Principles of Design in Removable Partial Dentures

The designing of removable partial dentures involves a basic understanding of the biologic & mechanical principles

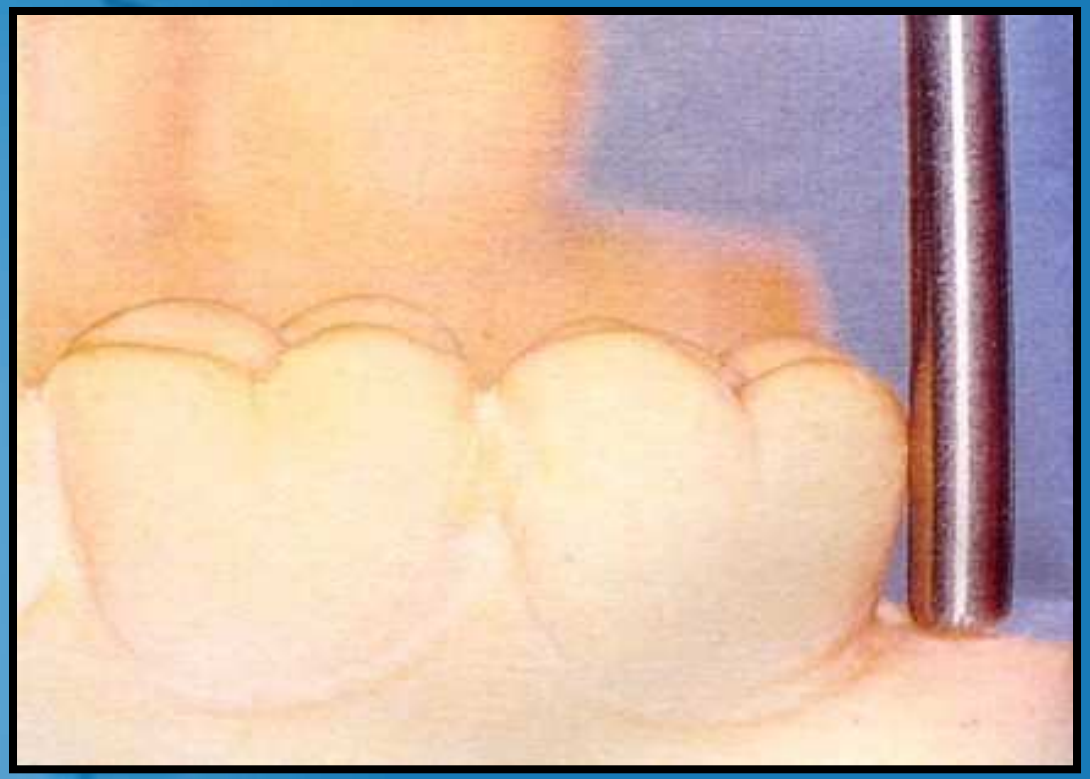
Biologic principles

Mechanical principles

The basic strategy is to select component parts for a partial denture so as to help control the movement of the prosthesis under functional loads

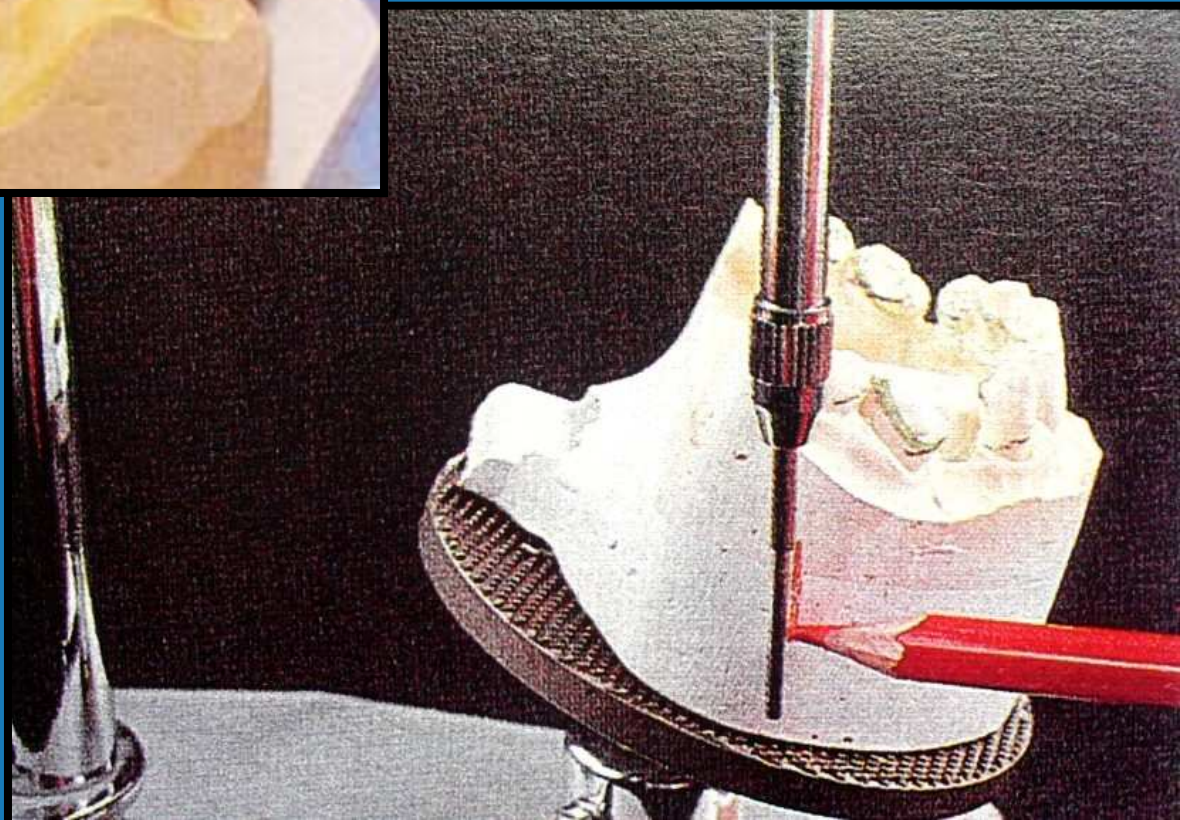
The selection of the components and the location / placement of these components is to a great extent decided after the surveying procedure

“STEPS”

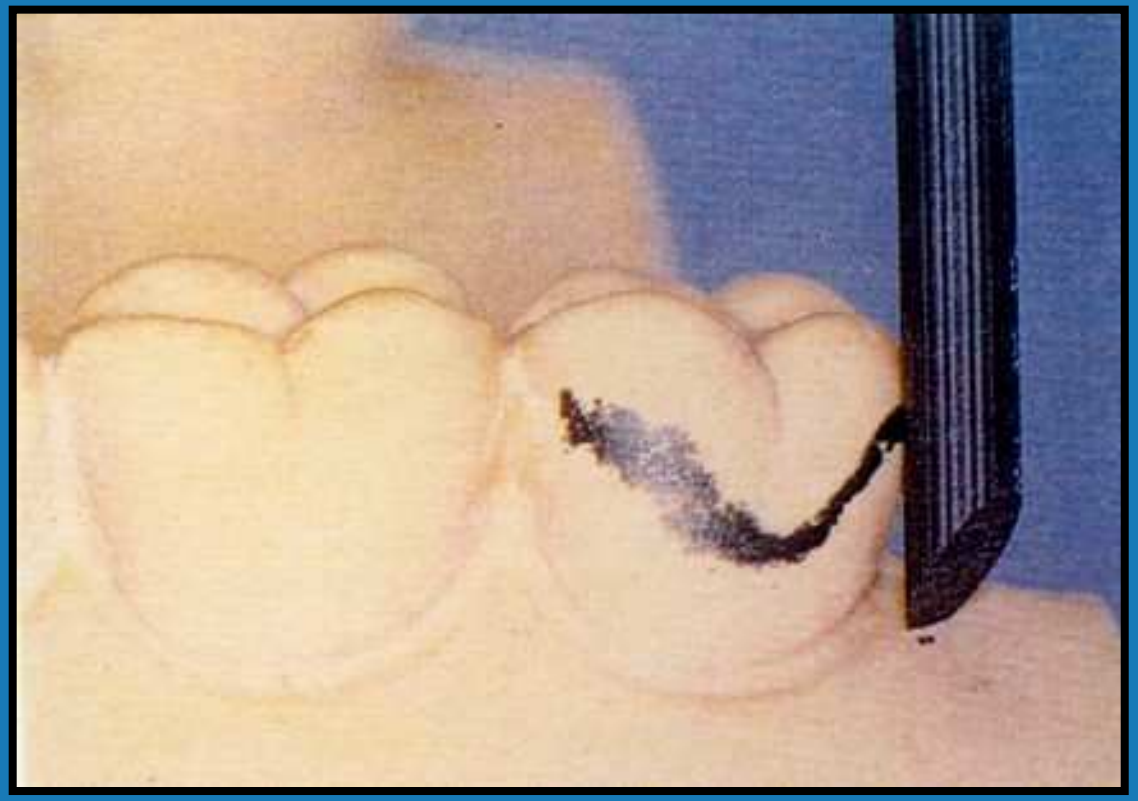


Analyzing rod

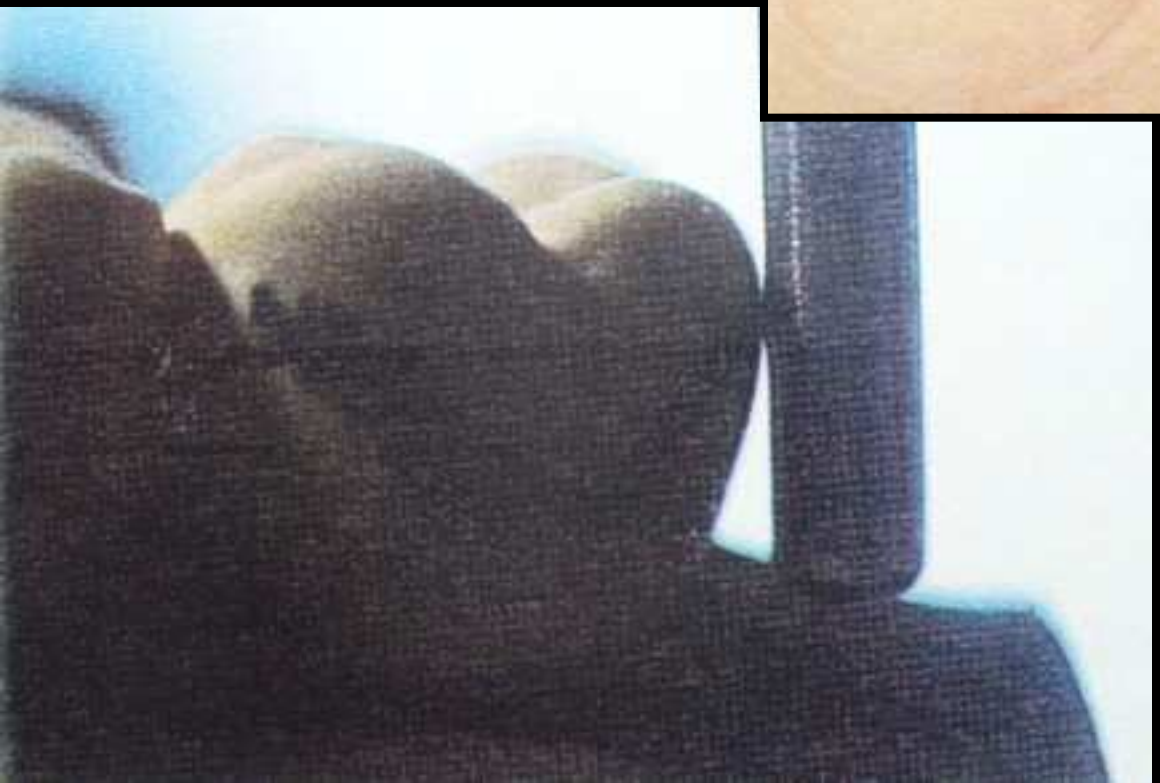
Tripoding



Survey line marked by carbon marker



Undercut gauge



“GOALS”

