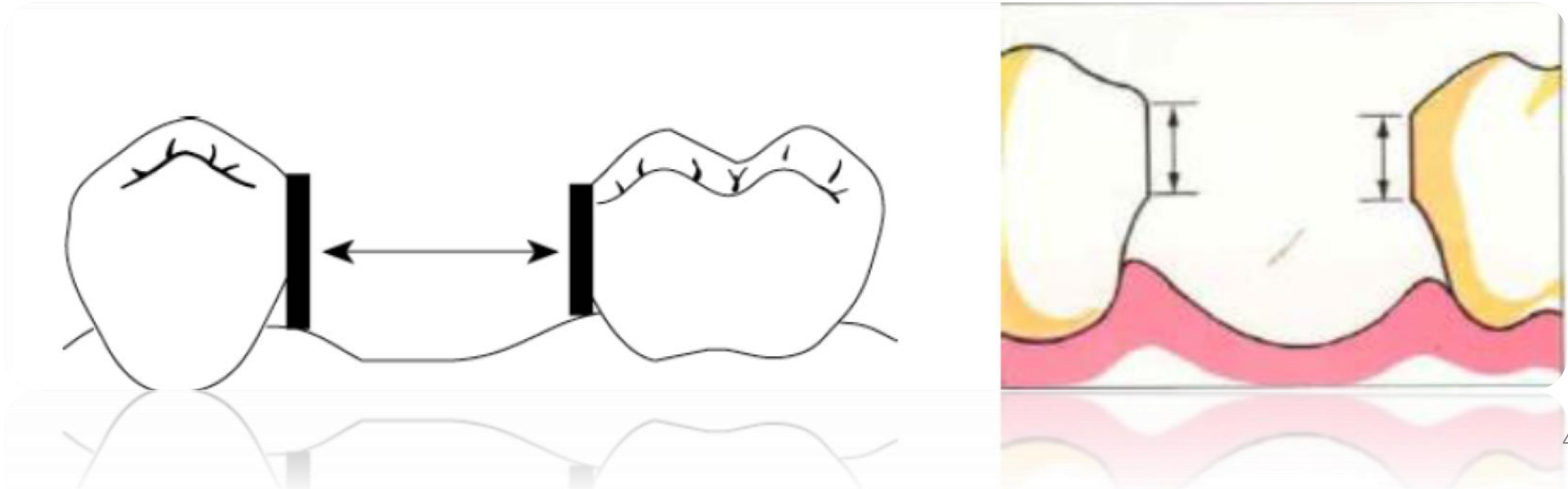
Path of displacement:

is the direction in which the denture tends to be displaced in function i.e., the direction of displacing forces.



