Successful partial dentures

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Edentulousness

- Adult Dental Health Survey 2009

	1978	1988	1998	2009
Edentulous %	30	21	13	6

- 3 million edentulous

Plus

- A further 5 million need tooth replacement
- More extensive partial dentures
- Older patients
- More challenging?

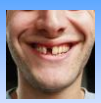
A spectrum of satisfaction - dissatisfaction

- Many denture patients have problems related to denture wearing
- There may be significant distress

Options for replacement

Options

- Bridge
- ***Denture***
- Implants
- Orthodontics
- Nothing



Each option has advantages and disadvantages

Informed consent

Shortened dental arch concept

Kayser

Older people can have adequate function and aesthetics, without adverse effect, with ten pairs of occluding teeth (SDA)

Extremely shortened dental arch (ESDA)

Removable partial dentures

Three phases of prosthetic dentistry

- **Treatment plan - Denture design**
- Denture construction
- Denture maintenance

Aims – morning session

To describe treatment planning and denture design

To give you the opportunity to discuss any aspect of partial denture treatment planning

Objectives

- Treatment planning
- Component parts of a denture
- Denture design process
- Hands on

Outcomes

- Improved confidence and ability in designing removable partial dentures

Denture design

Rules and exceptions
- To discuss exceptions you need to know the rules
- Many if not all cases are exceptions

Options
- Advantages Disadvantages

Informed consent

1. Treatment planning

A structured approach

..... A few important points

Each person is unique

Sum of
Personality (genetic)
Experience (acquired)

- Transference
- Counter-transference

Importance of the patient dentist relationship

Carlsson G. Critical review of some dogma in prosthodontics
Journal of Prosthodontic Research 2009 53 3-10

Personalities

Each person / patient is an unique individual
Sum of personality (genetic) and experience (acquired)

– Opinions, attitudes, expectations, prejudices
– Motivation
– Adaptation / habituation
– Transference Counter-transference

Personalities

Mood disorders - Neuroses Depression
Psychoses
Personality disorders
Other disorders

Illness

Oral symptoms affect prognosis

There are other illnesses without oral symptoms that can have a profound effect on prognosis

Other?

Ageing

Ageing of systems

Age related illness

Mobility
Dexterity
Adaptation Habituation
Communication

Treatment plan

- History
- Exam
- Special investigations
- Diagnosis

Treatment plan
Prognosis

History

C/O List of current complaints
PDH
Dental
Denture
History of most recent denture(s)
Have you ever has a satisfactory denture?
If so which and where where is it?
PMH Conditions relevant to pros treatment?*
SH Access
Attitude
Ageing*

Examination

- **Extra oral** Overall

- **Intra oral**

1. Mucosa
2. TP
   Perio OH BPE mobility
   Teeth caries/deficient restorations/tooth wear
3. Occlusion
4. Denture*

Special investigations*

- Denture assessment

Fit surface / Clasp units
Polished surface
Teeth (selection position)
Occlusion

Special investigations

- Radiographs
- Vitality

- Articulated surveyed study models?

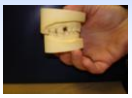


- ICP record

Hand articulate

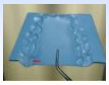
(Wax wafer / silicone)

Wax rims

- CJR record

When
Wax wafer
Wax rims



Surveying

- Detects hard and soft tissue undercut
  - Path of insertion
  - Usable undercut
  - Guide planes

Surveying

- Survey for design Dentist - technician

- Survey for construction

Treatment plan

- Provisional

- Definitive

- Contingency planning?

Treatment plan

Removable treatment options?

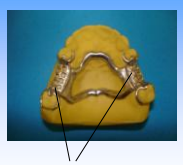
- Nothing
- Refurbish
- New
  - Standard technique new
  - Special technique(s) new

2. Component parts

Component parts

1. Saddle
2. Teeth
3. Rests
4. Clasps
5. Bracing
6. Connectors
   1. Major
   2. Minor

1. Saddle



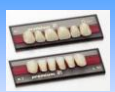
Saddles

Flange

2. Teeth

Acrylic
(Porcelain)

- Anterior
- Posterior

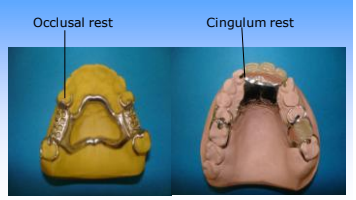


3. Rests

Provide **support**

There are three types

occlusal rest
cingulum rest
incisal rest



4. Clasps

Provides resistance to movement away from the tissues (retention)

They are flexible and act by engaging undercut

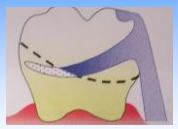
There are two main types of clasp:

- occlusally approaching clasp
- gingivally approaching clasp

Occlusally approaching clasps

Only the terminal one third of an occlusally approaching clasp arm should engage the undercut.