Undercuts

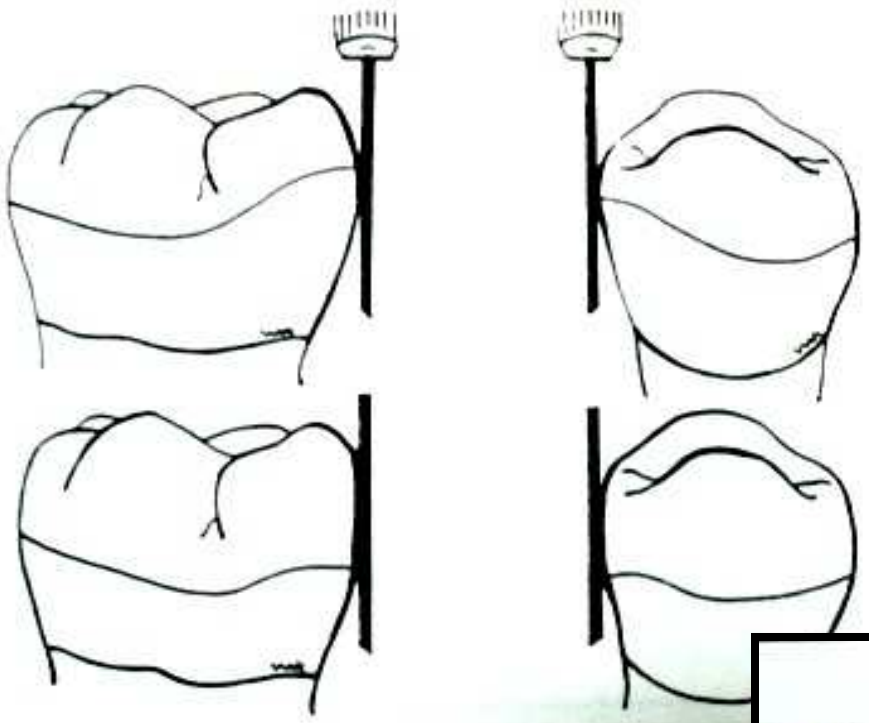
Guiding Planes

Interference

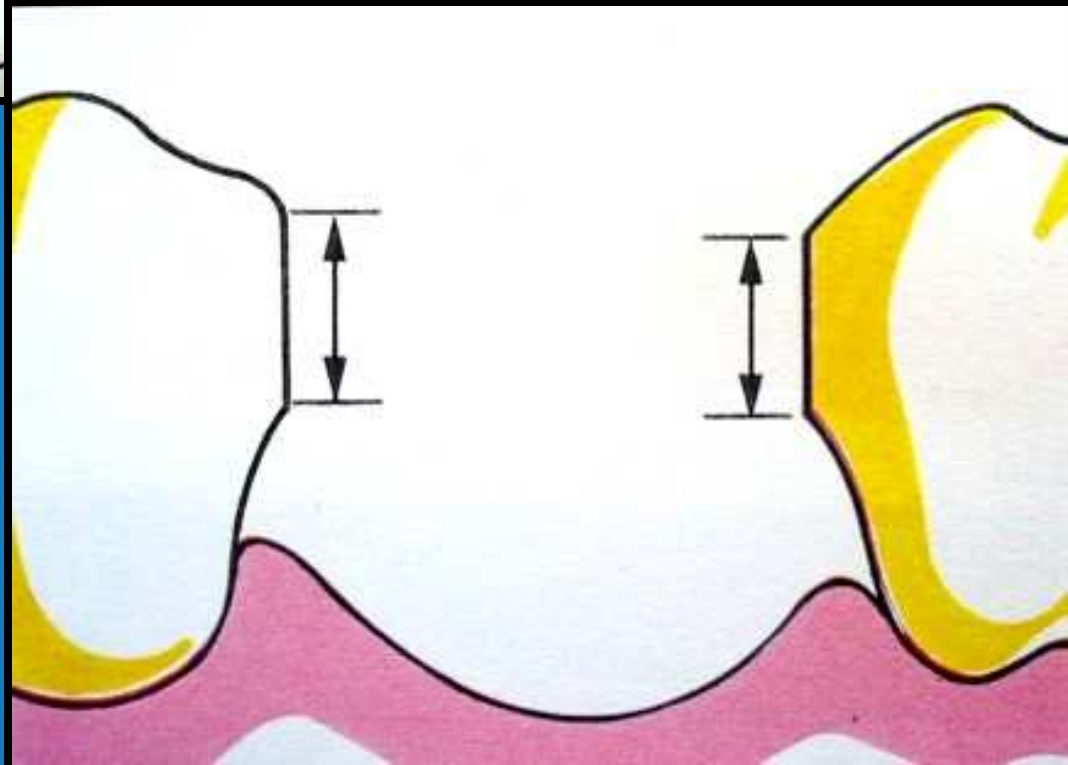
Esthetics

PATH OF INSERTION

DESIGN OF THE PROSTHESIS

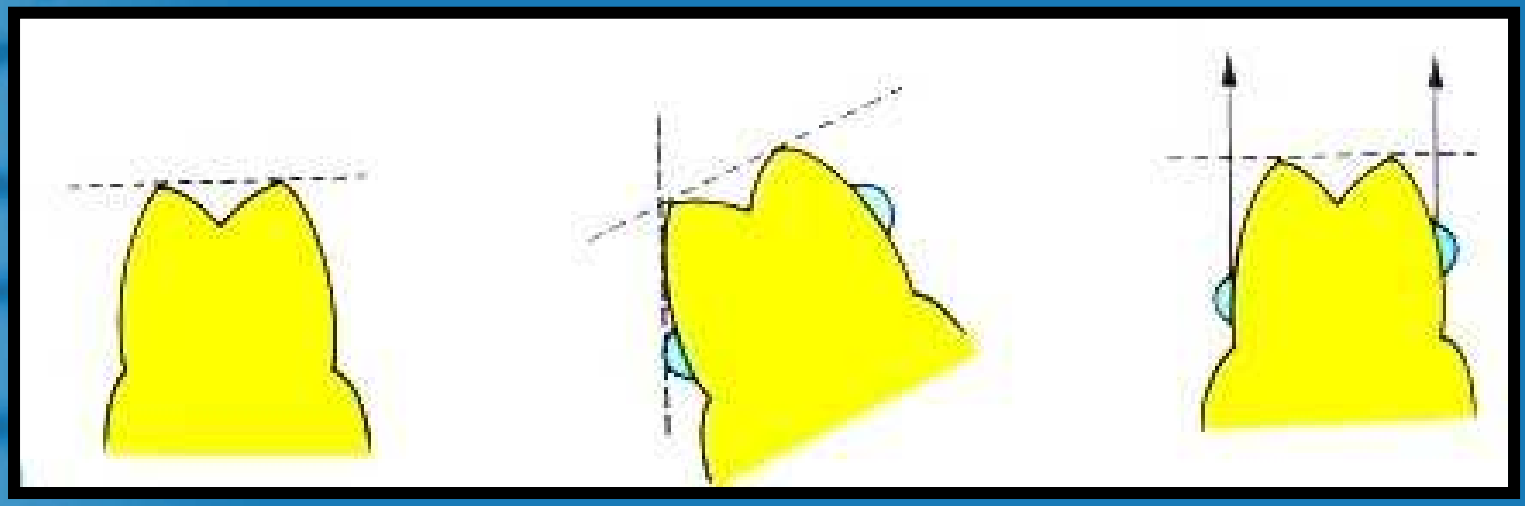


1.Guiding Planes

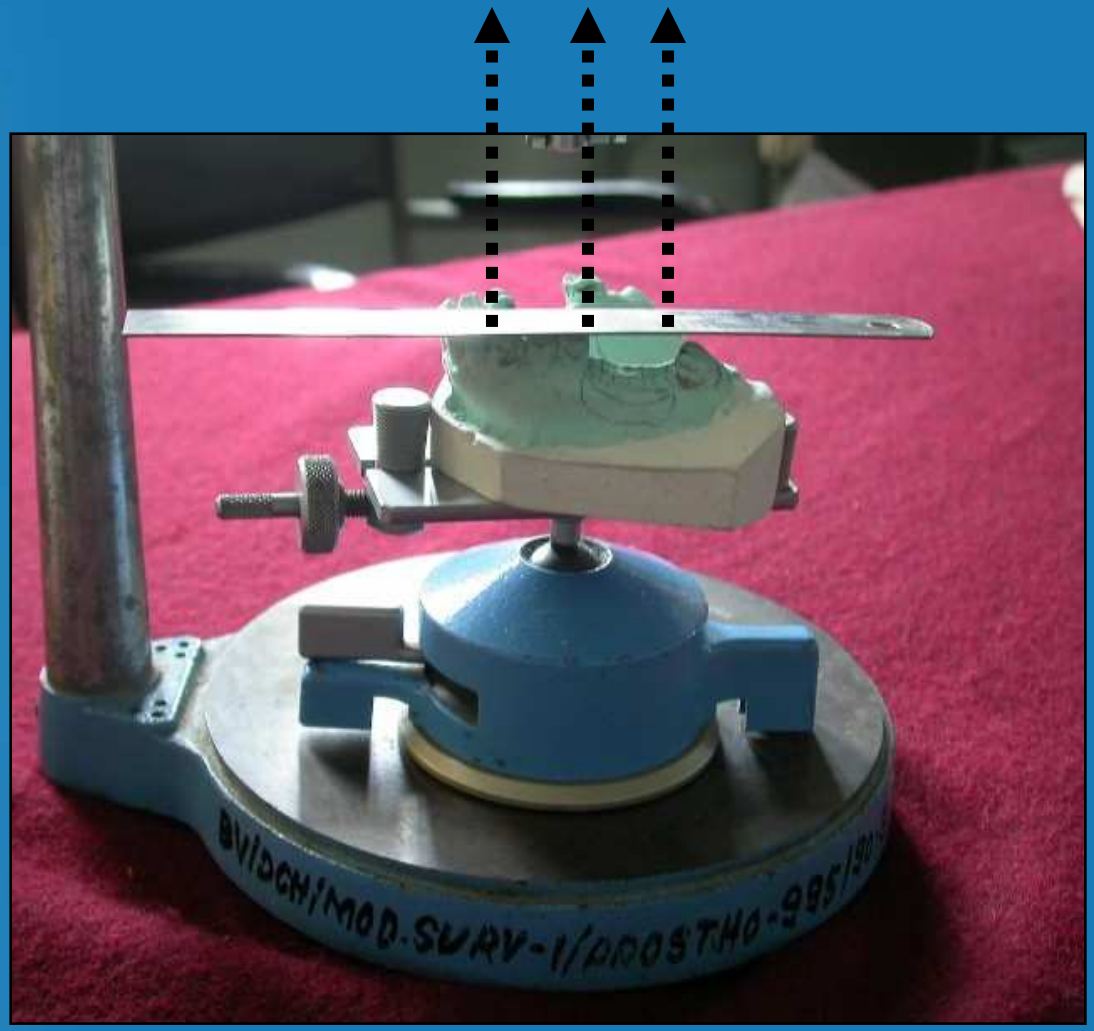


Guiding Planes

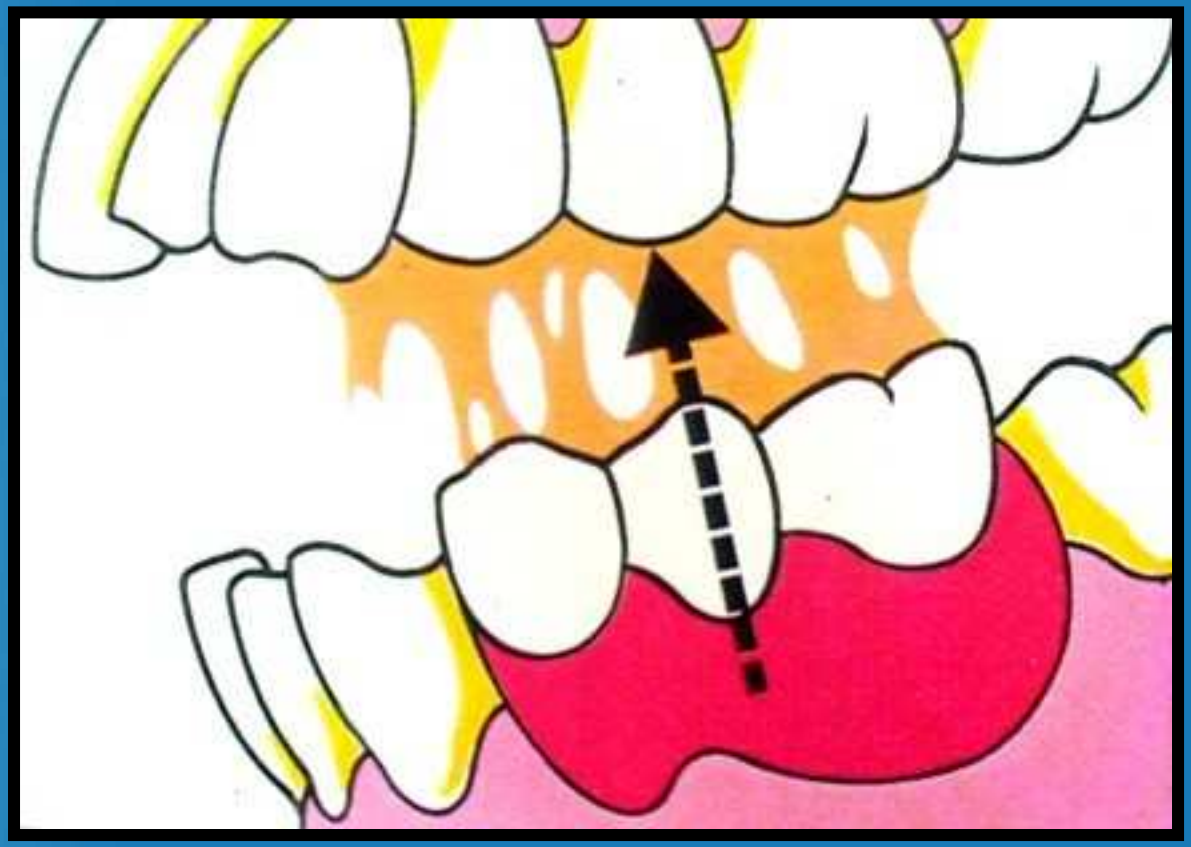
2.Undercuts have to be present at the horizontal / 0° tilt