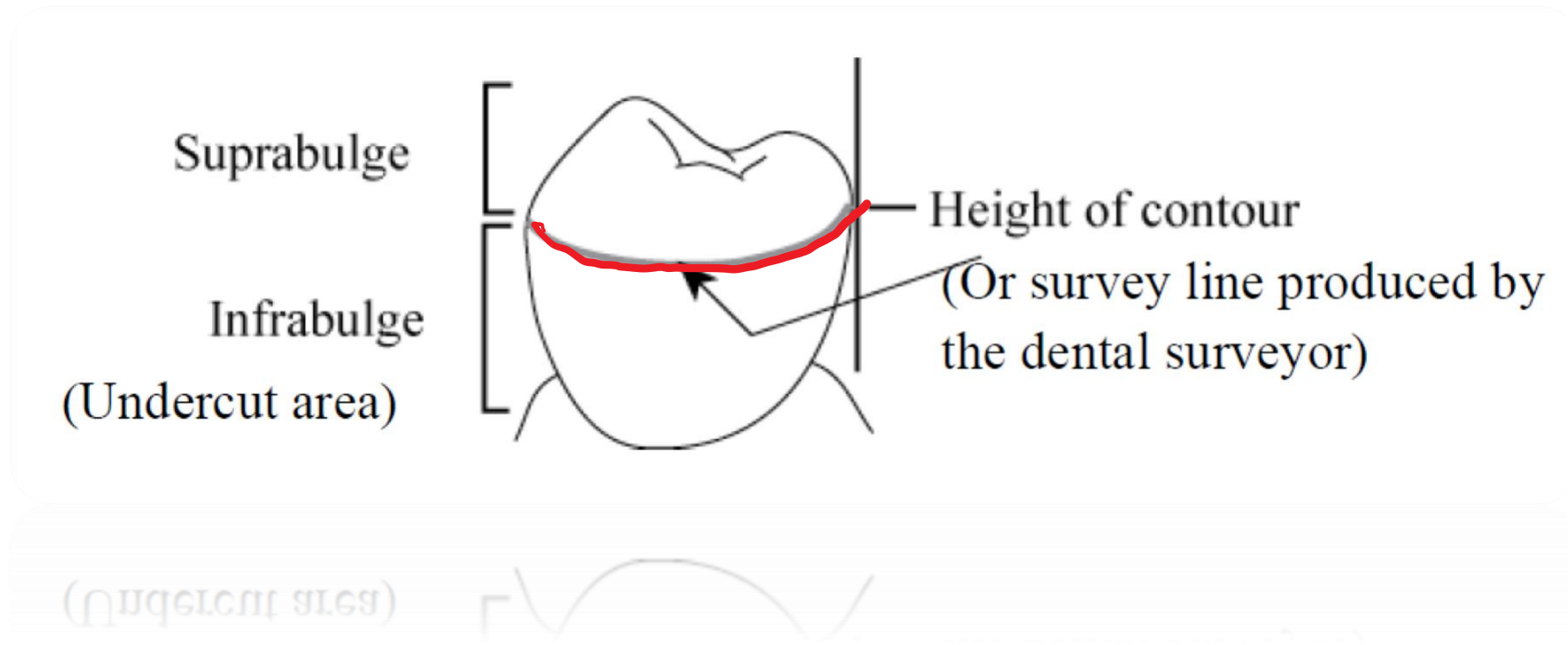
Guiding planes:

vertically parallel surfaces on abutment teeth or/and dental implant abutments oriented so as to contribute to the direction of the path of placement and removal of a removable dental prosthesis.



Height of contour:

a line encircling a tooth and designating its greatest circumference at a selected axial position determined by a dental surveyor.



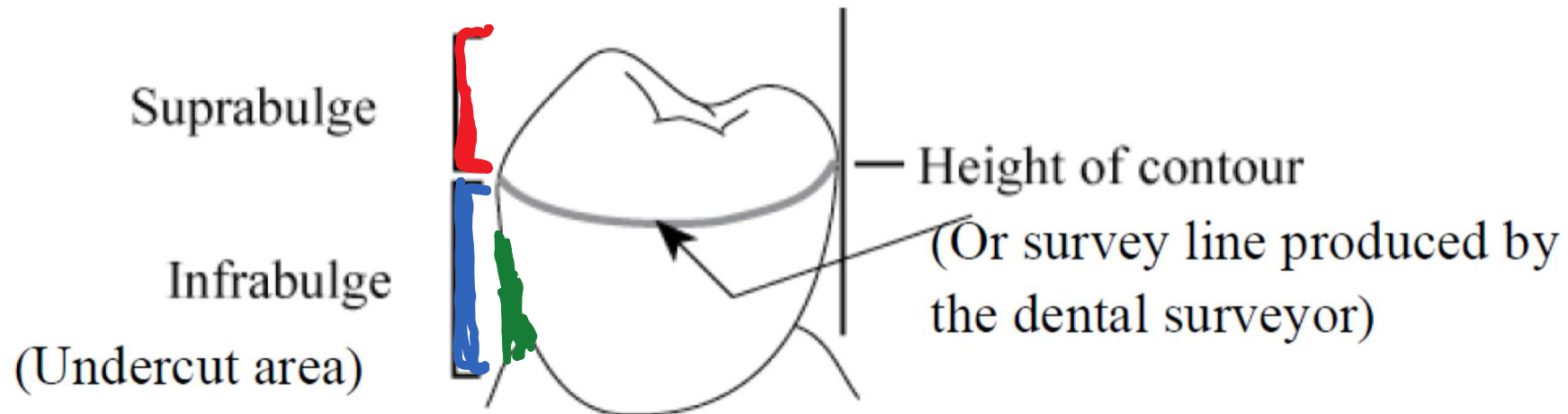
The suprabulge area:

the area on a tooth occlusal to the height of contour.

