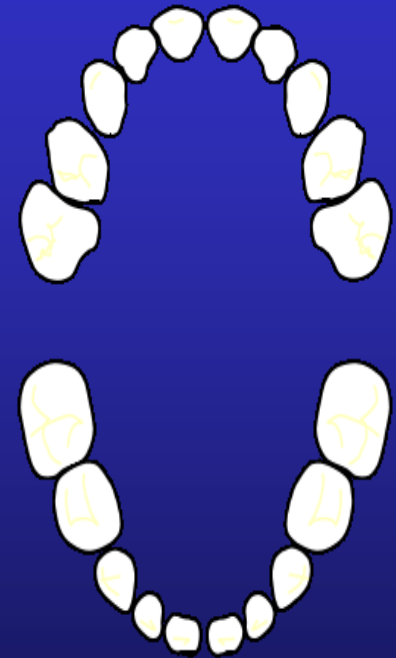


# Occlusal Considerations in Removable Prosthodontics



Prosthodontics (YEAR 2)

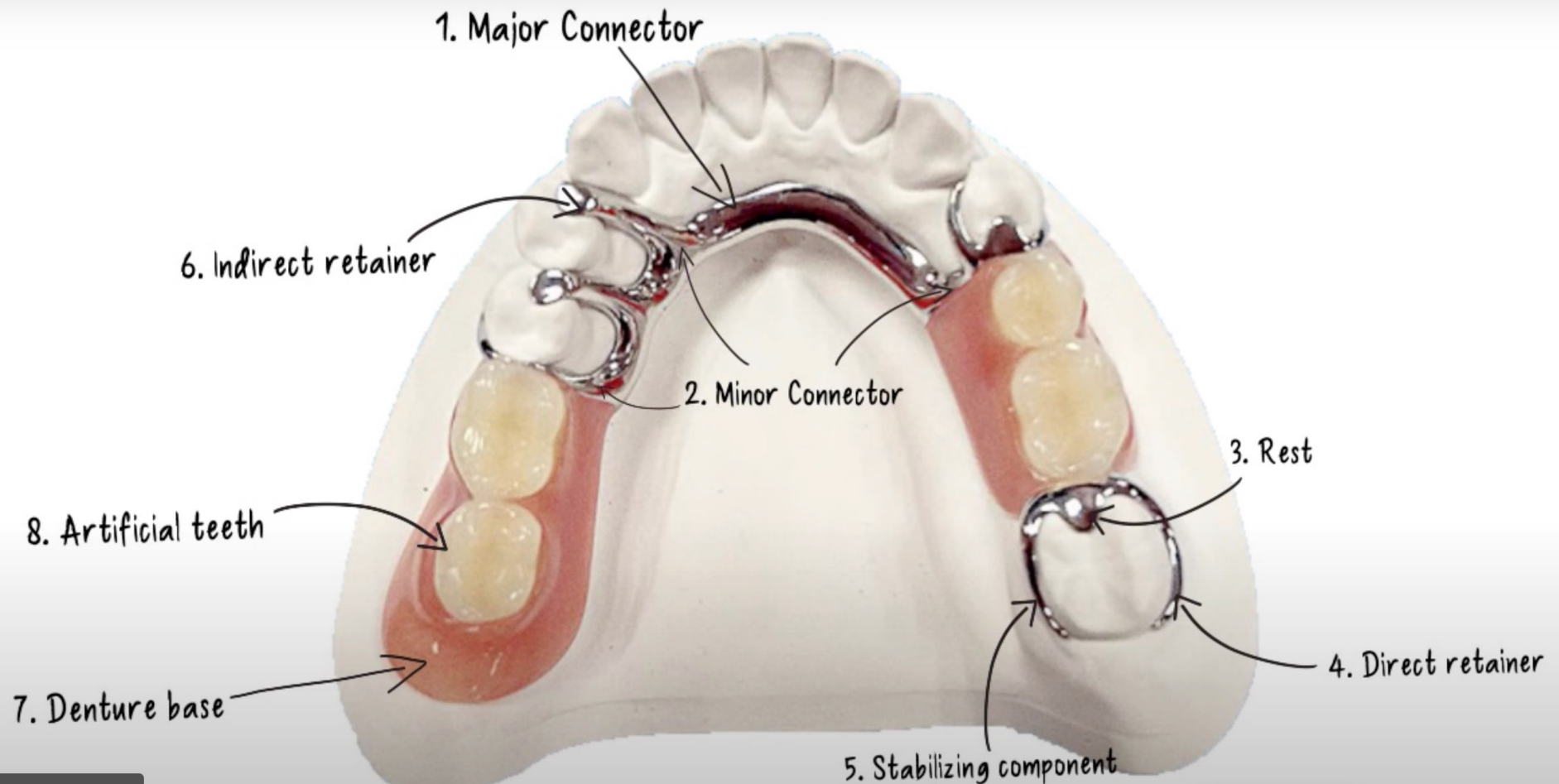
28 July 2021

Slides adapted from A/Prof S B Keng

# Aim in RPD Occlusion

- Occlusal harmony between a partial denture and the remaining natural teeth is a major factor in the preservation of the health of their surrounding structures.

# Aim in RPD Occlusion



# Differences between natural and artificial dentition

- 1. The teeth in dentitions are retained by periodontal tissues. When the natural teeth are lost, not only the occlusion is lost but also the attachments.
- In complete artificial occlusion, all the teeth are on two bases seated on slippery tissues.

# Differences between natural and artificial dentition

- 2. In natural dentitions, the teeth move independently and can migrate slowly to favorable occluding positions.
- The artificial teeth move as a unit and are instantly displaced by dislodging forces.

# Differences between natural and artificial dentition

- 3. A malocclusion of natural teeth may be uneventful for several years. If symptoms do occur, they are usually localized to the involved tooth or teeth.
- A malocclusion of artificial teeth creates an immediate response and usually involves a large area of the supporting tissues.

# Differences between natural and artificial dentition

- 4. Horizontal thrusts on one side of the natural teeth during mastication affect only the side involved and are well tolerated; whereas, in artificial teeth, the effect is bilateral and usually traumatic in nature.

# Differences between natural and artificial dentition

- 5. Incising in the anterior region of natural teeth does not affect the posterior teeth, but it does so in artificial dentitions.