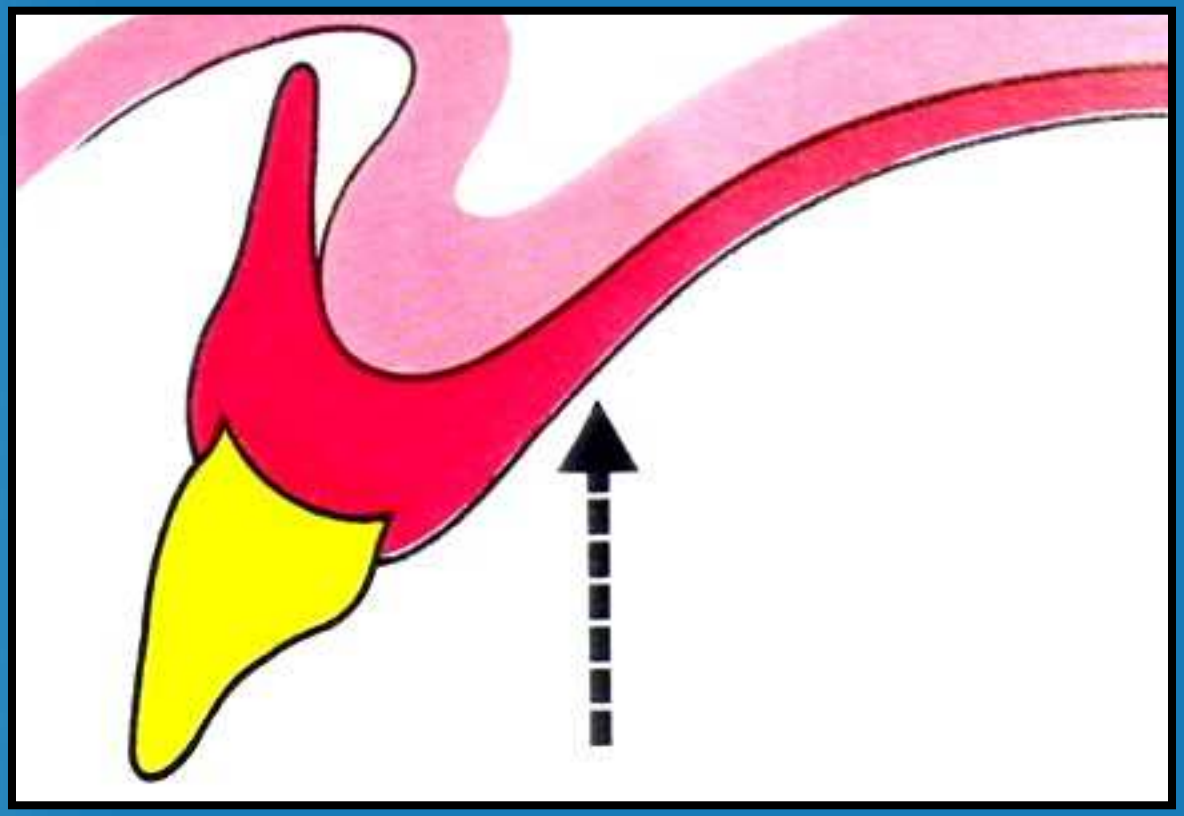
Dislodging forces perpendicular to the occlusal plane



The most common path of displacement is perpendicular to the occlusal plane



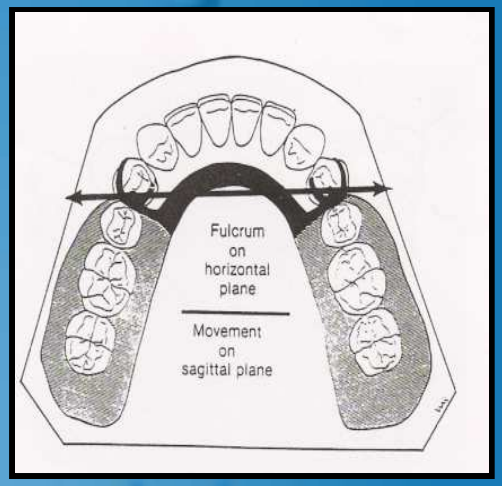
3.Interference

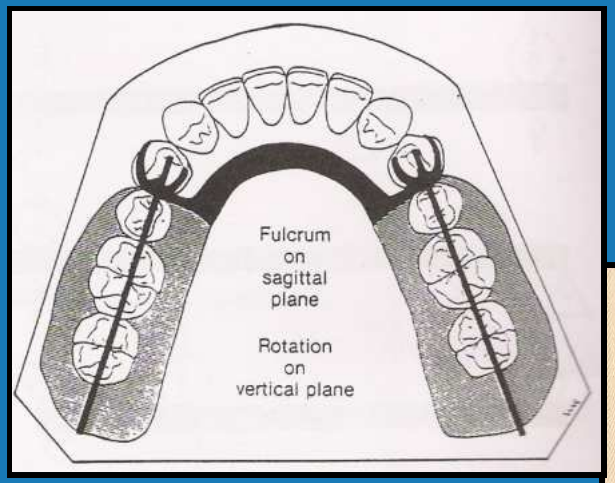


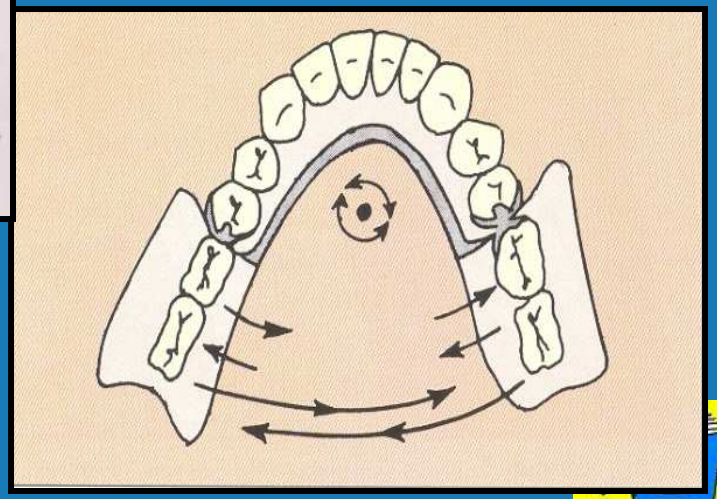
4.Esthetics

BIOMECHANICS OF RPDS

Forces acting on partial denture and possible movements

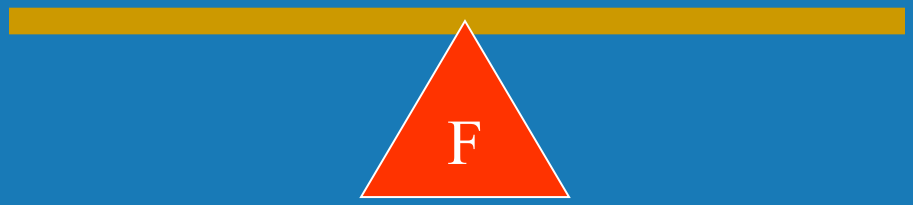




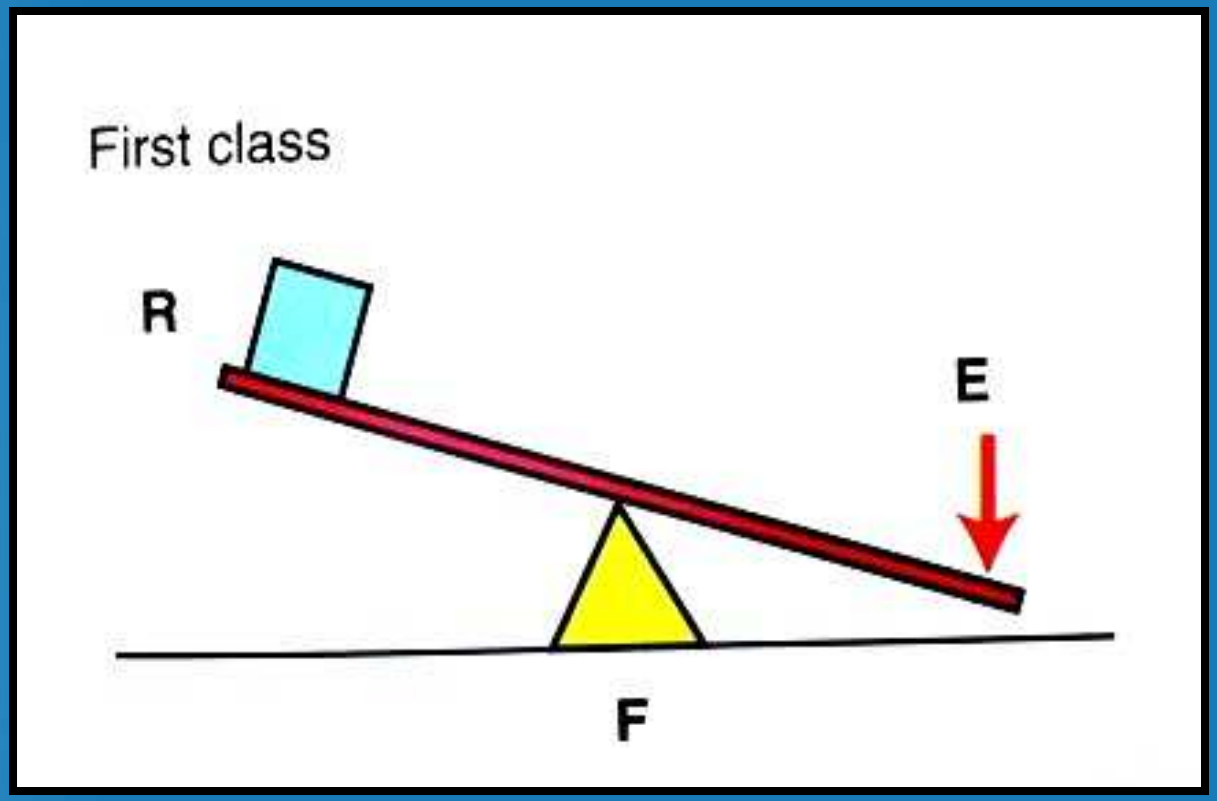


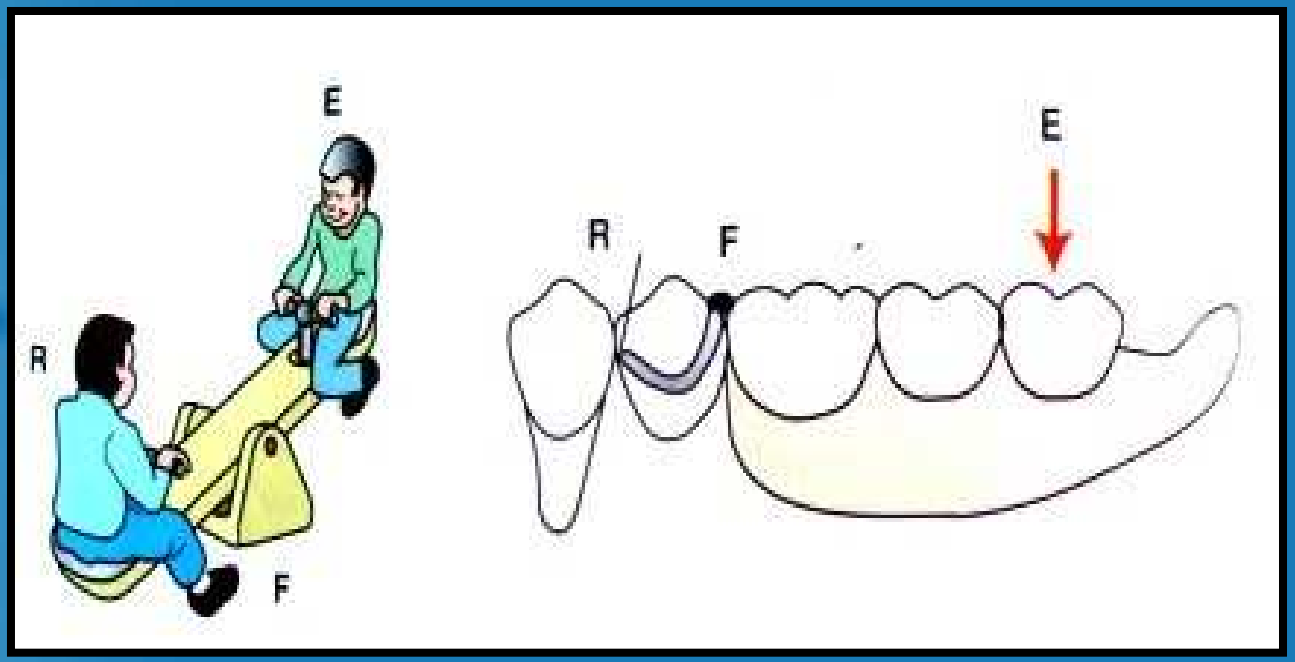
LEVERS

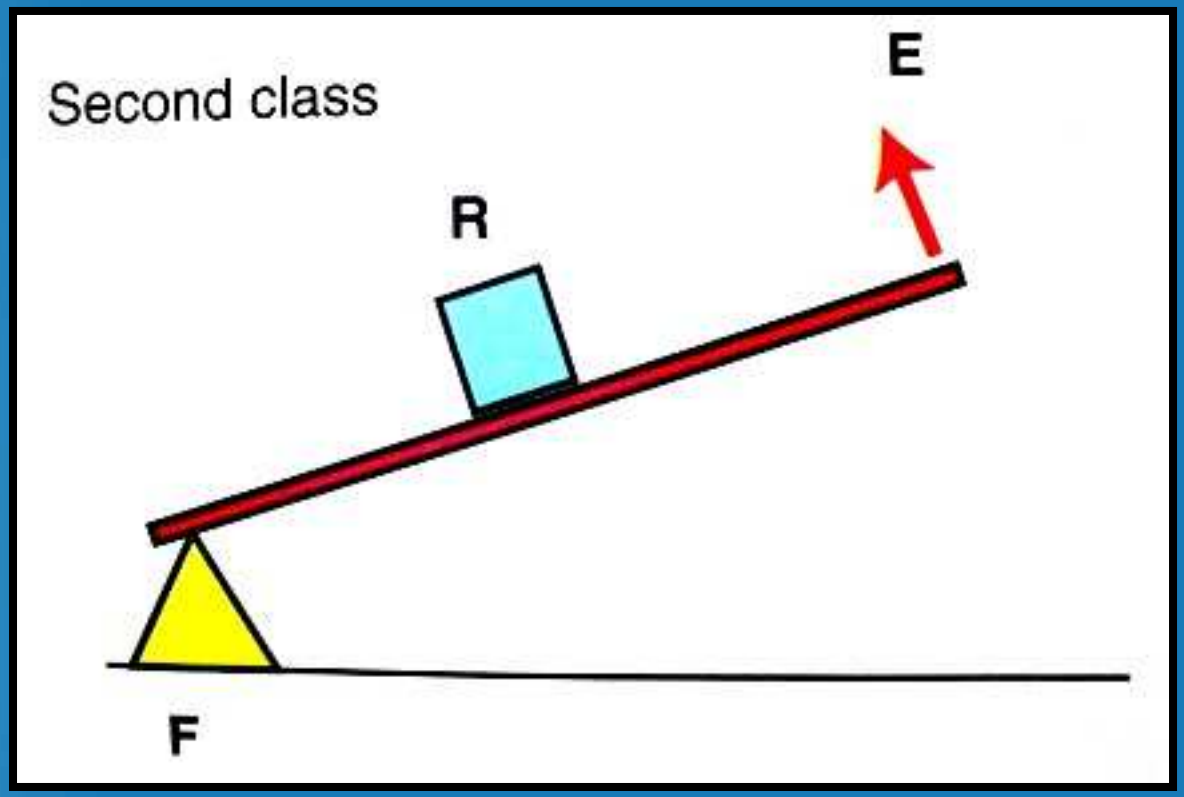
Lever *is a rigid bar supported somewhere along its length*