The infrabulge area:

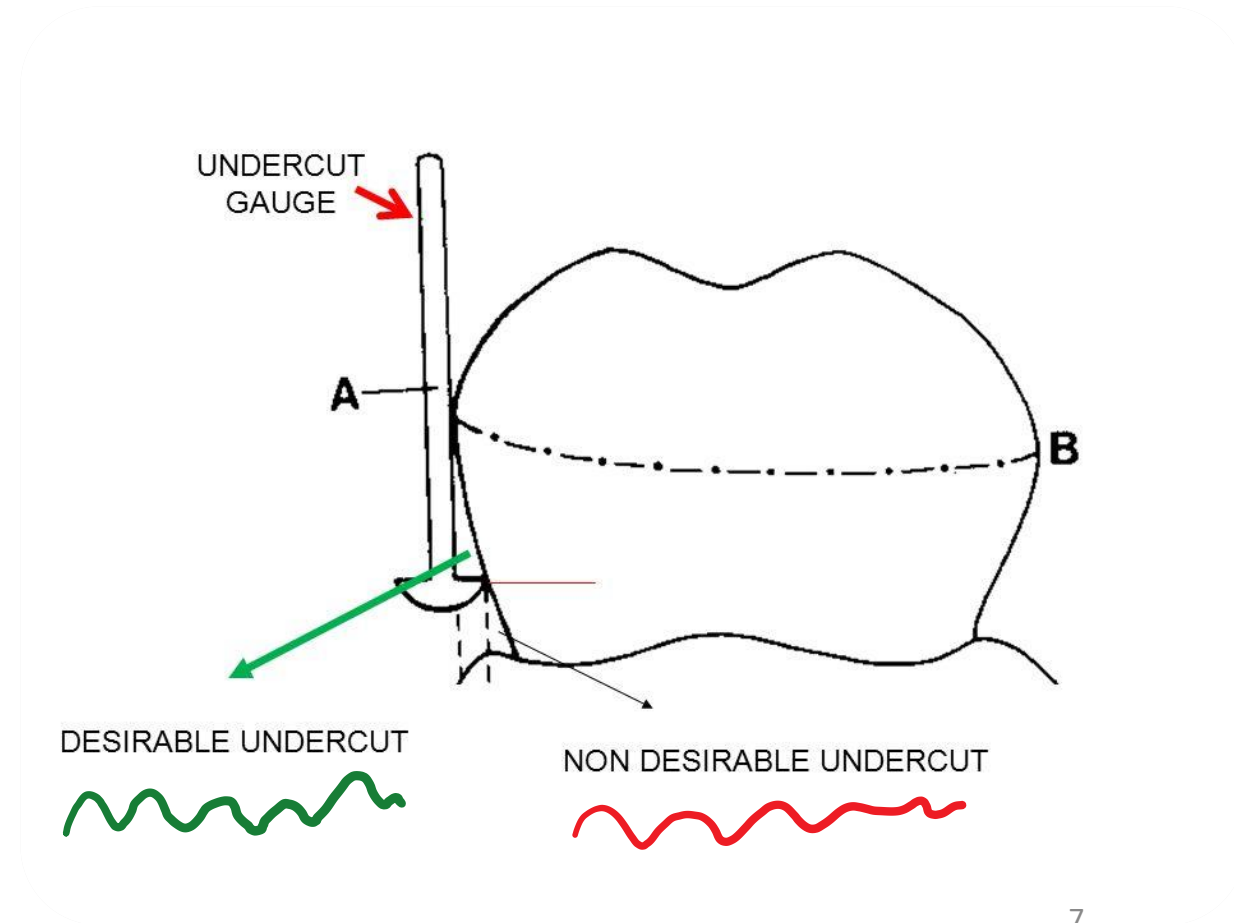
the area gingival to the height of contour is an undercut.

Undercut: The portion of a surface that is cervical to the height of contour in relationship to the path of insertion at a specific plane. It is usually located in the infrabulge areas.



