Philosophy, principles and rataional in RPD design

Philosophy & Objectives
1.restore masticatory efficiency
2.restore esthetics & phonetics
3.preserve remaining tissues

Type of prostheses
Complete denture
Removable partial denture
Fixed partial denture

Tooth Support
v.s.
Tooth-tissue support

Direct retainer
Indirect retainer
Guiding plane

principle & rational
Masticatory efficiency derives from..
1.functional occlusal harmony
2.adequate support
3.adequate retention

principle & rational
Esthetics & phonetics derive from..
1.correct tooth form & color
2.correct tooth positioning

principle & rational, esthetics & phonetics
derive from...

3.correct occlusal plane
4.correct denture base color and form (contour)
5.proper contour/thickness of denture base at speech area

principle & rational

Preservation of the remaining tissues
1.Optimize tooth coverage from RPD's component parts
2.Optimize support for masticatory forces

principle & rational
Preservation of the remaining tissues..
3.Optimize movements of the RPD during function
4.Minimize plaque retention, food impaction and allow self cleansing process

principle & rational, design concept

Optimize tooth coverage from RPD's component parts

1.simplicity of the framework design
2.minimize number of clasps
3.maximize efficiency of each component part

principle & rational, design concept, design limitation

Optimize support for masticatory forces

1.adequate distribution of abutment teeth

***primary abutment**

***auxillary abutment**

2.proper indirect retention location, design and distribution of guiding planes (to resist lateral torques)

principle & rational, design concept, design limitation

..Optimize support for masticatory forces..

4.extension of denture base within anatomical limit (tooth-tissue support)

5.close adaptation of denture base to edentulous ridge under function

design concept, bioengineering, biomechanics

Optimize movement of RPDs during function

***Tooth support**

***Tooth-tissue support**

Optimize RPD movements during function

1.adequate guiding plane length, distribution, parallelism

2.efficiency of retentive components (direct retainers = clasps, attachments)

3.efficiency of indirect retention (to resist lateral movements)

Optimize RPD movements during function
bioengineering, biomechanics

4.equilibration of occlusal contact and selection of occlusal scheme

5.allow adequate distal extention base movement (physiologic relief)

Optimize RPD movements during function
bioengineering, biomechanics

Classification of distal extension

***No. of tooth to be replaced & amount of tissue support**

***Maxillae & Mandible**

Optimize RPD movements during function
bioengineering, biomechanics

Need for functional impression

***relationship of denture base to metal framework, extension of denture base over edentulous ridge, selective pressure impression**

Optimize RPD movement during function
bioengineering, biomechanics

***Selection of direct retainer for distal extension cases**...

RPI, RPA direct retainer, combination of wrought wire, attachments---resilient types

optimize RPD movements during function...
bioengineering, biomechanics

allow minor movement with minimal torque to abutments.

principle, rational, design concept

Minimize plaque retention, food impaction, allow self cleansing process

1.well polished surface
***abutment, metal, acrylic**
2.minimize clasp component
3.clasp design & selection

design concept

..plaque retention, food impaction...

4.selection of major connector
5.denture base design
6.proper contour & contact at marginal ridge area

design concept

Factors involved with the design

1.Functional occlusal design
2.Framework design
3.Denture base design
4.Steps design in clinical & laboratory service

design concept

Functional occlusal design

1.study the remaining dentition and occlusal scheme (also type of the opposing dentition)

2.at correct occlusal plane & occlusal vertical dimension

..occlusal design

3.reestablish occlusal scheme by integration of the remaining dentition to the RPD teeth and component parts

4.diagnostic teeth set up, and/or provisional denture

Kennedy classification & Applegate's rules

occlusal relationship

K. class III-----Group function
Cuspid disclusion
K. class III-----Bilat. bal. occlusion

occlusal relationship

K. class II-----Group function
-----Cuspid disclusion
K. class II-----Bilat. bal. occlusion

occlusal relationship

K. class I----Group function
----Bilat. bal. occlusion
K. class I----Bilat. bal. occlusion

occlusal relationship

K. class IV---Group function
----Cuspid disclusion
with minimize anterior overbite
K. class IV----Group function
----Bilat. bal. occlusion

..occlusal design

Lingualized contact occlusion

To reduce lateral torque and lateral movement
To reduce maximum tooth to tooth contact

..occlusal design

Anterior guidance and Kennedy class IV

The occlusal element

Maximum versus minimum Function page1.