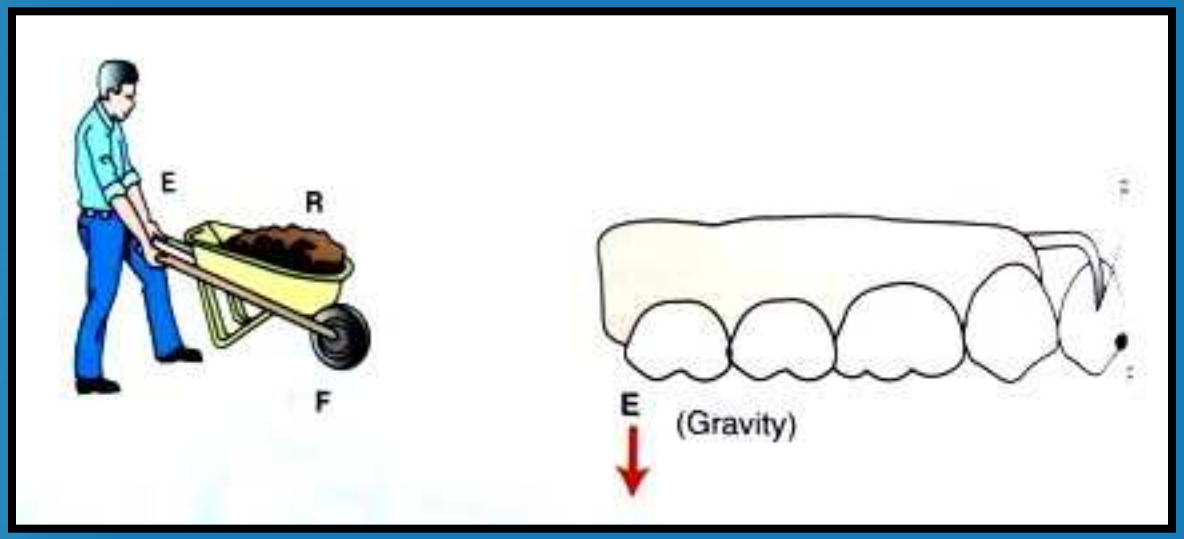


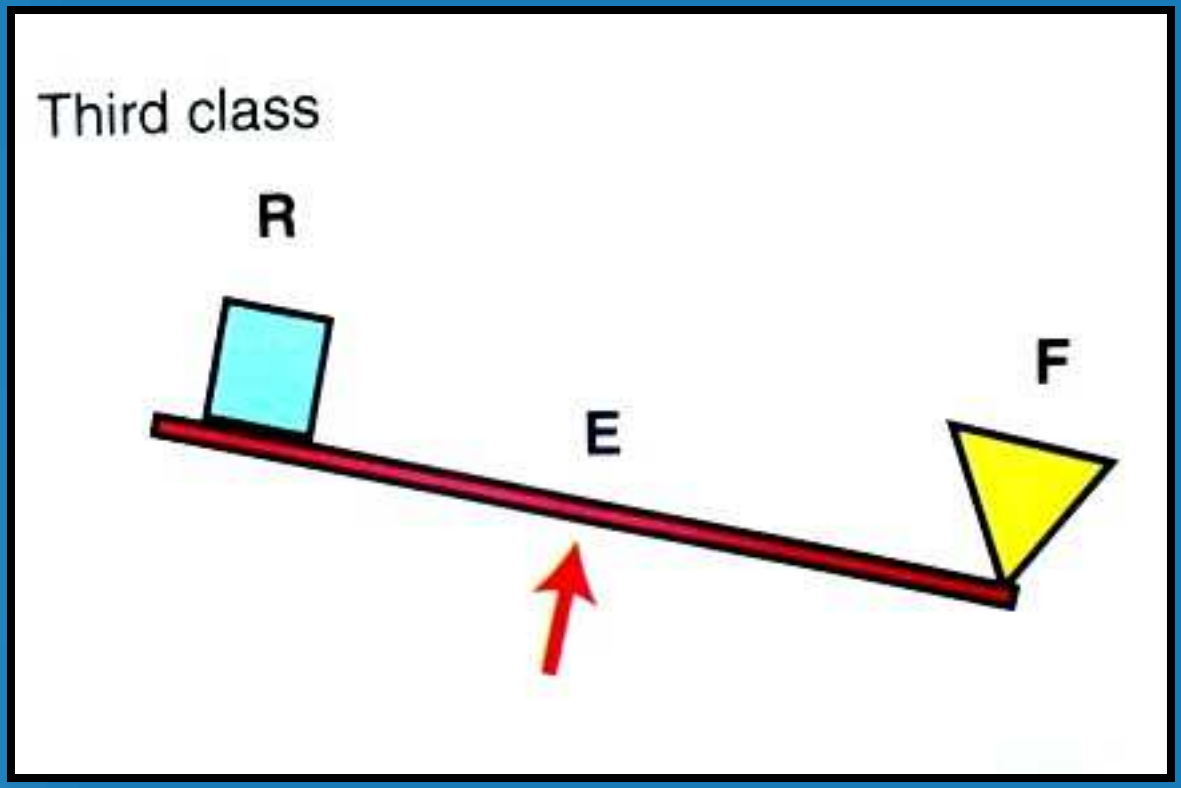
The support point of the lever is called as the **Fulcrum**

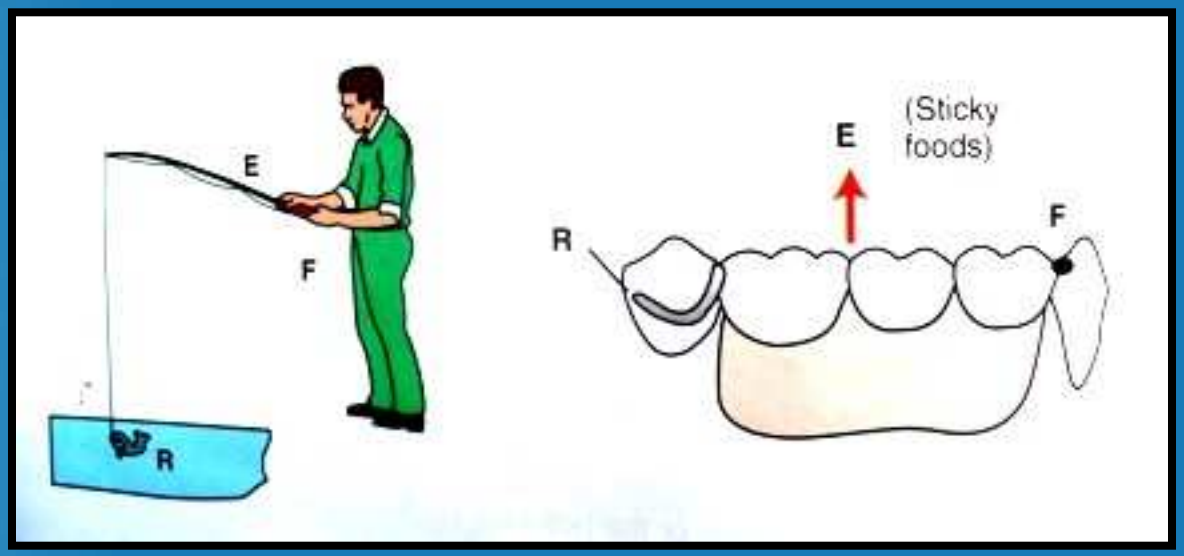



E
R
F
E
R
F




E
R
F
E
(Gravity)


Third class
R
E
F


E
F
R
E
(Sticky
foods)
F
R

Any prosthesis acting as a **Class I lever** exerts the most damaging forces in a biomechanical system

A **class II lever** exerts considerably lesser damaging forces

A **class III lever** does not exist in a removable partial denture situation

FULCRUM LINES & POSSIBLE MOVEMENTS IN PARTIAL DENTURES

The greatest movement possible occurs in the tooth tissue supported RPDs / Distal Extension Base RPDs mainly because of the reliance on the distal extension supporting tissues to share the functional loads with the teeth

A **Fulcrum line** is the imaginary axis around which movement or rotation of the RPD occurs

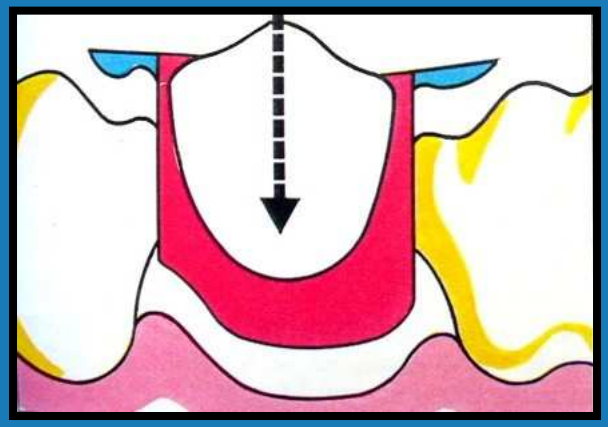
The basic rule of designing !!!

To develop a design for the removable partial denture , it is first necessary to determine how the denture is to be supported

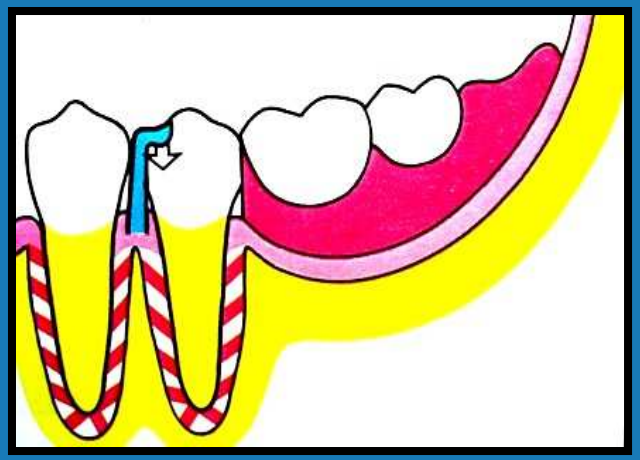
Tooth supported RPD

Tooth & tissue supported / Distal Extension RPD

Single path of insertion and removal offers better retention e.g., tooth supported RPDS

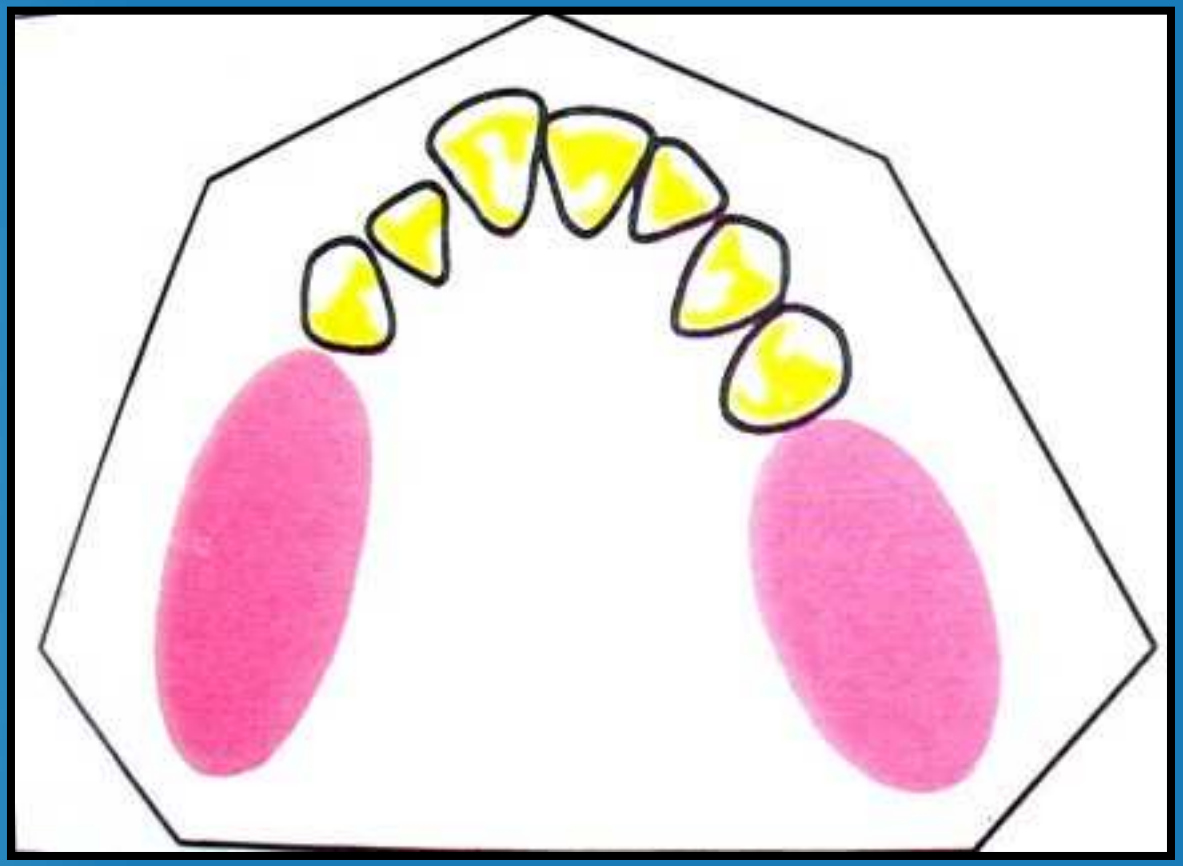


Multiple paths of insertion & removal compromises the retention e.g. Distal extension Base RPDS