Desirable undercut: this is useful to retain RPD against dislodging forces.

Undesirable undercut: other than that used to retain the RPD; in most of the cases undesirable undercut interfere with placement and removal of the prosthesis or produces damaging effects on the teeth and underlying structures.



The dental surveyor:
is a diagnostic instrument used to select the most favorable path of insertion and aid in the preparation of guiding planes. It is an essential instrument in designing removable partial dentures. The act of using a surveyor is referred to as surveying.

PARTS OF A SURVEYOR :



Objectives of surveying:

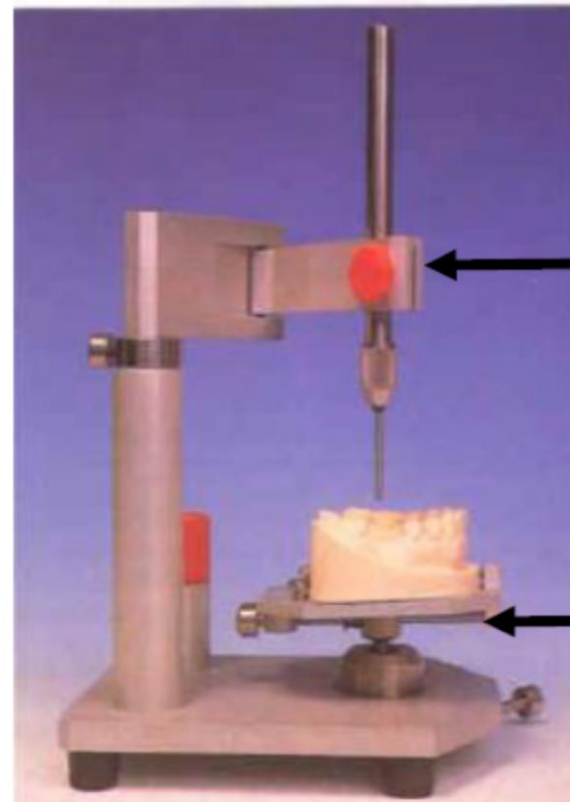
- 1. To mark the greatest bulk or contour of tooth or soft tissue.**
- 2. To identify undercut areas on the teeth and alveolar ridge on the cast relative to any given path of insertion or removal.**
- 3. To locate tooth surface that might help to guide the RPD in their exact position in the mouth.**
- 4. To find the undercut that can be used for retention and to measure the amount of horizontal undercut on the teeth selected for clasping.**
- 5. Help to design the exact location of clasp.**

- 6. To block out the undesirable undercuts on the cast.**
- 7. To determine whether tooth and bony areas of interference will need to be eliminated surgically or by selecting a different path of placement.**
- 8. To permit accurate charting of the mouth preparation to be made.**
- 9. To record the cast position in relation to the selected path of placement for future reference. This may be done by locating three dots or parallel lines on the cast (tripods); one anterior and two posterior to permit its reorientation.**

The most widely used surveyors are the **Ney** and the **Jelenko**. Both of these are precision-made instruments. They differ principally in that the Jelenko arm swivels, whereas the Ney arm is fixed.