# Differences between natural and artificial dentition

- 6. Mastication in the second molar region in the artificial occlusion shifts the base if it is on an inclined foundation; whereas, in natural teeth, it is one of the power points of mastication.

# Differences between natural and artificial dentition

- 7. In natural teeth, there rarely is bilateral balance during nonfunctional excursions; whereas, in artificial teeth, it is necessary to stabilize the bases.

# Differences between natural and artificial dentition

- 8. In the natural teeth, proprioception gives guidance to the neuromuscular control during function. This makes it possible for the individual to avoid clashing tooth contacts and to establish a habitual centric occlusion away from centric relation.

# Differences between natural and artificial dentition

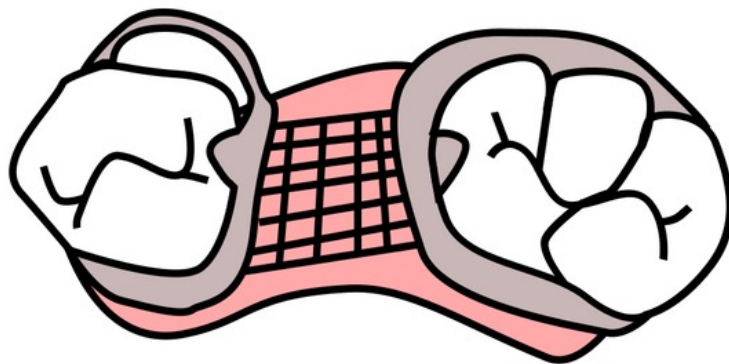
- 9. With artificial occlusion, no such signal system is present, and the mandible returns at the end of the chewing stroke to its optimum power position which is centric relation.
- If cusps interfere or if there are premature occlusal contacts, the base shifts to accommodate them.

# RPD

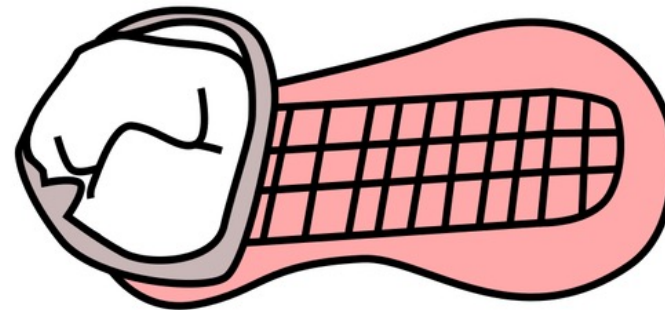
- Occlusal loads applied to the denture during chewing, swallowing and parafunction induce stress in the the bony support, either by **direct displacement of the mucoperiosteum** covering the ridge or via the tooth **through tension and compression of the periodontal membrane.**

# Saddles

- The artificial teeth that restores the continuity of the dental arch are attached to part of the denture called the saddle.