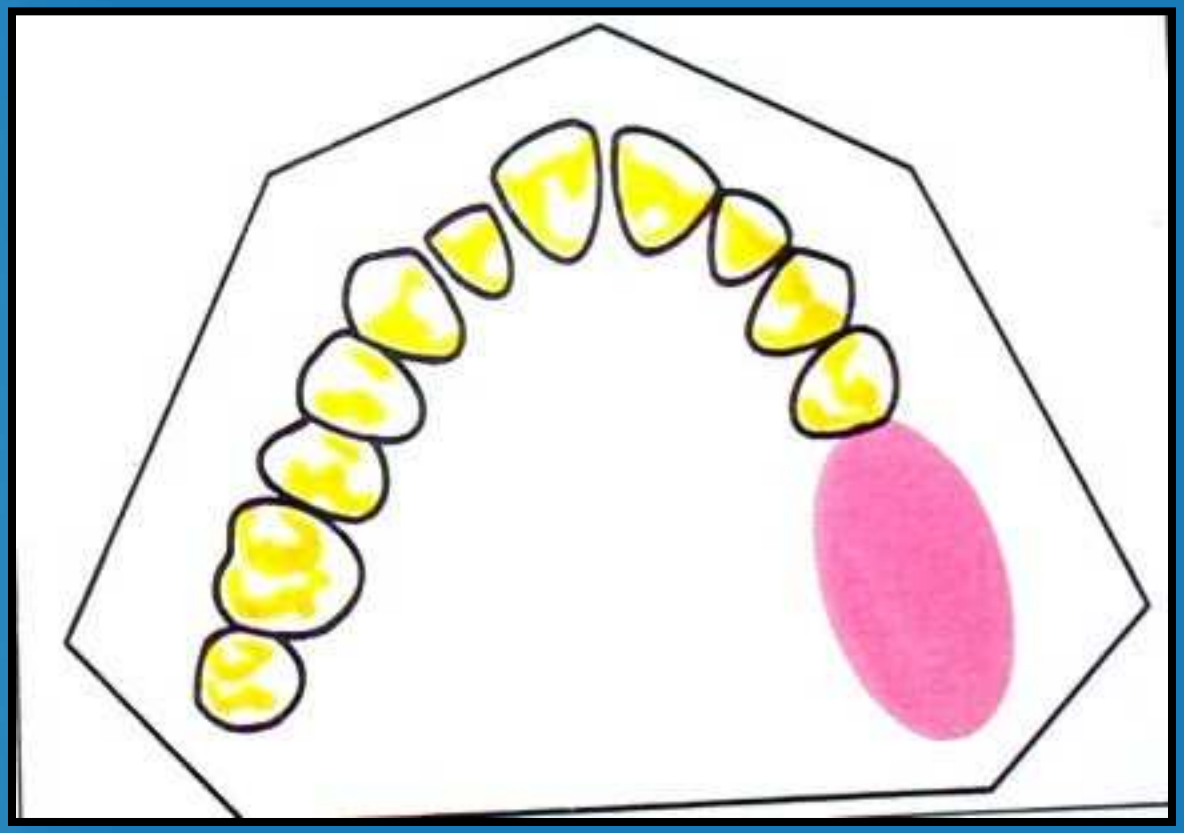


“ DIFFERENTIATION BETWEEN TWO MAIN TYPES OF RPDs ”

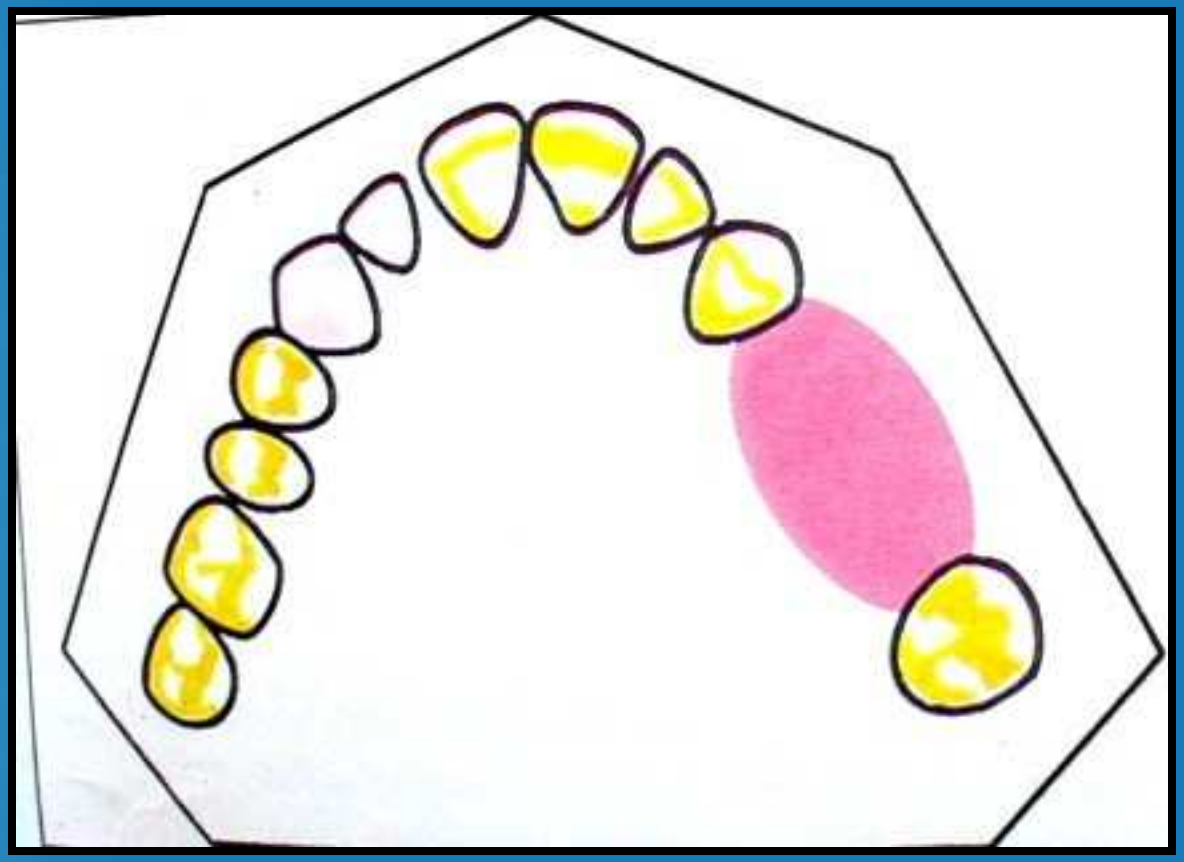
Kennedy's' Class I – Tooth &tissue supported /Distal Extension RPD



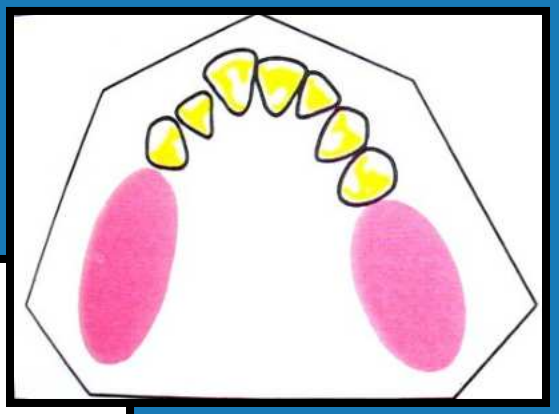
Kennedy's' Class II – Tooth &tissue supported / Distal extension RPD