Ney surveyor



Surveying arm

Surveying table

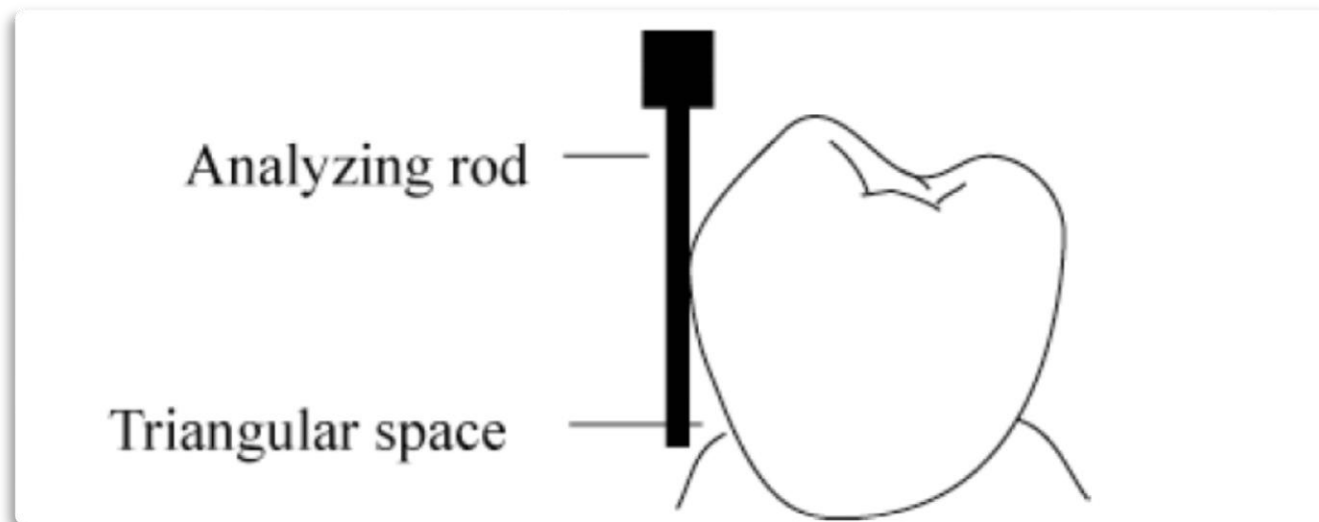
Jelenko surveyor

The principal parts of the dental surveyor follow:

- 1. Surveying Table (Cast Holder):** The part of the surveyor to which a cast can be attached. Through the use of a ball and socket joint it allows the cast to be oriented at various tilts and to be fixed along one of these planes.
- 2. Surveying Arm:** A vertical arm used to analyze the parallelism of various axial cast surfaces. It contains a holder so that several surveying tools may be attached and used.

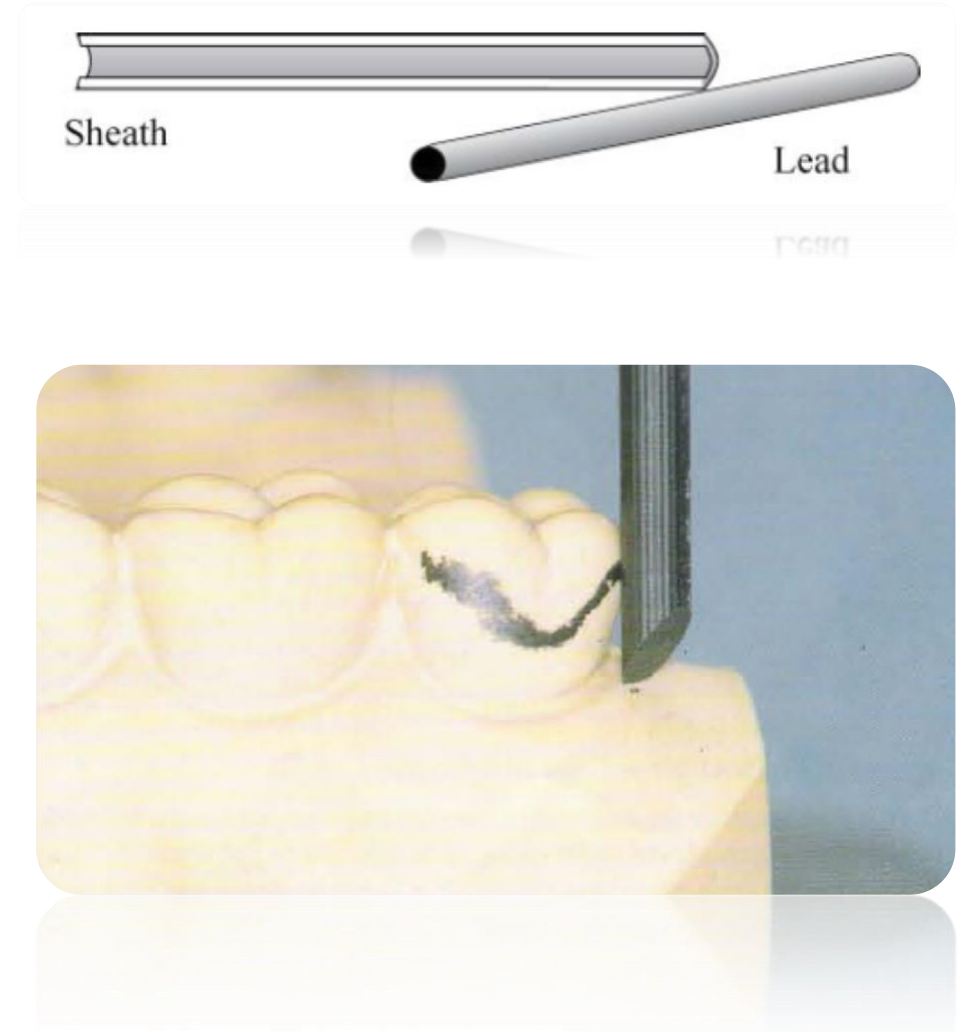
3. Surveying Tools:

A. Analyzing Rod: A thin straight metal rod used to analyze contours and undercuts. This is the principal tool used in surveying. The side of analyzing rod is brought into contact with surfaces of the proposed abutment teeth to analyze their axial inclinations.



B. Carbon Marker

Rods similar to pencil leads which can be used to mark the location of the height of contour on a dental cast. Some surveyors use a protective sheath to prevent or reduce breakage of the carbon markers.



C. Metal Gauges or undercut Gauges:

used to measure the extent of the undercut area on the abutment teeth that are being used for retention. Three gauges are available: 0.01, 0.02, 0.03 inch. Undercut dimensions can be measured on teeth by bringing the vertical shaft of the gauge in contact with a tooth and then moving the surveying arm up or down until there is also contact with the terminal lip.

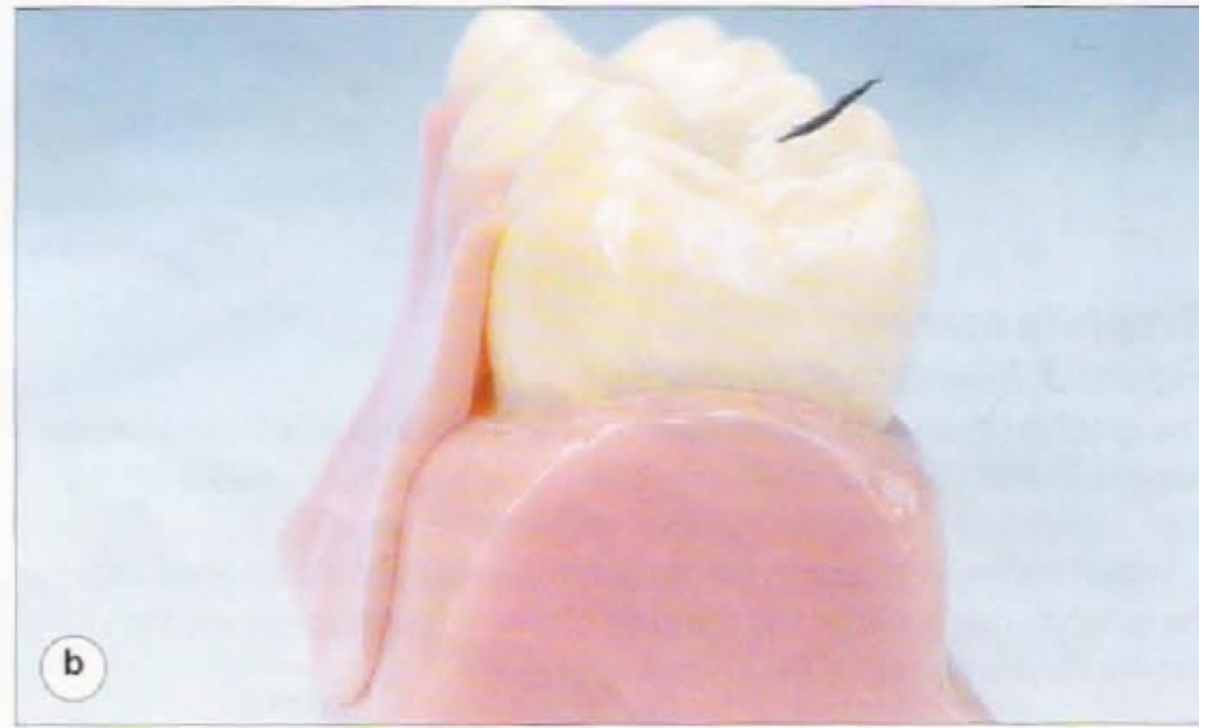
When vertical shaft of .02" undercut gauge contacts tooth simultaneously as the terminal lip, a .02" undercut is present.



