

## Surveying

*The ideal requirements for successful removable partial denture are:*

1. Be easily inserted and removed by the patient.
2. Resist dislodging forces.
3. It should be aesthetically pleasing.
4. Avoid the creation of undesirable food traps.
5. Minimize plaque retention.

This objective is achieved by a careful evaluation of a patient's study casts. The instrument used to aid the examination of the study casts is called a **dental surveyor** and the procedure is known as **surveying**.

### *Surveying*

It's the determination of the relative parallelism of two or more surfaces of the teeth or other parts of the cast of the dental arch.

### *Survey*

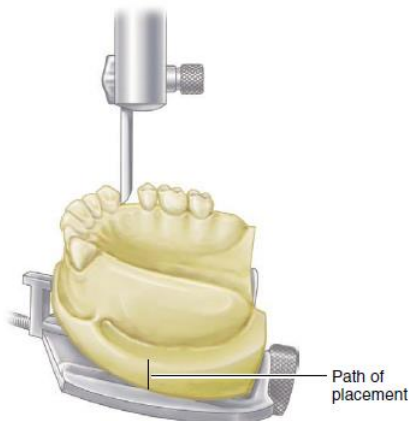
It's the procedure of the locating and delineating the contour and position of the abutment teeth and associated structures before designing a removable partial denture.

### *Objective of surveying*

In order to plane those modifications to fabricate a removable partial denture thus can be easily inserted in the mouth and retained in place during function.

### *Purposes (Objective) of Surveying the Diagnostic Cast*

1. To determine the most desirable path of placement that will eliminate or minimize interference to placement and removal.



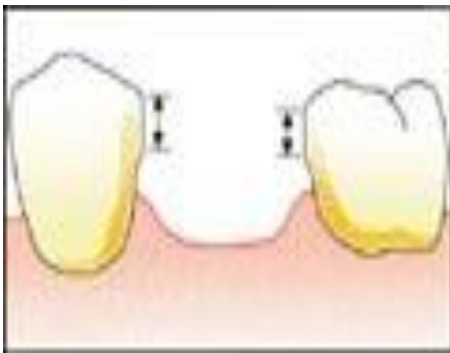
When the restoration (RPD) is properly designed to have positive guiding planes, the patient may place and remove the restoration with ease in only one direction.

***Advantages of single path of placement (insertion):***

- A. Allows insertion and removal of prosthesis without interference.
  - B. Help to direct the force along the long axis of the tooth.
  - C. Provide frictional retention.
  - D. Minimize torque on the abutment teeth.
  - E. Cross arch stabilization.
  - F. Equalize retention.
2. To identify proximal tooth surfaces that are, or need to be, made parallel so that they act as guiding planes during placement and removal.

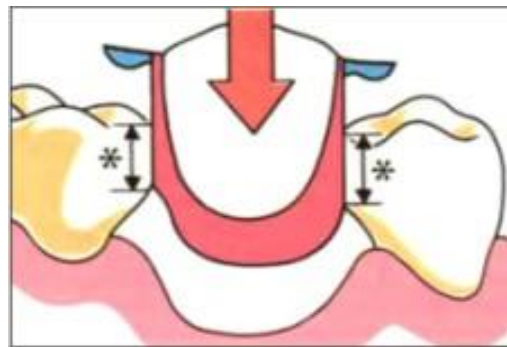
***Guiding planes:*** two or more vertically parallel surfaces on abutment teeth and/or fixed dental prostheses oriented so as to contribute to the direction of the path of placement and removal of a removable partial denture, maxillofacial prosthesis, and overdenture. They are:

- A. Flat surfaces parallel to the path of insertion.
- B. Represent the initial contact of the RPD.
- C. Help to stabilize, control and limit the movement of the RPD.



**Guiding planes**

**(Vertically parallel surfaces on abutment teeth)**



**(The prosthesis during placement)**

- 3. To locate and measure areas of the teeth that may be used for retention.
- 4. To determine whether tooth and bony areas of interference will need to be eliminated surgically or by selecting a different path of placement.
- 5. To determine the most suitable path of placement that will permit locating retainers and artificial teeth to the best esthetic advantage.
- 6. To permit an accurate charting of the mouth preparation to be made.
- 7. To delineate the height of contour (survey line) on abutment teeth and to locate areas of undesirable tooth undercut those are to be avoided, eliminated, or blocked out.