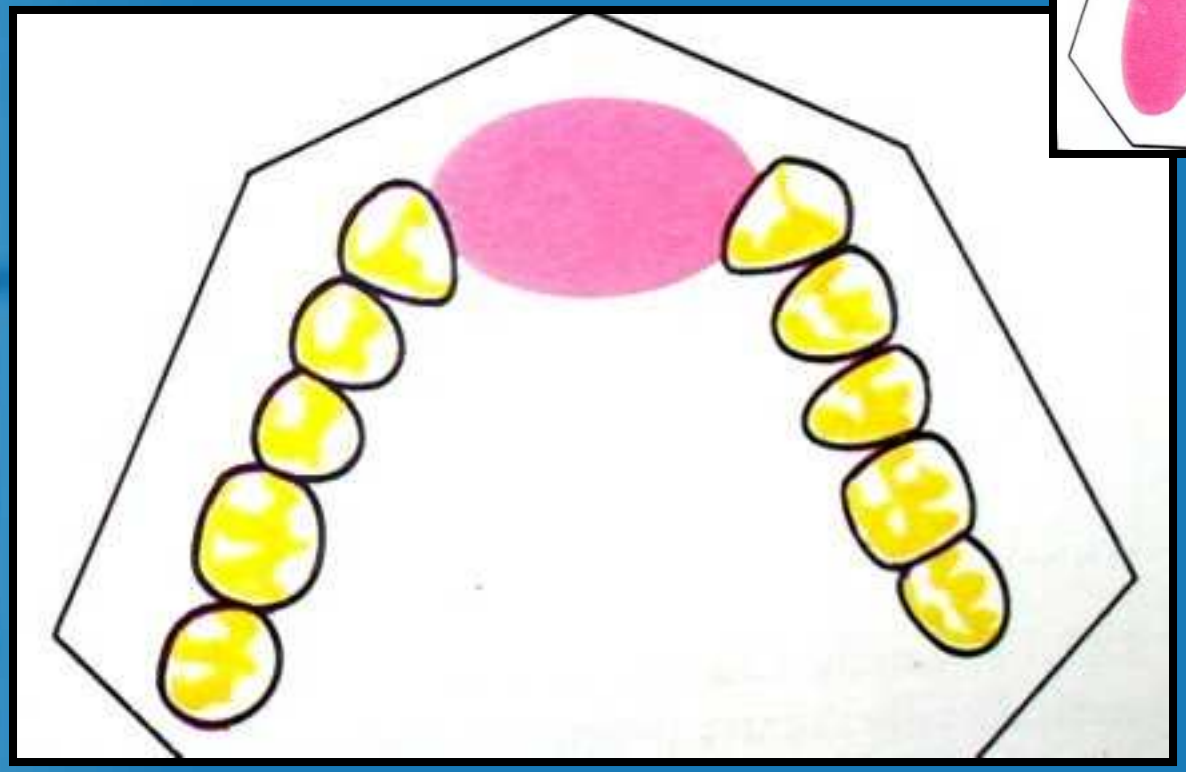


Kennedy's' Class III – Tooth supported RPD



Kennedy's' Class IV– Reverse Distal extension RPD





color coding

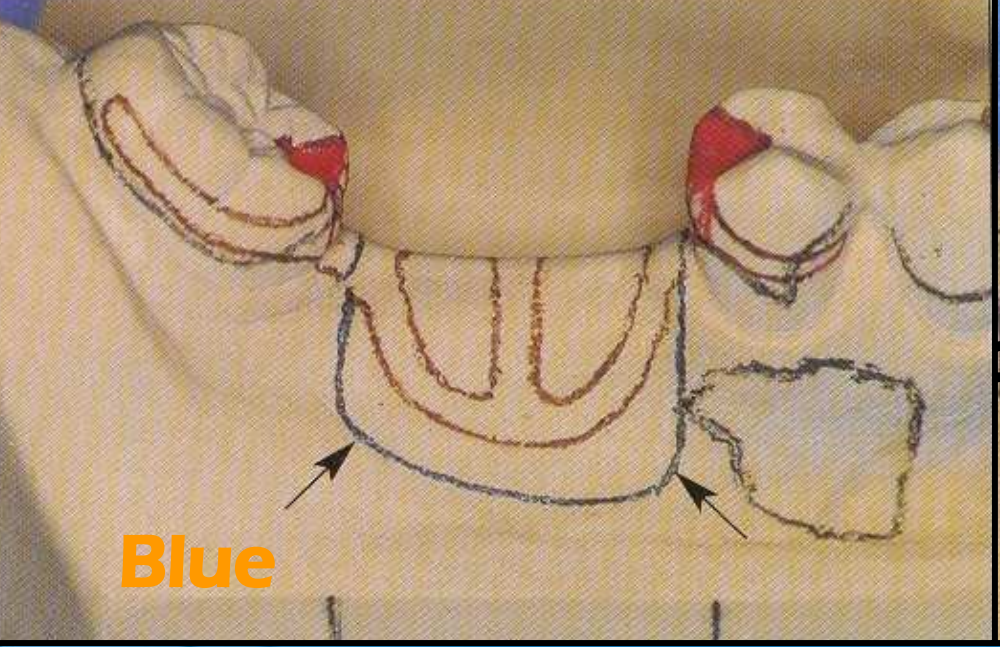
Present system uses

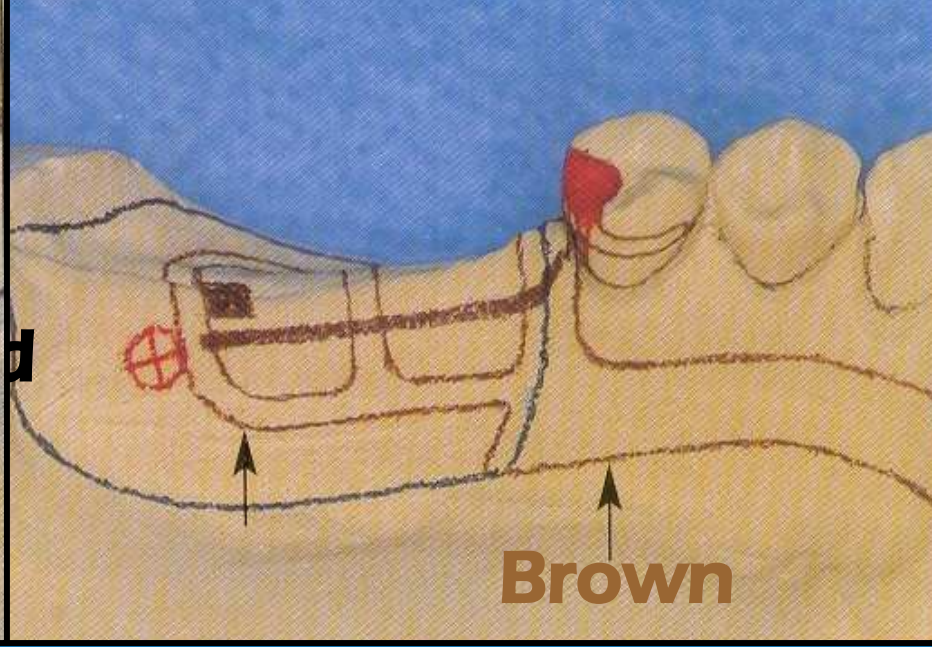
- ***Blue – acrylic portion***
- ***Brown – metal portion of partial denture***
- ***Red - areas on teeth that will be prepared , relieved or contoured***

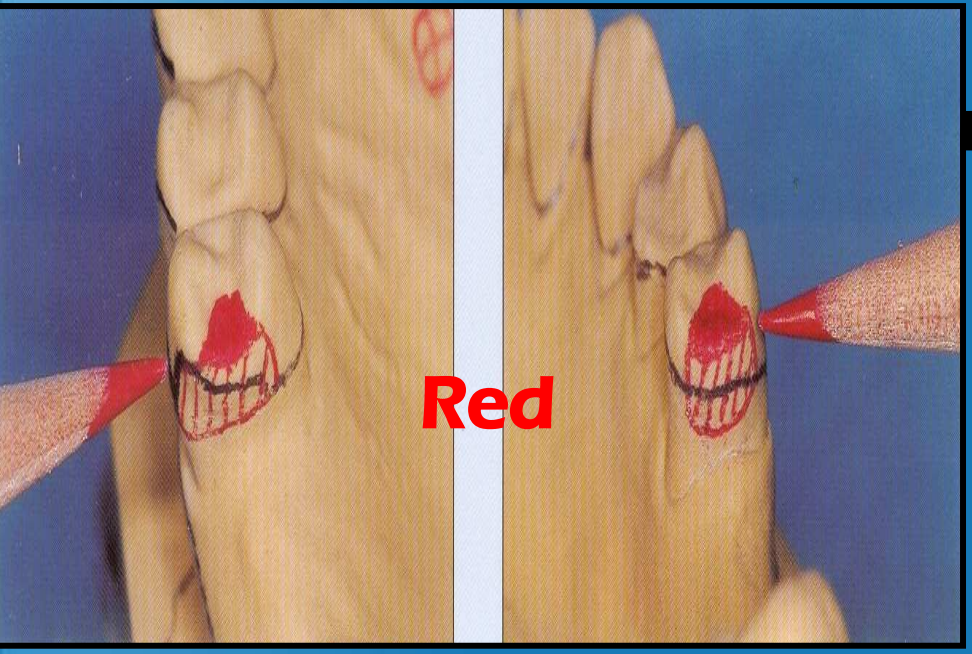
Solid red – rest seats

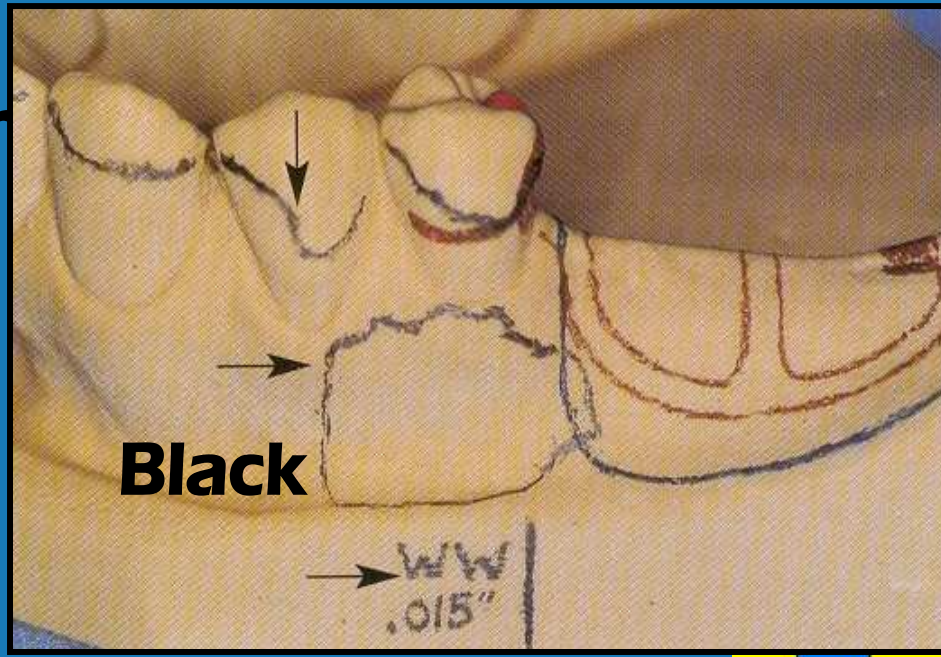
color coding

- **Black pencil and carbon marker** –tripod marks, survey lines, soft tissue under cuts and other information like type of tooth replacement or use of wrought wire for retentive clasps


Blue

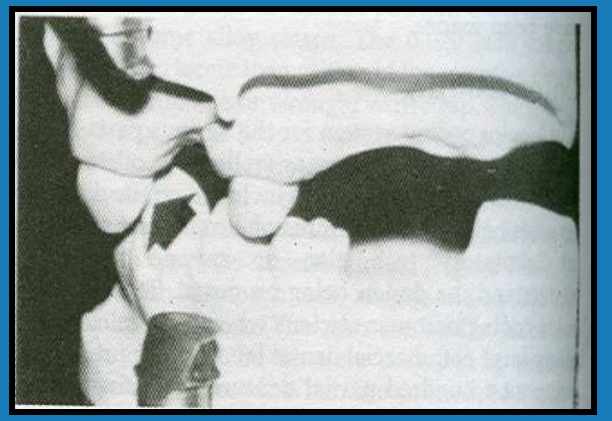

Brown

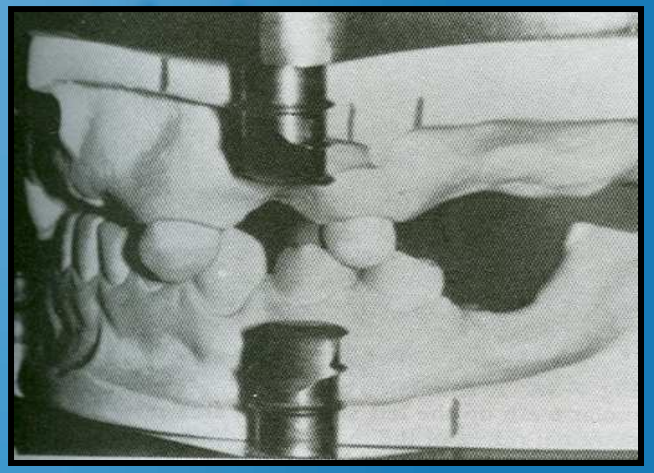

Red

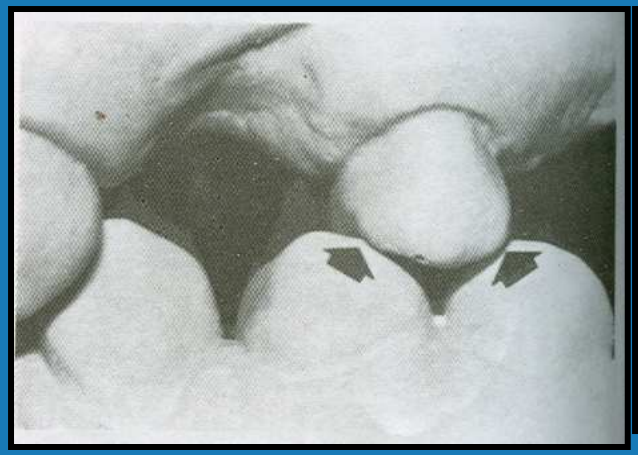

Black
WW
.015"

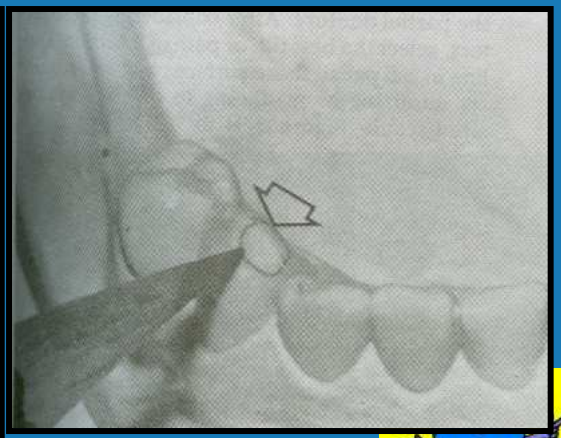
Steps in designing

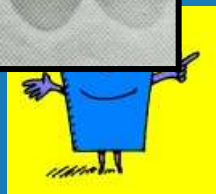
- *Examine the occluded diagnostic casts*



