DENT 718 - Advanced Topics in Removable Prosthodontics, Winter 2008

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Class I RPD Design Considerations
CLASS I - DESIGN

• Premolar abutments
  - mandible
  - maxilla
• Canine abutments
  - mandible
  - maxilla
• Premolar, canine and lateral abutments
FULCRUM LINES

• Page 96 of your text (you need to know this material, all three columns, especially fulcrum and retentive fulcrum line axes.)

• FULCRUM LINE AXIS - Tissue directed movement of the base under loading - goes through the most distal occlusal rests.

• RETENTIVE FULCRUM LINE AXIS - Movement of the base AWAY from the ridge - goes through retentive clasp tips.
INDIRECT RETENTION

• The component of an RPD that assists the direct retainers (clasps) in preventing displacement of a distal extension base by functioning through lever action on the opposite side of the fulcrum line when the denture base rotates away from the tissues around the fulcrum line. (from the previous slide, which fulcrum line would this be?)
Class I - Premolar abutments - Mandible

Primary rests
Indirect Retainer rests
Clasp arm
Major connector
Primary fulcrum line

Primary rests
19ga wrought wire clasps
Lingual bar with 30ga relief
Indirect retainer rests

Think about the pros and cons of placing rest seats on the mesial or distal surface of abutment teeth in such a case as this.
Class I - Premolar abutments - Maxilla

Think about clasp selection (design and material) - when and why?

Primary rests
Indirect retainer rests
Clasp arm
T bar cast clasp
Primary rests
Indirect retainers

Major connector
Primary fulcrum line
Anterior border of palatal plate ending in valley of rugae
Class I - Premolar abutments - Combination case

Gold occlusals allow for more accuracy in the occlusion - they also ‘hold’ the vertical dimension better because they resist wear more than acrylic does. This patient was a bruxer....

A combination case should have bilaterally balanced occlusion with maximum contacts in centric, balancing and working.

Balancing

Working
Class I - Canine abutments - Mandible

Primary rests provided by first portion of long rest

Indirect retention provided by mesial portion of long rest

Primary fulcrum line

Select appropriate clasp arms

A Class I-A case

PFM crowns with raised cingulum rests

A lingual plate covers the rests
Class I - Canine abutment - Mandible

Rotated canines make incisal notch the rest seat of choice

Lingual plate major connector with incisal notch rests

Combination case.
Class I - Canine abutments - Maxilla

- Clasps appropriate for tooth
- Primary rests
- Primary fulcrum line
- Palatal plate major connector
- Indirect retention provided by proximal plates which bind against guide planes when rotation away from tissues occurs
Class I - Canine, lateral and premolar abutments - maxilla and mandible

- I bar
- Modified T clasp
- \( \frac{1}{2} \) round cast clasp
Class I-A - Premolar abutments - maxilla

Secondary rests on laterals to support base in modification space and provide indirect retention.

Separate rest to provide indirect retention is NOT needed.

Customize your choice of clasp arm.

Primary rests, primary fulcrum line.
Class II RPD Design Considerations
Class II

Class II:
• Mandibular
• Maxillary
Class II - Mandibular

Indirect retainer

Clasps as appropriate for the abutment

Primary fulcrum line

#30 - full gold crown with DO rest, lingual guide plane and MB undercut

#28 - MO rest for indirect retainer

#21 - MO and DO rests, lingual guide plane, mid-buccal undercut

How do the clasps differ?
Class II - Maxillary

**Indirect Retainer**

- Major connector - anteroposterior palatal strap
- Clasp arms as appropriate
- Primary fulcrum line

**ML cingulum ball rest as part of PRI system**

**Indirect retainer**

- T-bar cast clasp
- ½ round cast clasp
Class II-P - Mandibular

Indirect retainers: plate and rests

Primary fulcrum line

Different clasp designs for lone standing molar

-½ rd CC clasp engaging 0.01in MB undercut.
-MO and DO rest seats.
-Lingual BAR (above)
-OR lingual PLATE (below) major connector on lingual of molar.