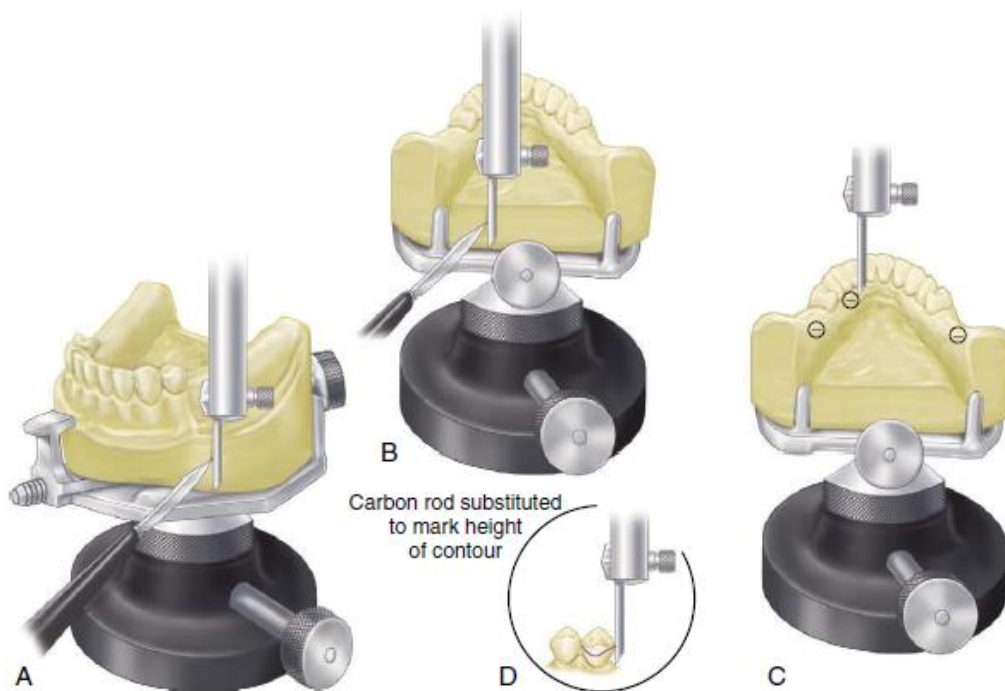
Undercuts could be:

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

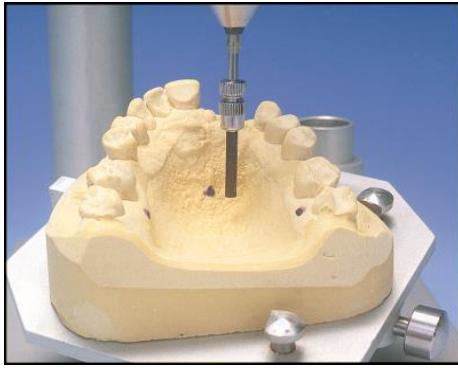
**B. Undesirable undercut:** other than that used to retain the RPD; in most of the case undesirable undercut interfere with placement and removal of the prosthesis or produces damaging effects on the teeth and underlying structures. Such type of undercut can be eliminated by:

- Block out with wax.
- Preparation and alteration of the tooth surfaces (within a limit).
- Crown restoration, in which the tooth surface can be reshaped to serve RPD functions and requirements.

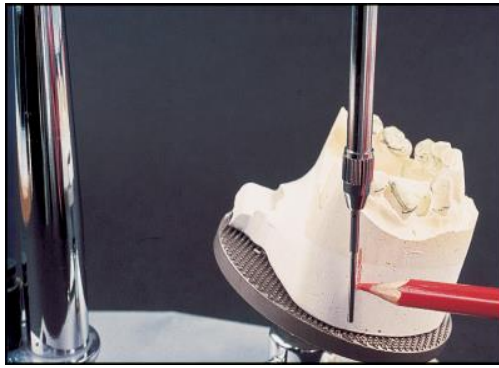
**8.** To record the cast position in relation to the selected path of placement for future reference. This may be done by locating three dots (tripods) or parallel lines on the cast; three dots or lines, one anterior and two posterior to permit its reorientation.