This is the retentive portion of the clasp arm.

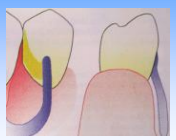


Gingivally approaching clasps

A gingivally approaching clasp contacts the tooth surface only at its tip.

The rest of this clasp does not touch the mucosa or the gingival margin.

The length of this clasp usually makes it more flexible than an occlusally approaching clasp.



Clasps may have different shapes

- I
- T
- Y
- S
- C

Materials used to construct a clasp are:

- Cobalt Chrome - cast
  - wrought
- Stainless steel - wrought
- Gold
- Acetal resin
- Nylon

Clasps

- MINIMUM LENGTH of a CoCr clasp to allow adequate flexibility is 13mm

Which clasp do you choose?

The choice of clasp on an individual tooth depends on

1. Position of undercut
2. Amount of bone support
3. Length of clasp
4. Appearance

5. Bracing / Reciprocation

This is a component of a denture that resists lateral movement.

Enables clasp function by keeping clasp opposed to the tooth
Each clasp must have reciprocation

6. Connectors

The **major** connector links up the saddles (and joins up all the structures of the denture)

Minor connectors join all other parts (to the major connector)

Major connectors

An important requirement of a major connector is that it is **rigid**

CoCr
Acrylic

Sufficiently thick

Major connectors

The choice of connector depends on

- Anatomy
- Hygiene
- Occlusion
- Patient preference

Major connectors for the maxilla

- Palatal plate
  - Anterior
  - Mid
  - Posterior
- Ring connector

Avoid gingival margins (as much as possible)

Ring Connector

Palatal plate

Major connectors for the mandible

i. Lingual bar
ii. Lingual plate
iii. Dental bar
iv. Kennedy bar
v. Sublingual bar
vi. Labial bar

Lingual Bar

- 3mm gingival clearance

≥ 7mm needed

Lingual Plate

- Encourages plaque formation

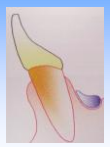
Dental Bar

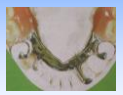
- Avoids damage to the periodontium
- Patients do not tolerate it well.

Kennedy Bar

- Continuous clasp.
- This is rarely well tolerated
- Difficult to construct

Sublingual bar





Sublingual bar

- NOT the same as the lingual bar.
- Its dimensions are determined by the master impression and it represents the functional depth and width of the sulcus.
-
- The technician waxes up the connector as determined by the impression.

Labial bar

May be useful if teeth are severely lingually inclined

Rarely used

Minor connectors

3. Denture design

Types of partial dentures!

i. By material
ii. By distribution of missing teeth
iii. By support

Confusion relating to describing dentures

i. By denture base material

Acrylic resin

Cobalt chrome

Vinyl resin

Polyamide

Titanium

Other

ii. By missing teeth

Kennedy I Kennedy II Kennedy III Kennedy IV

iii. By support

Mucosa

Tooth

Tooth and mucosa

Design

STEP 1*****

If it's 'not broken' – don't 'mend' it

- Adaptation!
- Habituation!!!!!
- Modifications are ok

- To design a denture you must first decide the type of denture by support - because the design process for each type is different

  Mucosa
  Tooth
  Tooth and mucosa

Stability is a composite of

Support resistance towards tissues
Retention resistance away
Bracing resistance laterally

All prostheses benefit from optimum stability

STEP 2.

- DECIDE TYPE by SUPPORT
  - Mucosa borne
  - Tooth borne
  - Tooth and mucosa borne

1. MUCOSA BORNE DENTURES

Mucosa borne dentures

- A mucosa borne denture is a denture that derives its support entirely from the soft tissues

Mucosa borne dentures

- Very common > 95%
- Little is written about them in textbooks or journals
- There is a general lack of knowledge and many misconceptions

Mucosa borne dentures

- May be made from any of the denture base materials

... usually acrylic resin

but also

- Acrylic co-polymer (high impact)
- Cobalt chrome
- Nylon
- Titanium
- Gold
- Stainless steel
- Vulcanite

Mucosa borne dentures

Why so common?

Mucosa borne dentures

Why so common?

Easy to design
Easy to make
Easy to adjust
Easy to add/repair
Cheap

…….. but?

Mucosa borne dentures

Why so common?