..what type of occlusion to establish on a partial denture.

Maximum function would relieve some of the strain from the remaining teeth other then the primary abutments, but it might be more risky in terms of the strain on the primary abutments and the supporting residual alveolar ridge.

The occlusal element

Maximum versus minimum Function page1.

On the other hand, minimum function decreases the risk of damaging the primary abutments and the residual ridge but leaves the remaining teeth overload.

The occlusal element

Maximum versus minimum Function page2.

Many dentists feel that the partial denture is so dangerous to the abutment teeth that the less function it is allowed, the better the chance for survival of the primary abutment. The partial made under this philosophy do little more than fill the edentulous space and make minimal contact with opposing teeth.

The occlusal element

Maximum versus minimum Function page3.

..one must remember that any error in occlusion, either in centric or eccentric, is multiplied in its effect on the primary abutment depending on the distance of the prematurity from the fulcrum point. The risk of error increases, of course, as the number of the occlusal contacts is increased.

Frank A. Eich Tuff Univ. 1962

Classic philosophy

DeVans gave us a fundamental concept or philosophy within which we should operate when he said that in partial denture construction we should not be so concerned with the meticulous replacement of what has been lost but rather with the careful preservation of what remains. I am sure he refers to both hard and soft tissues. Frank A. Eich; Tuff Univ.1962

Framework design
1.path of placement
2.major connectors
3.direct retainers
4.indirect retainers
5.tooth alteration plans

..framework design

Path of placement and removal within 15° of conical sphere perpendicular to occlusal plane (lack of distal abutment or bilateral free end case)

..framework design

Selection of major connectors

..framework design

Selection of direct retainers

..framework design

Need for indirect retention

..framework design, direct retainers

Type and function of retentive units
1.tooth undercut
1.1rigid framework design
1.2hinge design
2.attachments

framework design, direct retainers,
tooth undercut, retentive units

1.1 rigid framework design

cross arch design

buccal or lingual - conventional clasps

proximal undercut =rotational design=

unilateral design

utilization of both buccal and lingual undercut of the abutment

framework design, direct retainers,
tooth undercut, retentive units,

1.2 hinge framework design

utilize of both labial (buccal) and lingual undercut

= Swinglock design =

framework design, direct retainers

Efficiency of retentive units to RPD's retention

1.distribution and location of the opposing retentive clasp arm

2.angle of clasp approach

3.tripping action (of bar clasp)

framework design,
efficiency of retentive units

Distribution and location of the opposing retentive clasp arm

framework design,

efficiency of retentive units

Angle of clasp approaching (of the equal undercut amount) or angle of convergence. And how this situation affecting RPD retention

framework design,
efficiency of retentive units

Tripping action of bar clasp

principle & rational

Denture base design
1.substitute ridge resorption
2.base extention to maximize ridge support

principle & rational, denture base design

3.match ridge contour
4.match ridge color
5.mask metal framework

Classification of the RPD design

Removable partial denture design (1)

Conventional clasp design
Rotational design
Swinglock design

classification..
..Removable partial denture design (2)
Incorporated with **precision attachment**
Incorporated with **crowned abutments**
Incorporated with **telescopic crowns**
and for maxillofacial defects

Case critique
Class shall practice, discuss
And exercise wherein we could learn
From diagnostic casts or slide pictures

This paper shall provide wide view to ones who concern the succession upon RPD construction.