D. Wax Trimmer :

A tool with a straight sharp edge, which parallels the surveying arm. It is used to contour waxed crowns for partial denture abutments, or to place block-out for a partial denture framework. It is used with a dragging or shaving motion to remove thin layers.





- (a) This RPD cannot be inserted in the mouth because failure to eliminate unwanted undercut on the cast has resulted in acrylic resin being processed into the area.
- (b) This denture has been processed on a correctly prepared cast and, as a result, there is no interference with insertion.

Surveying procedure

This may be divided into the following distinct phases:

1. Preliminary visual assessment for the study cast.

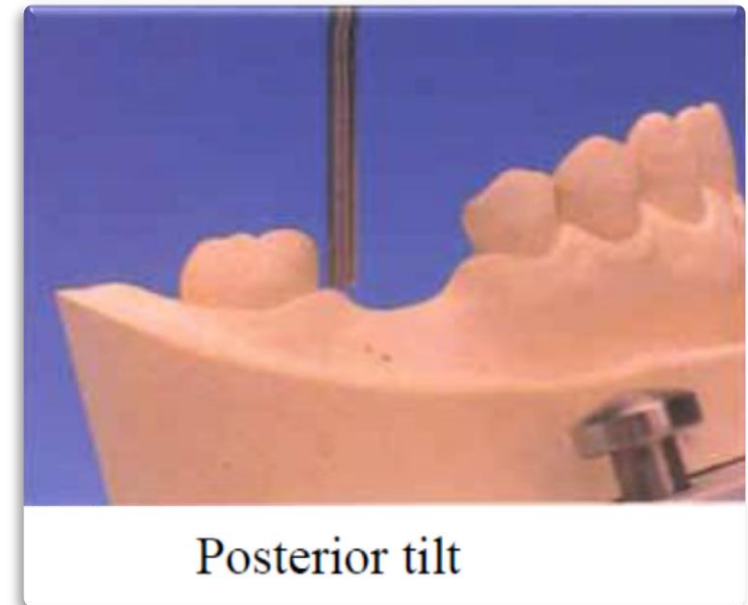
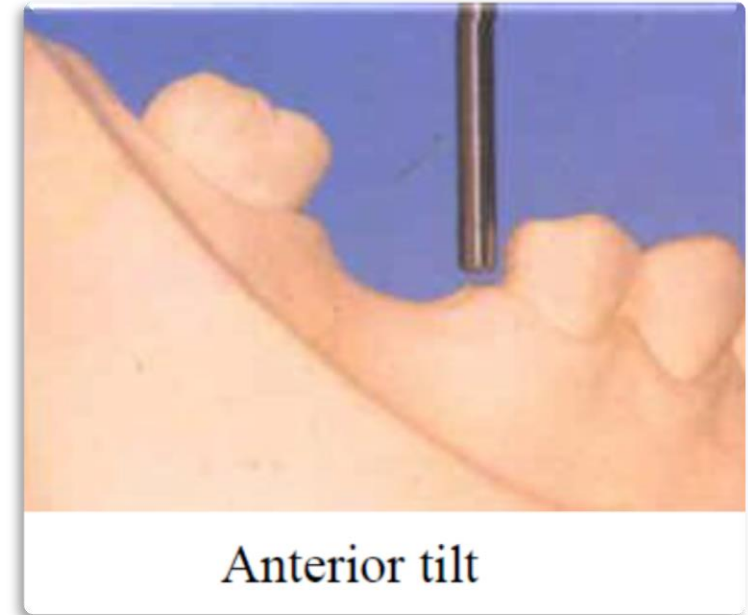
The cast is held in the hand and inspected from above. The general form and arrangement of the teeth and ridge can be observed, any obvious problems noted and an idea obtained as to whether or not a tilted survey should be employed.

