Successful partial dentures

Rob Jagger

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Edentulousness

- Adult Dental Health Survey 2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Edentulous %</th>
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<tr>
<td>1978</td>
<td>21</td>
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<td>1988</td>
<td>13</td>
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<td>1998</td>
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- 3 million edentulous
  - 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

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

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)
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


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 Depresssion 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 had a satisfactory denture?
If so which and where was it?

PMH

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

**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

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

2. Component parts

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
- 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

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)

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
- 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
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

Confusion relating to describing dentures
iii. By support

- Mucosa
- Tooth
- Tooth and mucosa

**Design**

STEP 1****

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

- Adaptation!
- Habitation!!!!!
- 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
    - Teflon
    - Gold
    - Titanium
    - Vulcanite
### Mucosa borne dentures

#### Why so common?
- Easy to design
- Easy to make
- Easy to adjust
- Easy to add/repair
- Cheap

... but?

#### Disadvantages
- Soft tissue support
- Lack retention
- Potential for damage

#### Potential for damage
- Alveolar bone
- Mucosa
- Teeth
- Gingival tissues

#### Design process
- Decide material
- Wide support
- Gingival free
- Retention - Avoid clasps if possible

#### Recommended designs
- maxilla

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

#### Recommended designs
- mandible
  - Gum stripper

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

#### In general NO design is recommended in the mandible
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

Support from teeth
Rests either side of the saddles
No support from the connector

2. 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
but 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)

2. Stability
   Extend into the retromylohyoid space

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