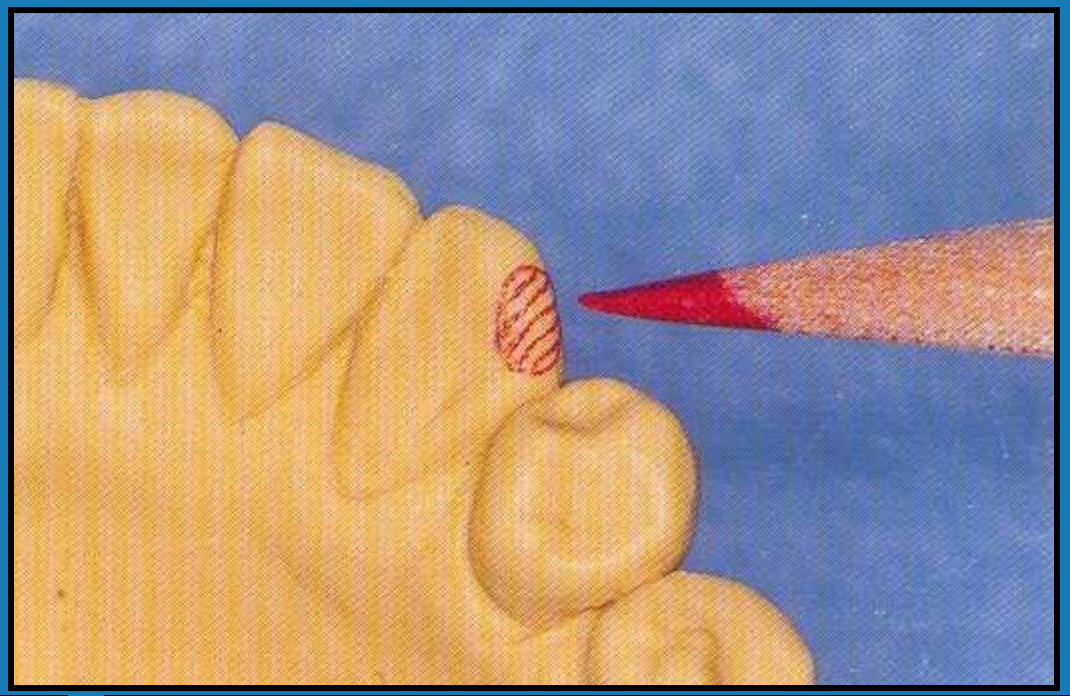


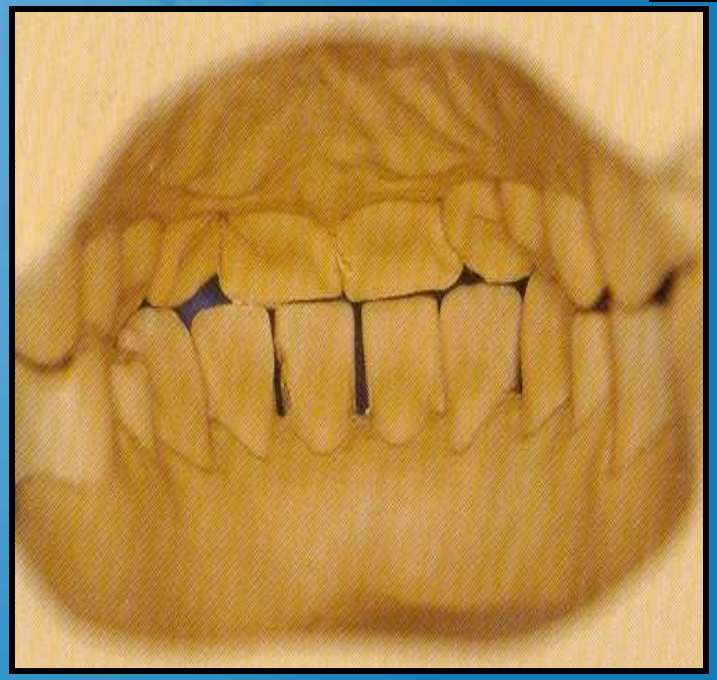


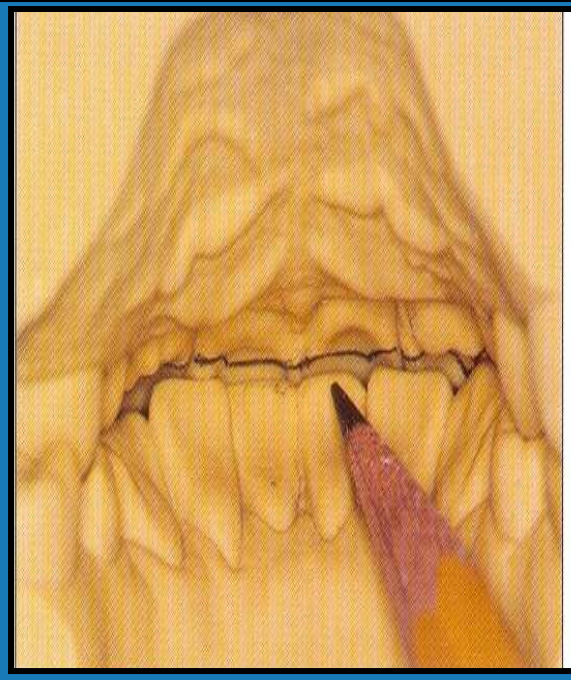


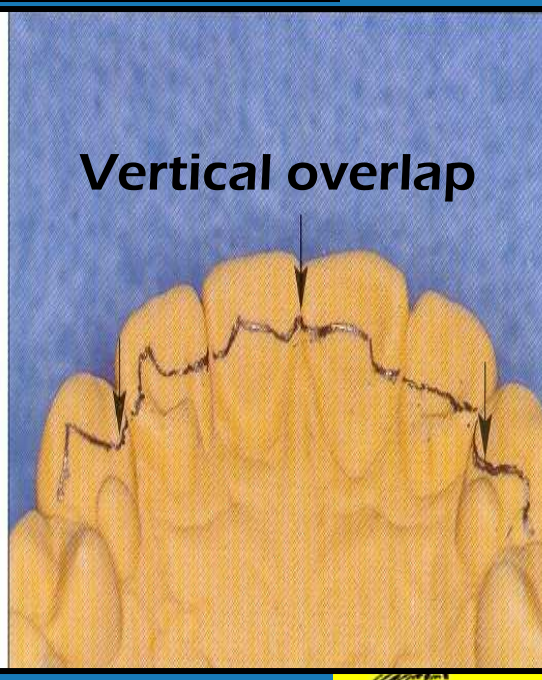


Reshape

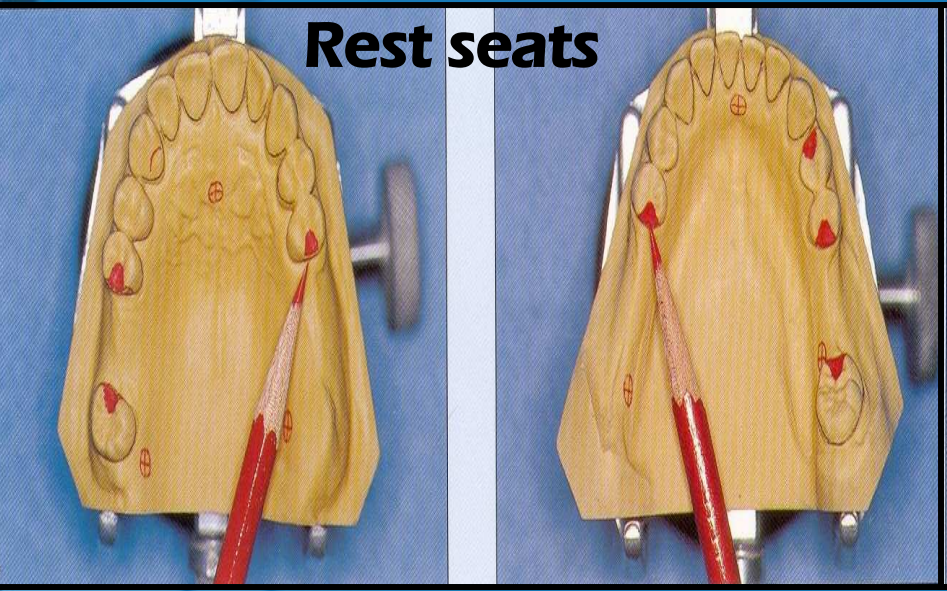




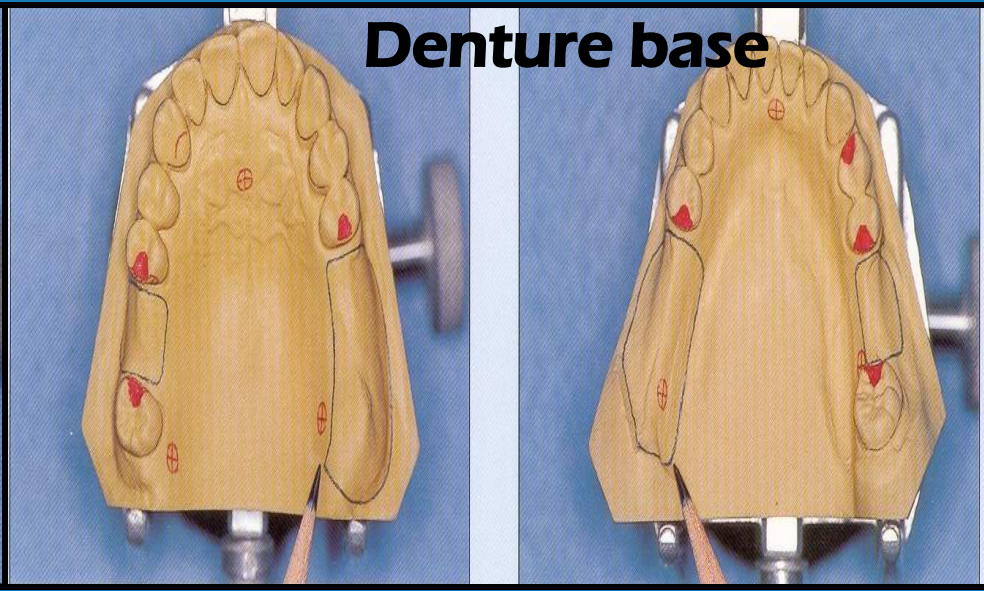




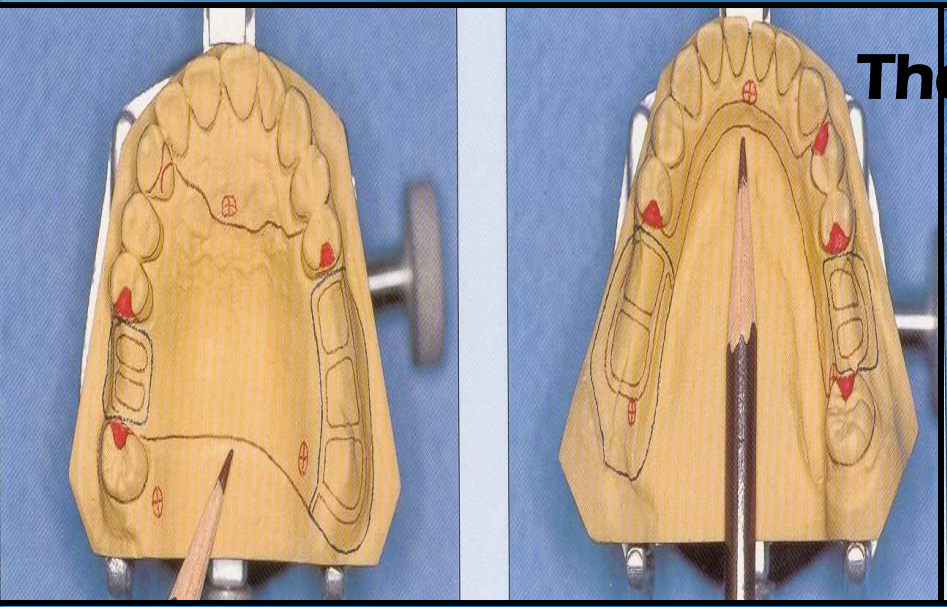
Rest seats

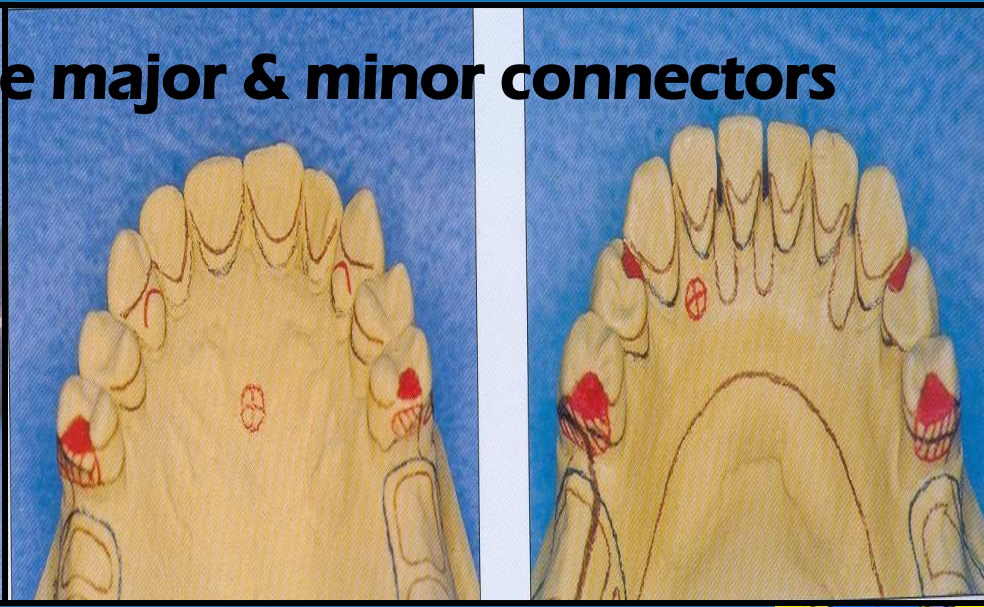


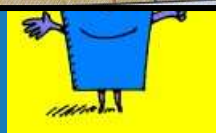
Denture base



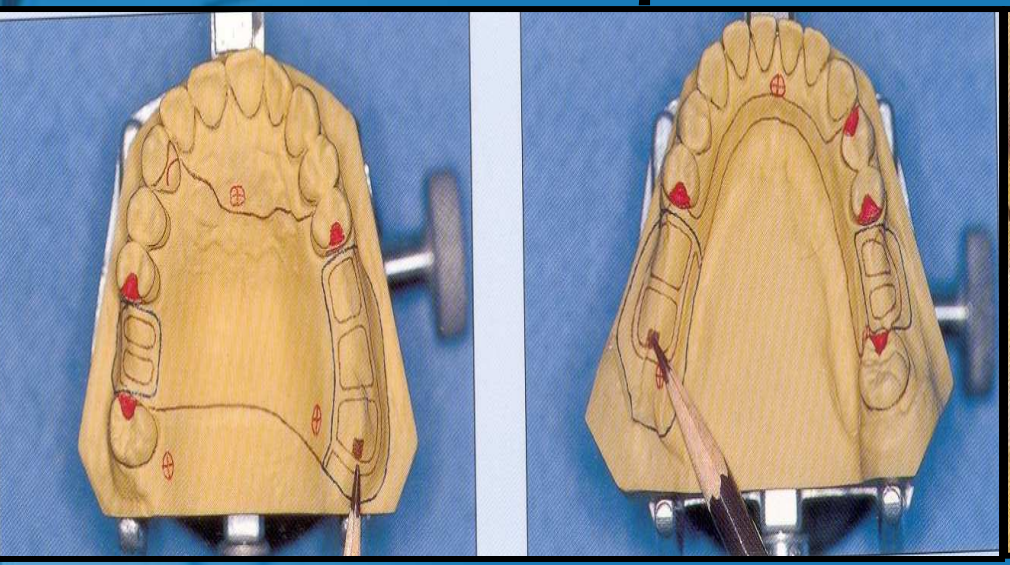
The major & minor connectors