**A-B,** The path of placement is determined, and the base of the cast is scored to record its relation to the surveyor for future repositioning. **C,** An alternate method of recording the relation of the cast to the surveyor is known as *tripoding*. A carbon marker is placed in the vertical arm of the surveyor, and the arm is adjusted to the height by which the cast can be contacted in three divergent locations. The vertical arm is locked in position, and the cast is brought into contact with the tip of the carbon marker. Three resultant marks are encircled with colored lead pencil for ease of identification. Reorientation of the cast to the surveyor is accomplished by tilting the cast until the plane created by three marks is at a right angle to the vertical arm of the surveyor. **D,** Height of contour is then delineated by a carbon marker.



**Three dots (tripoding)**



**Parallel lines**

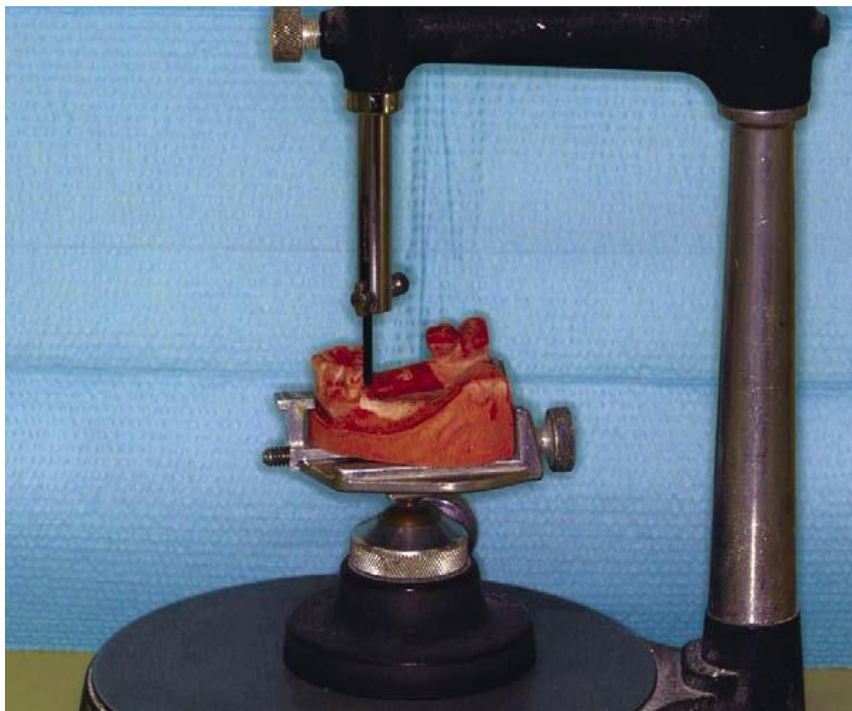
### ***Dental surveyor***

It's as an instrument used to determine the relative parallelism of two or more surfaces of the teeth or other parts of the cast of a dental arch.

### ***Types of dental surveyors***

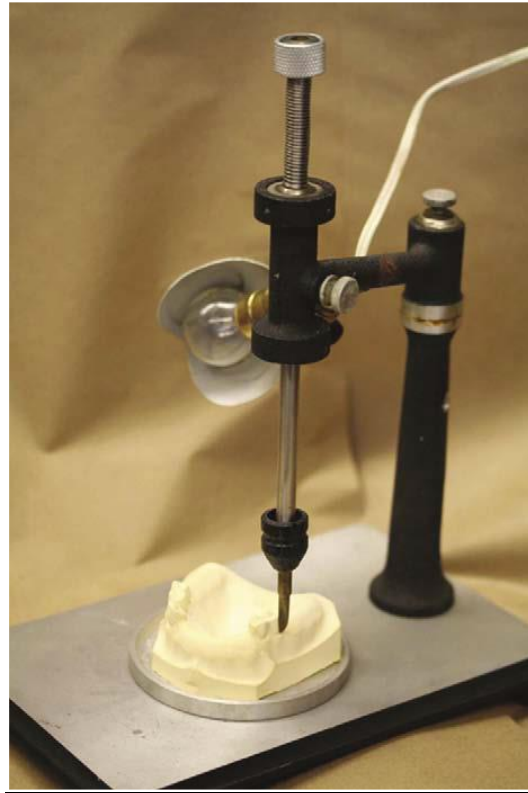
The most widely used surveyors are:

1. ***Ney surveyor*** with non-swiveling horizontal arm.