BOUNDED  
SADDLE



FREE - END  
SADDLE

# Bone Loss

- Stress applied to the edentulous alveolar ridge gives rise to increased bone loss in comparison with the unloaded ridge which has not borne a denture.

# Type of support of RPD

- **The choice of support** will be decided by the evidence gained in the clinical and radiographic examination of the patient and the consideration of the occlusal relationship of the articulated casts.



# Mucosal support

Provided by the saddle of the partial denture which fits over the residual alveolar ridge.

The amount of support depends on:

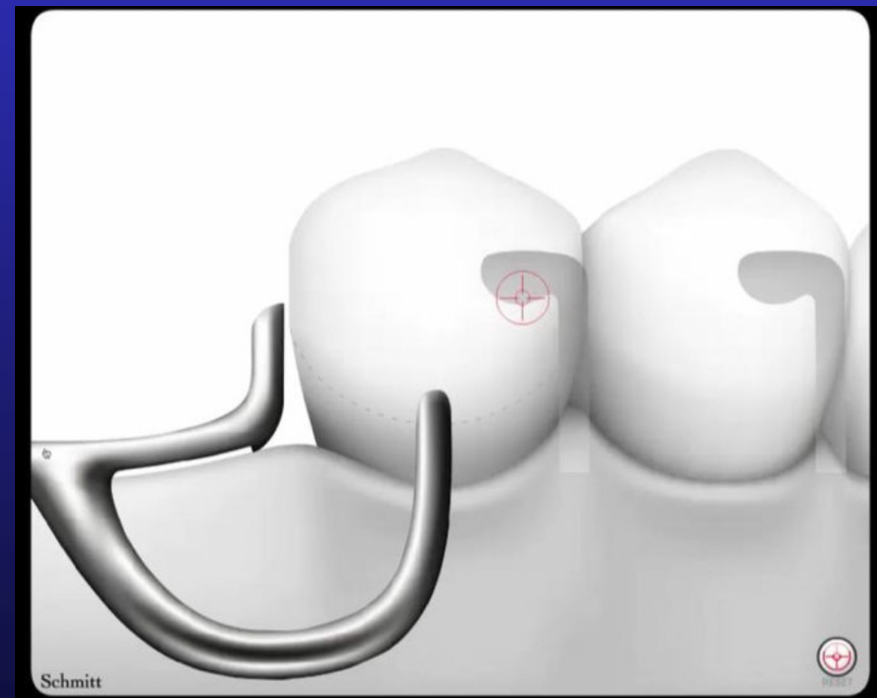
- a) Area covered
- b) The type of impression used to record the tissues
- c) The accuracy of fit of the saddle
- d) The thickness and compressibility of the supporting tissues.

# Occlusal support by mucoperiosteum

- Denture solely supported by the mucoperiosteum is likely to lose positive occlusal contact after loading
- Any contact of the base with the gingival margins may result in trauma inducing gum stripping

# Abutment teeth loading

- May produce torque and bodily movement



# Tooth Support of RPD

- Established mainly by the **abutment tooth** when the natural teeth has a suitable crown size, healthy periodontium, root size and not mobile.
- When the **artificial teeth are entirely supported** against vertical displacing forces by adjacent teeth, **the area of coverage of the edentulous ridge** may be small, sufficient only to restore the lost contour.

# Tooth Support of RPD



## Axial direction of force

- The vertical component of force applied to the artificial occlusion is most satisfactorily resisted by loading the abutment teeth in an axial direction within the physiological tolerance of the periodontal membrane.



# Conditions which make axial loading difficult

- When there is a free end saddle with **no distal abutment tooth** to support the saddle, the forces will then be distributed through the **abutment teeth and mucoperiosteum beneath the edentulous saddle**.
- Marked **destruction of the periodontal membrane** of the abutment teeth, or if the area of membrane is small in comparison with the area of the occlusal table of the denture

# Loading differential between PM and mucoperiosteum

- The problem of **differential displacement** in which the the mucosa is deformed 10 times more than the periodontal membrane
- Loads of  $10\text{g}/\text{mm}^2$  produce displacement of oral mucosa of 30-40% of its resting thickness after 0.1 seconds and 50-60% after 10 minutes.