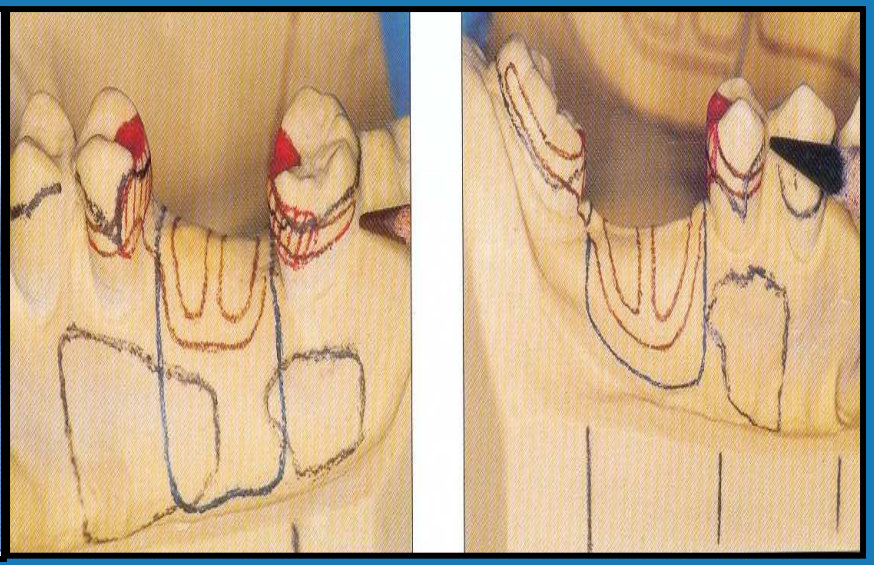




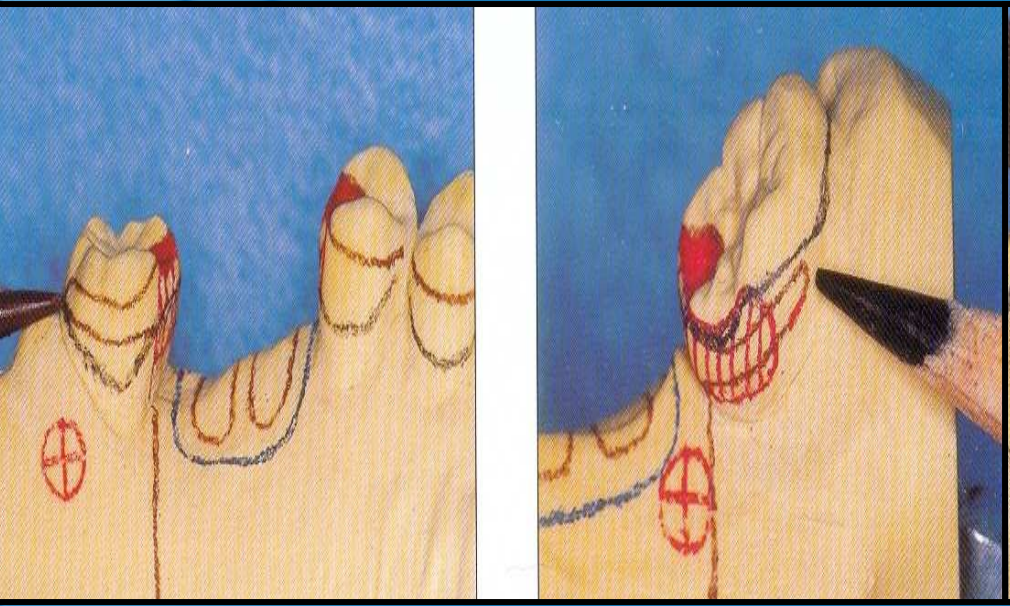
Cast stops



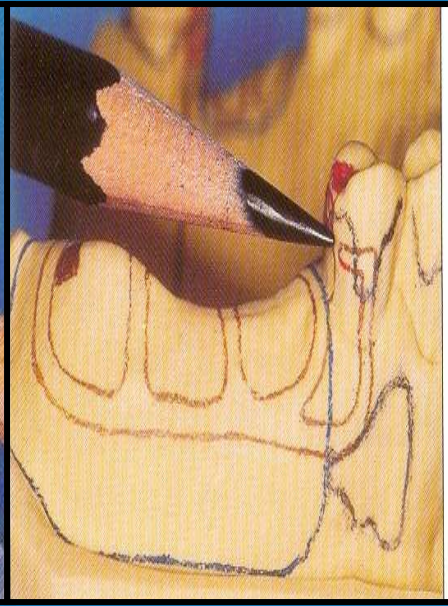
Retentive elements



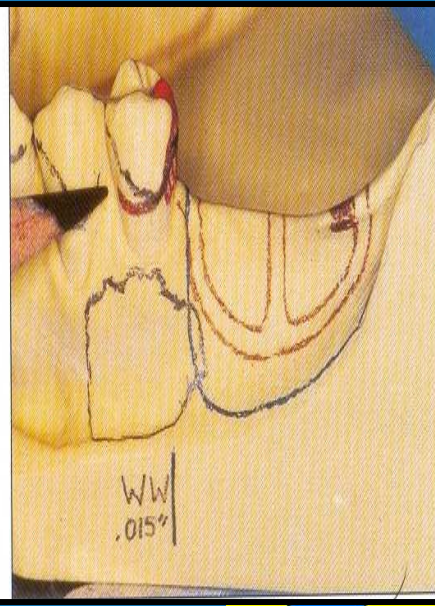
Reciprocal elements

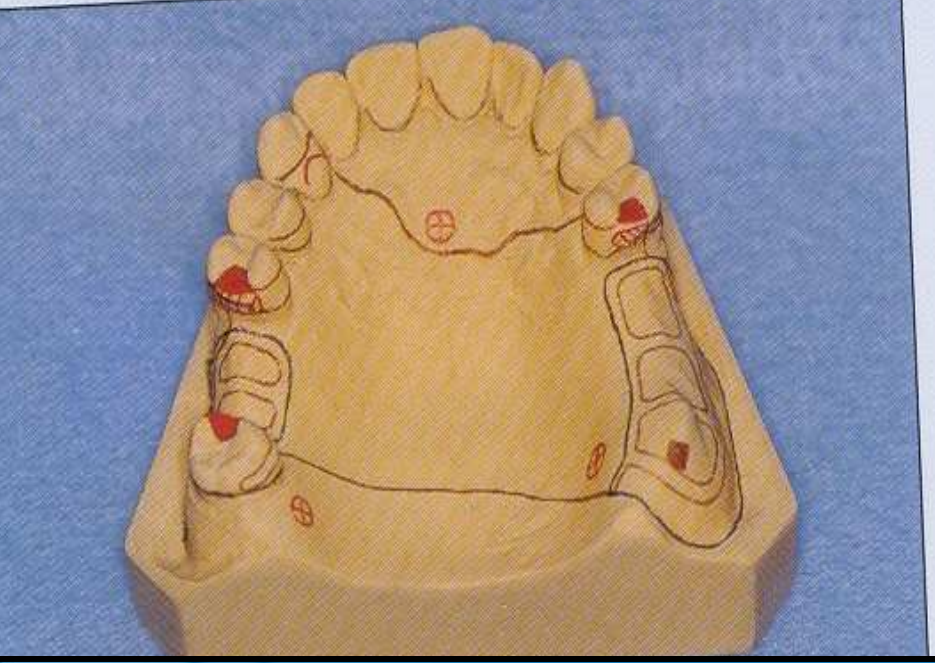


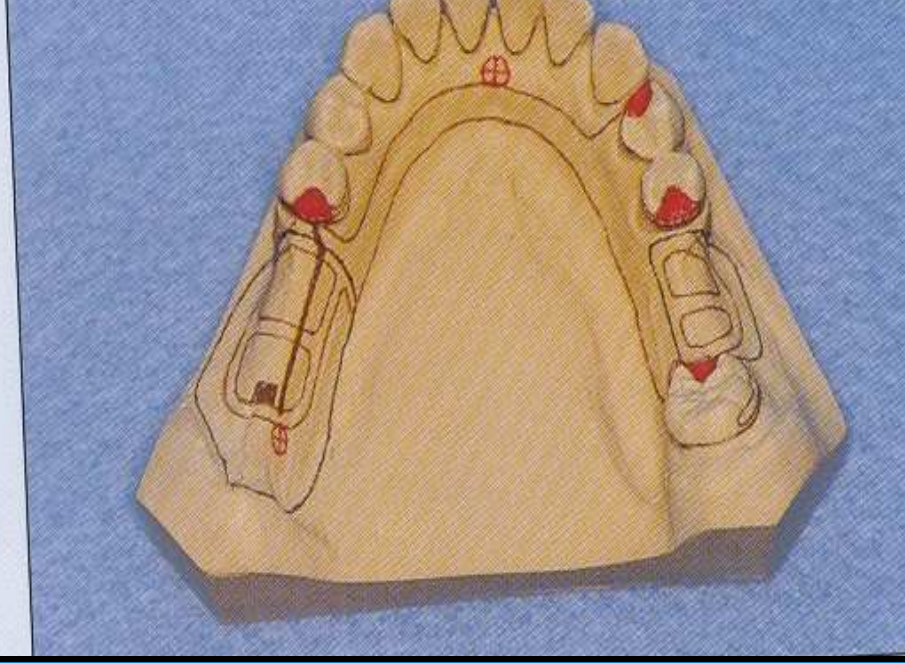
Distal ½ T retentive arm



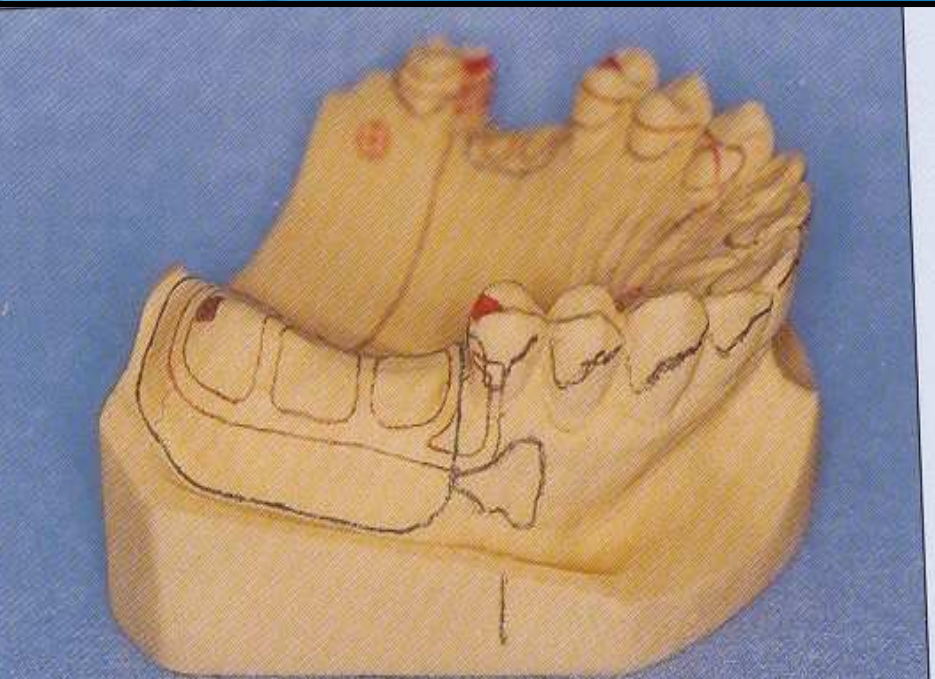
Wrought wire retentive arm

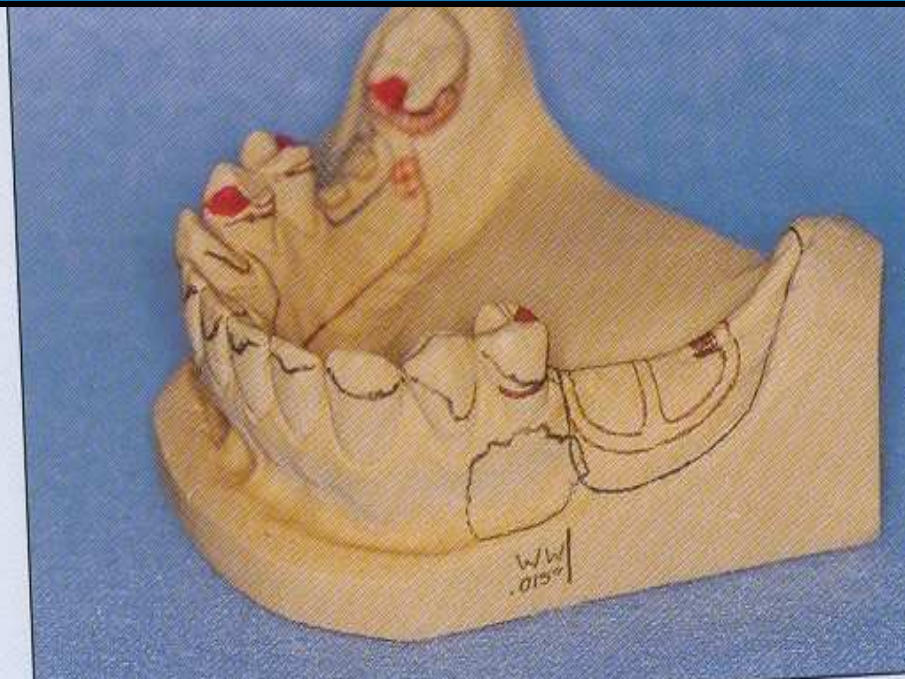






Completed design





THANK YOU