2. Initial survey.

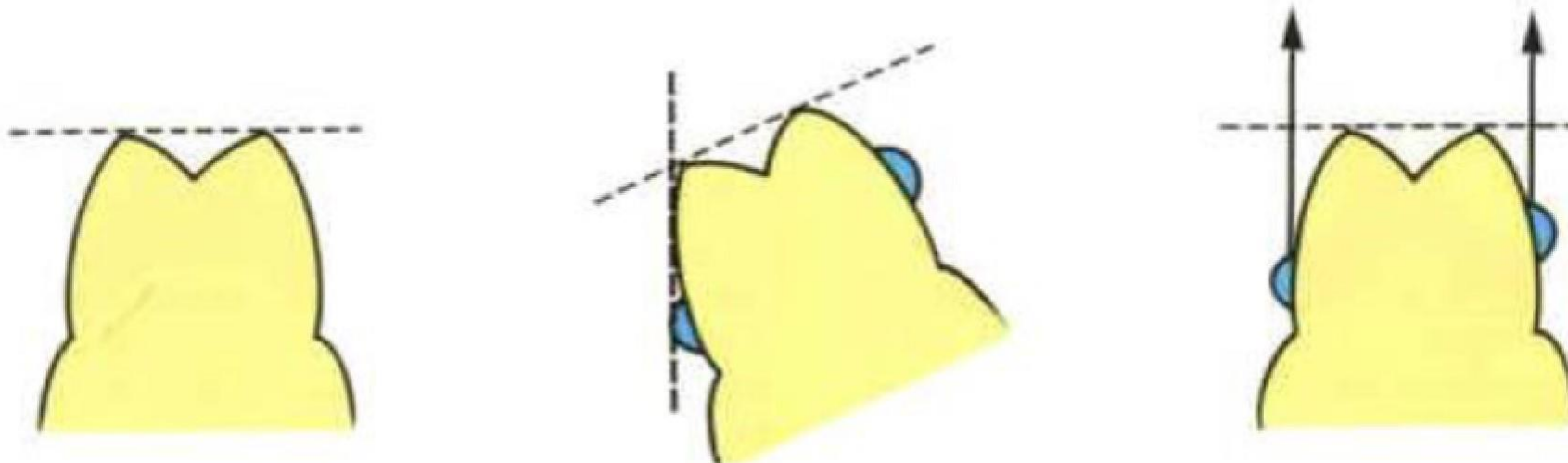
- a. The cast must be surveyed with the occlusal surface parallel to the base of the surveyor- this is zero tilt.**
- b. The cast stabilized by the clamps of the table of the surveyor, all the surfaces of the abutment teeth and other structures are analyzed with the analyzing rod to estimate the undercut distribution. By using undercut gauges; undercuts can be evaluated as desirable or not.**
- c. If the analyzing rod is replaced with the carbon marker; a line will drawn at the most convex points around the tooth surfaces represent height of contour.**
- d. An assessment can be made as to whether the horizontal extent of undercut is sufficient for retention purposes.**

3. Analysis.

- a. Surveying **at zero tilt** means that: path of insertion= path of displacement.
 - b. However, there are occasions when tilting of the cast is indicated so that the path of insertion and displacement differ like enhancing appearance, retention or to avoid interferences.
- C. **Anterioposterior tilt** will redistribute undercut mesiodistally, anterior tilt increase mesial undercuts while posterior tilt increase the distal undercut. This may help to eliminate undesirable undercuts.



D. Cast can be **tilted laterally dealing with the buccal and lingual undercut areas to locate the best position for the retentive part of the RPD.**



4. Final survey.

If it is decided that the cast should be tilted, the analyzing rod is exchanged for a marker different in color from that used in the first survey, and the final survey is carried out.

- a. The area cervical to the height of contour is used to place the retentive component of the retainer-clasp-while areas occlusal to the height of contour is suitable for stabilizing or bracing components.**
- b. It is important to remember that tooth surfaces can be re-contoured by selective grinding or placement of suitable restoration to achieve most suitable path of insertion and to fit the other requirements of RPD construction.**