# Movement of abutment teeth depends on

- The number, type and location of rests offering support for the denture
- (Precision and deep seated rests may produce greater movement than shallow spoon shaped types)



# Movement of abutment teeth depends on

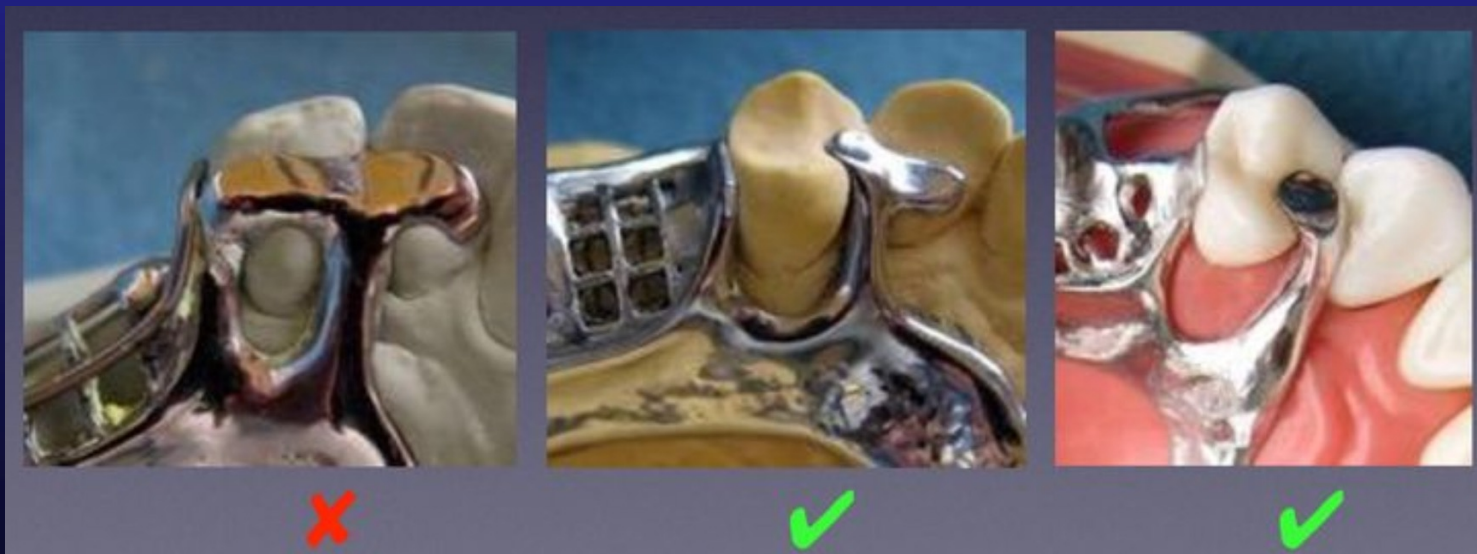
- **Cast retainers** (Both chrome cobalt and precision attachments induce **more stress** than wrought wire clasps)
- The extension and fit of the saddles (**poorly fitting and under-extended saddles** produce more movement)
- The **size of the occlusal table** (a reduction in the area of contact reduces stress applied to the supporting tissues).

# Vertical loading on artificial teeth

- A) Borne directly by the mucoperiosteum covering the alveolar ridge.
- B) Transferred from the saddle to the periodontal membrane of the abutment natural teeth.
- C) Shared by the edentulous ridge and the teeth.

# Rests

- **Linked to minor connector** to prevent displacement of the base towards the tissues.
- Should transmit forces nearly as possible along the **long axis of the tooth**.
- Should **not interfere** with the normal path of closure of the mandible into centric occlusion.



# Rests

- Should **deflect food** away from the interdental embrasure.
- May modify an **improve the occlusal form** and masticatory function of the tooth.
- Frequently it may be possible to reduce or reshape the surface of the tooth to produce an adequate rest seat which will permit the above criteria to be fulfilled .

# Failure to provide and maintain adequate occlusion in RPD is due to:

- 1) Lack of support of the denture base
- 2) Failure to establish occlusion to a single static jaw relation record.
- 3) Unacceptable occlusal plane i.e. occlusal forms of the teeth on the denture must conform to an already established occlusal pattern of the remaining natural teeth.

