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**Tooth preparation for RPD**

Our goals when preparing teeth for RPD are to:

-Establish guiding planes

-Modify unfavorable survey lines

-Provide rest seats

-create retentive areas

-doing some occlusal adjustment

Teeth preparation must be planned on articulated casts after being surveyed. Always preparation is done in enamel using *diamond* burs. After that, roughened enamel should be smoothened and polished. Then topical fluoride should be applied to reduce caries risk of the modified enamel surfaces.

**Guiding planes**

It is defined as two or more parallel axial surfaces on abutment teeth which limit the path of insertion of a partial denture. May occur naturally but most commonly need to be prepared by the dentist.

Functions of guiding plane:

1-**Increase stability**

Stability is the resistance to horizontal forces

This is achieved by resisting displacement of the denture in lateral directions other than along the planned path of displacement

\*if you have multiple paths of insertion and removable, the denture will not be stable against lateral forces

2-**Reciprocation**

It allows a reciprocating component to maintain continuous contact with a tooth as the denture is displaced occlusally

When the clasp tip flexes down in the maximum bulge under the survey line, it exert force on the other side of the tooth, so we should have a component on the other side that resists this movement.

Reciprocation on the other side can be achieved by reciprocal elements like reciprocal arm or plate placed opposite to the retentive tip.

Reciprocal element should be above survey line. That’s why we always prepare the lingual or palatal surface of teeth to provide parallel surface to the other guiding planes where the reciprocal element will be touching the tooth surface as long as the retentive tip is moving up and down the survey line.

3- **Prevention of clasp deformation**

Guiding surfaces ensure that the patient removes the denture along a planned path. The clasps are therefore flexed to the extent for which they were intended to flex. Without guiding planes the patient may tilt or rotate the denture on removal, causing clasps to flex beyond their proportional limit

Continuous flexion beyond proportional limit will cause fatigue and fracture. Eventually it will also cause traumatic forces on the teeth. The clasp will become nonfunctional.

4- **Improve appearance**

A guiding surface on an anterior abutment permits an intimate contact between saddle and tooth which allows giving a more natural appearance. Most of the times, these guiding planes needs to be prepared

Usually anterior saddle has *posterior tilt*. So you can extend the denture in areas that are not undercuts in the path of insertion and removal but are undercuts relative to the common path of displacement. This gives extra retention and you can cover the gaps anteriorly and so improve esthetics.

Preparing guiding planes:

You need to preserve the tilt. You can use score line on the sides of the cast or tripoding. You hold a high speed diamond chamfer or shoulder bur and put it parallel to the score lines then transfer it the way it is to the patient mouth and you prepare the teeth.

You check parallelism by eye and you can take an impression after you finish to make sure the planes are prepared the way it was planned for it. And this impression could be your final impression if everything is ok.

A more precise approach to the preparation of guiding surfaces is by the use of jigs constructed on a prepared study cast and then transferred to the mouth, either to control the positioning of the handpiece or to check on the location and amount of enamel reduction, but to be honest no one does this.

\*You should be very conservative while preparation. You should not exceed 0.5 mm of the tooth surface and follow the contour of the teeth bucco-lingually (we don’t want a *flat* surface). Cylindrical concept is to follow the contour of teeth bucco-lingually, and occluso-gingivally you should have 3 mms that are parallel to the path of insertion.

*A guide surface should extend vertically for about 3 mm and should be kept as far from the gingival margin as possible*

Guiding planes on abutment teeth supporting distal extension base is minimized to achieve stress breaking effect, so we have to have shorter guiding plane so we will not have a very rigid contact with the tooth.

You can as we said prepare guiding planes on the lingual surface of teeth to get reciprocation, but also you prepare lingual surface for other components of the RPD like putting cingulum rest seats.

Any unfavorable undercuts could also be reduced or prepared in a way to get reciprocation from it.

All guiding planes should be prepared parallel to the path of insertion.

\*Notice: Guiding plane is on the tooth but guiding plate is a metallic component in the denture itself ☺

After finishing the guiding planes, we move to prepare the rest seats.

Rest seats functions:

1. **produce a favorable tooth surface for support 2- prevent interference with the occlusion 3- reduce the prominence of the rest(**less irritating to the patients)

Rest seat principle is to transfer the force to the **long axis** of the tooth. It is not only for support but also prevent traumatic forces acting on the teeth.

Occlusal rest seats in *Posterior teeth*

Reduction in the height of the marginal ridge by about 1-1.5 mm to ensure an adequate bulk for mechanical strength of the rest. Less than 1 mm it will be prone to fracture.

Triangular in shape with the apex towards the center and base towards marginal ridge.

If we take a cross section, the floor of the rest seat should have an angle less than 90 degree with the guiding plane.

Seats should be saucer-shaped to allow an amount of horizontal movement of the rest to dissipate some of the energy developed by occlusal forces.

In occlusal view, the seat takes half the distance bucco-lingually and one third the distance mesio-distally in premolars ( in molars it is one forth)

Seats should be rounded(saucer shaped) because box-shaped rest seat may result in the rest applying damaging horizontal loads on the abutment tooth.

To know if you did adequate reduction after seat preparation, take a piece of softened wax and tell the patient to bite on it and then check the amount of reduction you did with a graded probe.

In double acer, we also lower the marginal ridges to provide enough space but be very careful never to break the proximal contact between the teeth.

On *Anterior teeth*, we mostly use cingulum rest seats mostly on maxillary canines. We could also use cingulum **ledge**, ball and inverted V.

Cingulum Inverted V mainly for maxillary canines sometimes in mandibular canines and very rare in incisors and although we call it inverted V we have no sharp angles in it. It is 2-3 mm mesio-distally.

Cingulum **Ledge** rest seat is prepared the same way but more gingivally placed and if you look proximally you will see it(slightly cross the midline).

Cingulum Ball rest seat provide less support and less thickness and is rarely used.

Incisal Rest seats are rarely prepared, mainly for lower incisors and canines. They are the last option if we have no prominent cingulum. They are placed 2.5 mm mesio-distally and 1.5 mm occluso-gingivally.

Cingulum rest seats are better in the concern of esthetics and also because they are more centered towards the midline.

After finishing rest seats, we aim to adjust unfavorable survey lines.

When we do surveying, we notice that some survey lines are too high(going occlusally). We can improve it by changing the tilt but sometimes this will affect other teeth's survey lines. So in these cases we can reduce from the contour(bulge) to locate the line more gingivally so the occlusally approached clasp tips will engage well and flex properly under the new line.

In the occlusally approaching clasp, we need at least 0.25mm of undercut so there will be proper engagement. If we have less than .25mm, we can improve the undercut by either making a small dimple(enameloplasty) under the survey line for the tip to engage or we can actually build up the tooth with composite on the buccal surface(broad base composite not a spot area).

Please refer to the slides to see relevant photographs

Thank you ☺