Easy to design
Easy to make
Easy to adjust
Easy to add/repair
Cheap

- Disadvantages

Soft tissue support

Lack retention

<u>Potential for damage</u>

Mucosa borne dentures

Potential for damage

- Alveolar bone
- Mucosa
- Teeth
- Gingival tissues

Mucosa borne dentures design process

Decide material

Wide support

Gingival free

Retention - Avoid clasps if possible

Mucosa borne dentures

Recommended designs
- maxilla

Mucosa borne dentures

Recommended designs
- mandible

In general NO design is recommended in the mandible

Mucosa borne mandibular partial

= Gum stripper

Mucosa borne dentures

- 3 exceptions
  - Temporary (relatively quick)
  - Transitional
    (Gradual extractions and additions)
  - Replacing success

Mucosa borne dentures

Additional retention

- Wrought clasps
  - Stainless steel
  - Gold
  - CoCr Wrought (Wiptam)
  - Acetyl resin
  - Nylon

Mucosa borne dentures

Good technical support is needed!

Technicians need to

- develop a path of insertion – survey and blocking out hard and soft tissue undercut
- relieve gingival margins
- Use duplicate casts

Mucosa borne dentures

- Wide support
- Avoid gingival margins
- Avoid clasps if possible

- Avoid mandibular denture if possible

2. TOOTH BORNE DENTURES

2. Tooth borne dentures

Support from teeth

Rests either side of the saddles

No support from the connector

Tooth borne dentures

Support from teeth

Better support
Better retention

Cf. mucosa borne denture

Tooth borne dentures

A system for design:

- Outline saddles
- Support
- Retention
- Bracing
- Connectors
- Review design

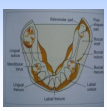
3. TOOTH AND MUCOSA BORNE DENTURES

Tooth and mucosa borne dentures

Very similar design process to tooth borne

<u>but</u>
you must deal with the additional problems caused by the free-end saddle

1. Support
2. Stability
3. Retention
4. Damage to abutments

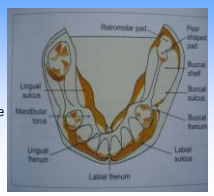


Tooth and mucosa borne dentures

1. Support

Optimum Extension

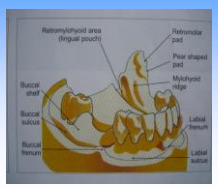
(Muco displacive Impression)



Tooth and mucosa borne dentures

2. Stability

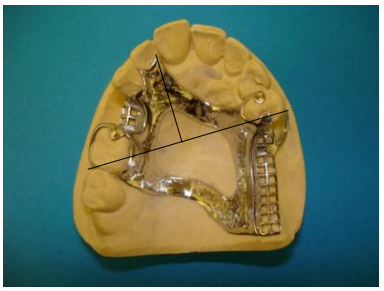
Extend into the retromylohyoid space

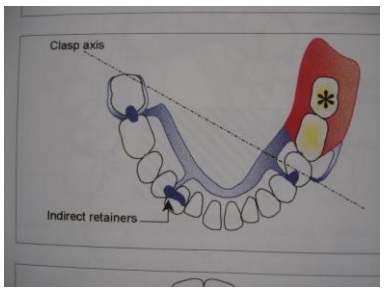


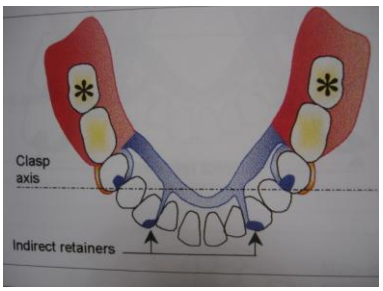
Tooth and mucosa borne dentures

3. Retention

- **Direct Retention –** abutment tooth Clasps
- **Indirect retention** – support opposing rotation is obtained anterior to the rotational axis



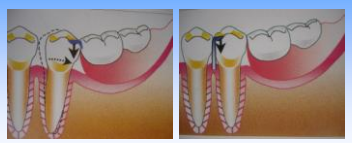




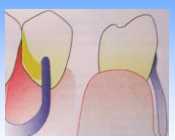
4. Minimise forces (torque/rotational force) on the abutment tooth

i. Mesial rest placement
ii. Gingivally approaching clasp

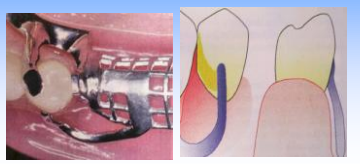
i. Mesial rest placement



ii. Gingivally approaching clasp



RPI system - good practice



- Managing the free end saddle

1. Support
2. Bracing
3. Retention
4. Damage to abutments

Additional

- Designing for the cast
  remember the occlusion
- Designing for the cast v the mouth

- Rules and exceptions
- To discuss exceptions to the rules you need to know the rules
- Each case is an exception with potential options

Hands on

Three cases

For each case please design

- Mucosa borne for the maxilla
- Tooth borne or tooth and mucosa borne for the mandible