# Natural teeth dictates artificial teeth

The pattern of the occlusion of **natural** teeth present at the time the RPD is made usually **dictates the occlusion on the RPD.**

# How to establish a satisfactory occlusion in RPD

- a) An analysis of the existing occlusion
- b) Correction of the existing occlusal disharmony if necessary.
- c) Recording of CR. or an adjusted centric occlusion.
- d) The recording of eccentric jaw relations on functional eccentric records
- e) The correction of occlusal discrepancies created in the processing of the dentures.

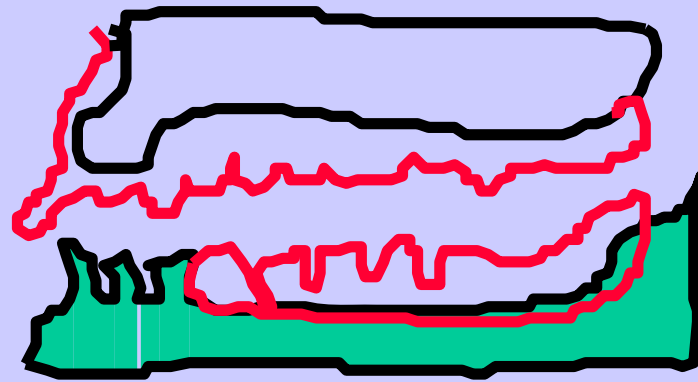


# Desirable occlusal contact relationship for RPD

- 1) Simultaneous bi-lateral contacts of posterior teeth i.e. in CO (Max intercuspation)
- 2) Completely tooth-borne dentures may be arranged similar to the occlusion seen in a harmonious natural dentition.

# Desirable occlusal contact relationship for RPD

## 3) Upper complete denture/ Lower RPD.



Here we strive to get balanced occlusion in eccentric positions. This is done to promote the stability of the upper complete denture.

# Desirable occlusal contact relationship for RPD

## 4) Lower Distal Extension Free-end saddle denture

Working side contacts in the (Free-end saddle case) should occur simultaneously with the working side contacts of the natural teeth to distribute the stress over the greatest possible area.



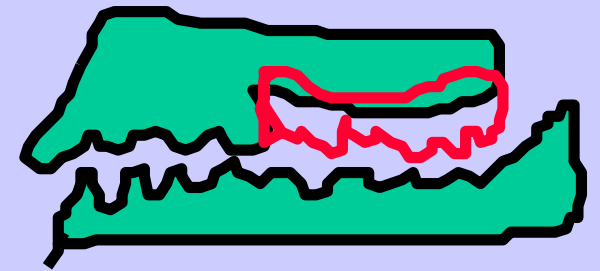
# Desirable occlusal contact relationship for RPD

## 5) Upper bilateral distal extension RPD

Simultaneous balancing and working contacts should be formulated for this case.

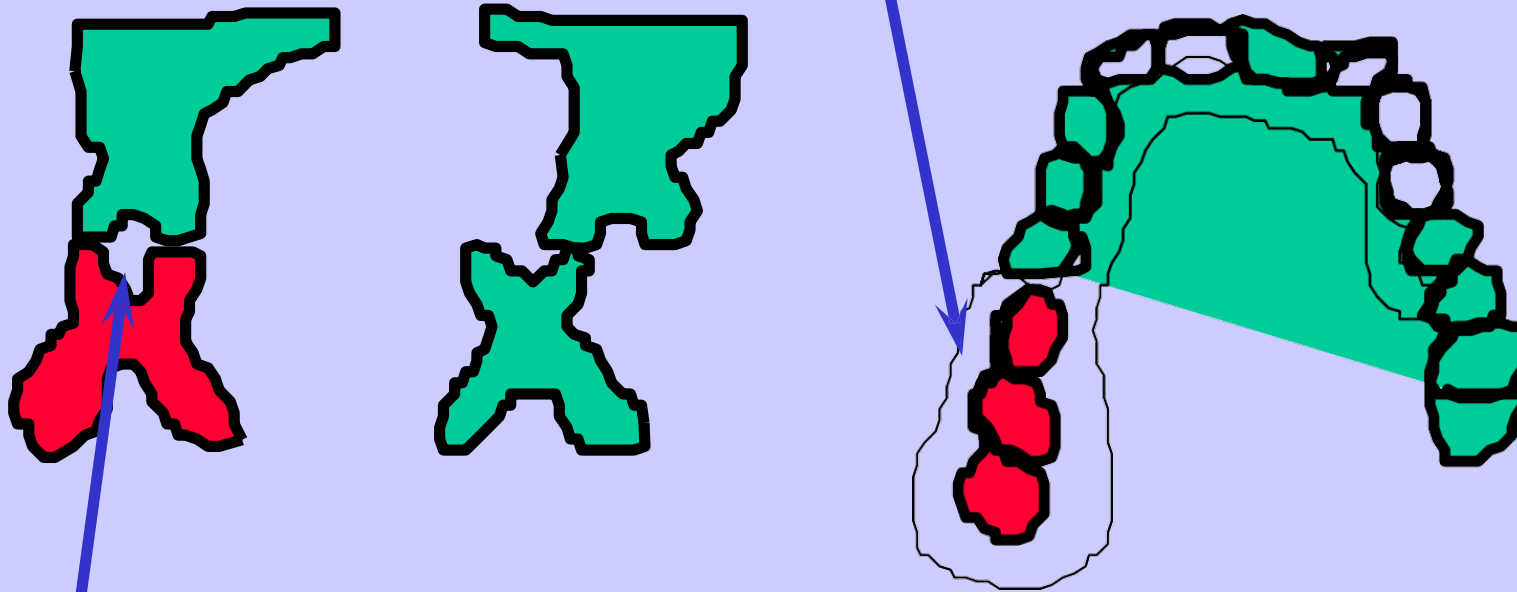
This is done to compensate for the unfavorable position of the maxillary artificial teeth which is usually positioned lateral to the crest of the ridge.