**The Ney surveyor is widely used because of its simplicity and durability.**

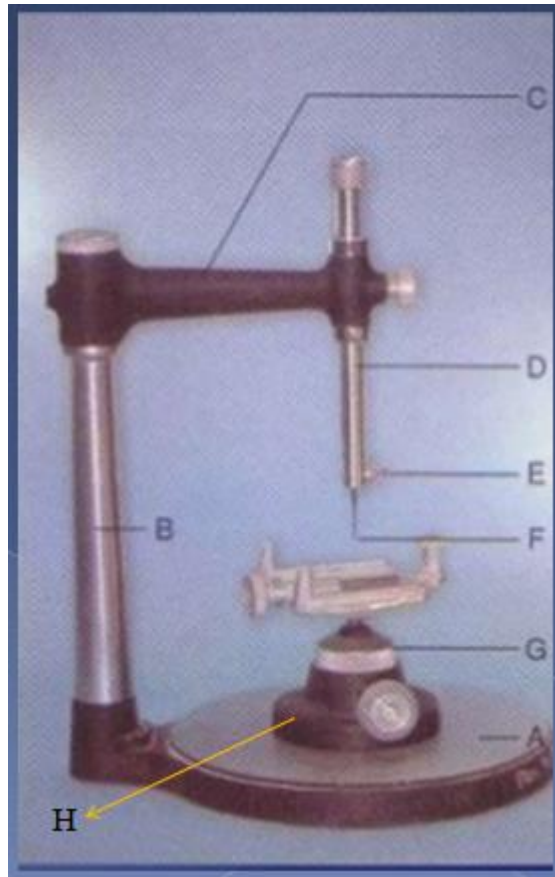
2. *Jelenko surveyor* with swiveling horizontal arm and has spring mounted paralleling tool.



The Jelenko surveyor: Note the spring-mounted paralleling tool and swivel at the top of the vertical arm. The horizontal arm may be fixed in any position by tightening the nut at the top of the vertical arm.

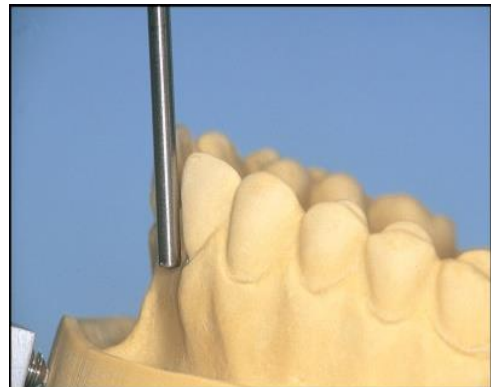
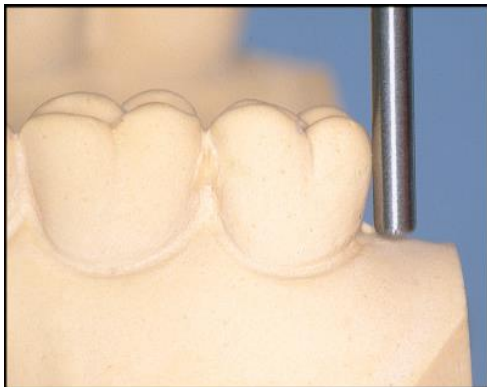
### ***Parts of dental surveyor (Ney type surveyor):***

- A. **Platform** on which the base is moved.
- B. **Vertical arm or upright column** that supports the superstructures.
- C. **Horizontal arm** from which surveying tools suspends.
- D. **Survey arm.**
- E. **Mandrel** for holding special tools.
- F. **Tools** which are used for surveying (**in sequence**) include: analyzing rod, carbon marker, undercut gauges, wax trimmer.
- G. **Table** to which the cast is attached.
- H. **Base** on which the table swivels.



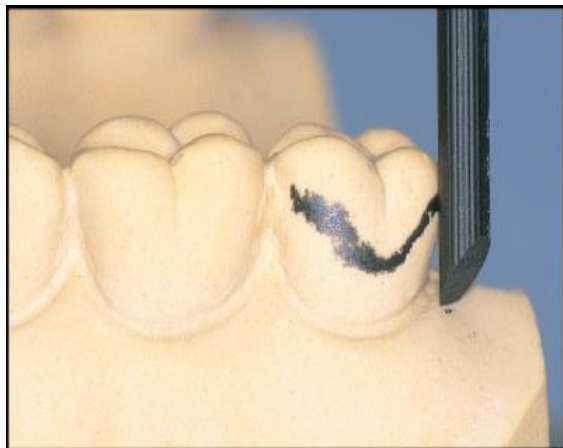
### ***Analyzing rod***

It's a rigid metal rod used for diagnostic purposes in the selection of the path of placement and to determine the undercut areas prior to scribing the height of contour with the carbon marker.