(note how clasps on anterior abutment are optional)
Class II-P - Mandibular

teeth #18, #20, & #28 abutments
#28 - pfm cr. with DO rest
#20-#22 pfm fpd with raised cingulum
rest on #22 and DO rest on #20
#18 - natural tooth with MO & DO rests
Class II - A-P - Mandibular

Indirect retention provided by teeth in modification space and rests

#20 - PFM crown, DO rest
#21 - PFM crown, MO rest
#27 - PFM crown, raised cingulum
#30 - Gold crown, MO & DO rests

Cast clasp
Wrought wire clasp
Class II - AP - Mandibular

#22, #23, #24 - PFM crowns; raised cingulums
#29 - Full gold crown, MO rest
#30 - Full gold crown, MO and DO rests

Lingual plate, indirect retainer rest #24

1/2 rd. cast clasp on #22
Class II-P - Maxillary

#5 - PFM crown, MO rest
#11 - ML ball rest
#15 - Gold crown with MO and DO rests

secondary rest seat to support modification base is also the indirect retainer rest

I-bar cast clasp - #5 & #11
1/2 rd. cast clasp - #15

left lateral view of working occlusion showing canine guidance
Class III RPD Design Considerations
Class 3-P - Mandibular (bilateral)

Mesial and distal rest seats on lone-standing molars preferred to mesial rest alone

Molars: gold crowns, MO & DO rests, buccal guide planes, and ML retention

#20 - DO rest, lingual guide plane, & MB retention

#27 - raised cingulum composite rest, lingual guide plane, & MB retention

Metal bases; re-line not likely to be necessary
Class 3-P - Mandibular (bilateral)

- Clasp on #20 OR #27 can be eliminated without reducing retention.
- C-clasp on molar and 18 ga. rd. clasp on canine.
- #27 - raised composite cingulum - lingual plate major connector is fabricated around the new lingual cusp.
- Clasps: cast vs. wrought wire - wire thought to be more stress-broken and therefore gentler on weaker teeth.
- C-clasp on molar and 18 ga. rd. clasp on premolar.
- Secondary rest seat to support the major connector.
- Metal base with retention beads.
This framework rests on a gold coping cemented onto the molar. This is an alternative to placing a post and core, and crown on the tooth.
Class 3-A - Mandibular

An additional rest seat on the distal of the molar is desirable.
Class 3 - Maxillary

For patient comfort, a full palatal plate major connector, as shown in the diagram on the right, along with a secondary rest on the premolar, is more desirable than the design shown below.
Class 3-P - Maxillary (bilateral)

Composite replacing an amalgam - why?

Palatal strap major connector and metal bases - why not acrylic?

1/2 rd. cast clasps on molars and 18 ga. rd. cast clasps on the canines
Class 3-P – Maxillary and Mandibular

#18,#31 - full gold crowns
#22,#27 - 3/4 gold crowns

#18,#31 - 1/2 rd. cast clasps  #22,#27 - 18 ga. rd. cast clasps
Class 3-A - Maxillary

In the images below, the I-bars on the bicuspid teeth approach from the interproximal space one-tooth removed – why?
(A good guess would be that the prognosis for #4 is guarded or finances preclude crowning the tooth - and #13 may lack the necessary height of contour.)

Modified T-bar clasp - remember that the clasp arm must have adequate length for flexibility - too short an arm = rigidity.
Class 3-A-P - Maxillary

Anterior Palatal Strap or Open Horseshoe major connector to circumvent the palatal torus
Class 3-P-2A - Maxillary

An adaptation of a modified T-bar clasp
Class IV RPD

Design Considerations
Class 4 - Mandibular

Rest seat location - try to place a rest seat on the two teeth adjacent to the edentulous area and also the most posterior teeth remaining on each side; preferably molars and on the distal surface as shown on right image

- Embrasure clasps on #20,21 & #28,29

-Lingual plate major connector
-Molars tipped too far lingually to use as direct retainers.

Ledge type cingulum rest seats on #22 & 27 to support anterior base.
Class 4 - Mandibular

Lingual inclination of all molars precludes using a conventional major connector

Lingual plate imparts rigidity and bracing (reciprocation) for I-bar clasps on the premolars

- Labial bar major connector
- #18,32: i/2 rd. cast clasps to ML retention
- Bracing/reciprocation: #18: horizontal arm, #32: buccal plate

- Labial bar
- #21,28: I-bar cast clasps
Class 4 - Maxilla

Rest seat location - try to place a rest seat on the two teeth adjacent to the edentulous area and also the most posterior teeth remaining on each side; preferably molars and on the distal surface as shown on the image at right.

major connector choices are full palate (preferred), closed horseshoe (as shown) or open horseshoe

T-bar cast clasps on both molar abutments have retention on both “wings” of the “T”

I-bar clasps on the premolars

#2 & #15: DO rests
#12: gold inlay

Major connector at least 6mm from fgm.
Class 4 - Maxilla

Two more examples of Class 4 RPD’s - on the right with a full palate major connector, and below with a closed horseshoe (ant/post palatal strap)

Note the red, irritated palatal tissue associated with the RPD base and major connector caused by occlusal trauma and plaque on the tissue surface of the rpd.