This desirable relationship is often compromised if patients' natural teeth have a steep vertical overlap.



# Desirable occlusal contact relationship for RPD

- 6) Maxillary or Mandibular unilateral distal extension denture



- Only working side contacts need to be formulated

## Desirable occlusal contact relationship for RPD

- 7) Class IV RPD
- Contact of opposing anterior teeth in centric occlusion is desirable to prevent a continuous eruption of the opposing natural teeth.

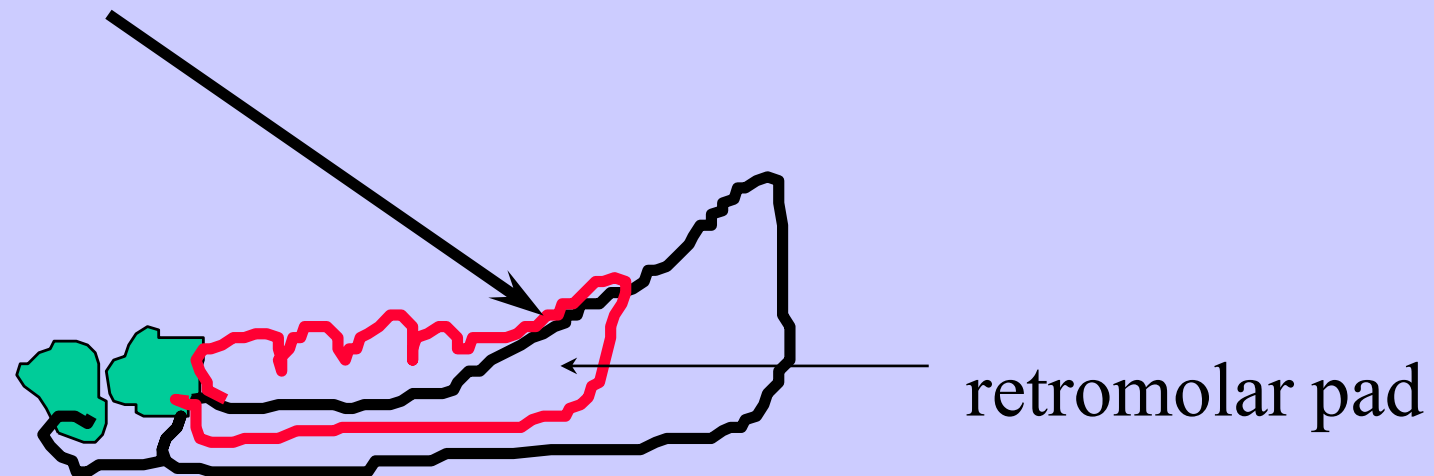
## Desirable occlusal contact relationship for RPD

- 7) Class IV RPD
- However in eccentric positions it should not be developed **except for edge to edge position in protrusive balance.**



## Desirable occlusal contact relationship for RPD

Artificial teeth should not be arranged on the upward slope of the retromolar pad.





Thank you for your attention!