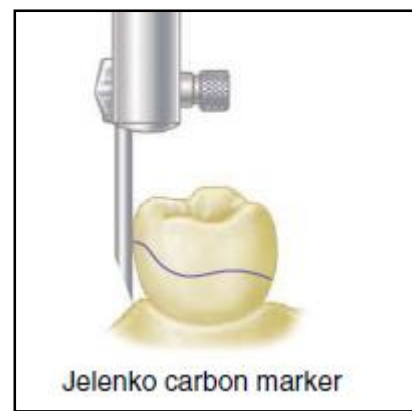
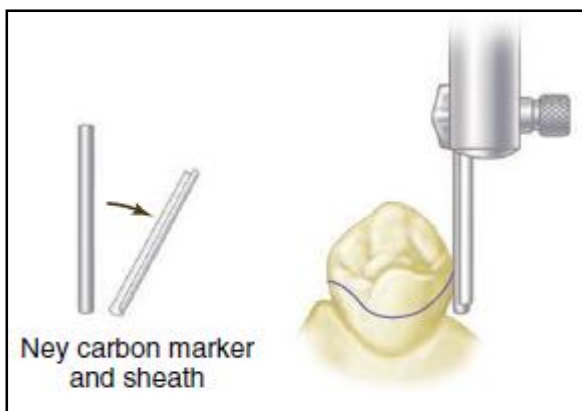


## Carbon marker

It's used for the actual marking of the survey lines on the cast. A metal shield is used to protect it from breakage.

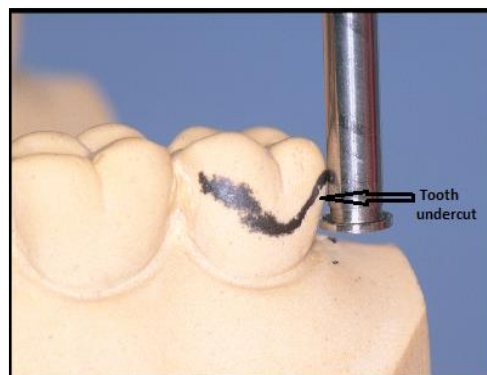


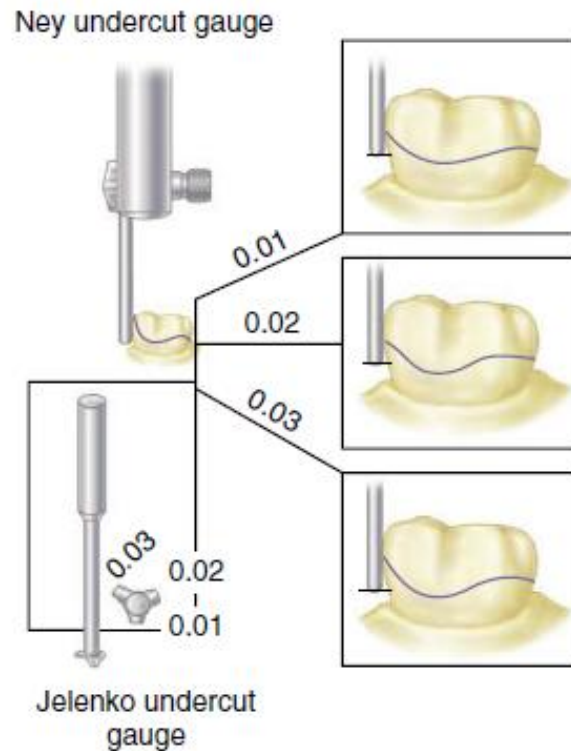
Carbon marker and metal shield



## Undercut gauges

They are used to measure the extent of the undercuts on abutment teeth that are being used for clasp retention, usually there are available in three gauges: 0.01, 0.02, and 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 tip.





### ***Wax trimmer***

It's a knife used for trimming the excess wax which blocks out undesirable undercut in such way to be parallel to each other and to the pre-determined path of insertion.



Whenever possible, 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 force of occlusion. If the path of insertions is other than vertical to the occlusal plane such seating may deform the clasps.