The pragmatic modifications of dental treatment for people with moderate dementia: Restorative Aspects

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Senior Lecturer / Consultant in Restorative Dentistry
Content

• Caries Management
• Prevention and the use of Fluoride
• Pragmatic tooth replacement (fixed prosthodontics)
Pragmatism

I'm generally a very pragmatic person: that which works, works

Linus Torvalds

picturequotes.com
Herodontics

• The practice of heroically performing treatment; the prognosis usually being hopeless which the practitioner knows will quickly fail due to never having any chance of success.
• The direct opposite to pragmatic dental care
• Prevalent in dental hospitals!
Chronic Dental Diseases

• Three processes: caries, periodontal disease, toothwear
• Diet, reduced manual dexterity, xerostomia
• The 2009 UK Adult Dental Health Survey reported that 27% of adults aged 65-74 years had evidence of dental caries whilst this figure increased to 40% for those aged 75-84 years. Fuller, Steele et al. 2011
Root caries

- Disease almost unique to older patients
- Associated with gingival recession
- Carbohydrate rich diets
- Reduced mechanical cleaning
- Partial dentures
- Xerostomia: Polypharmacy
- Restorative challenge
Minimally Invasive Dentistry (MID)

• Overall treatment concept
• Huge emphasis on prevention: including the use of fluorid.e
• Minimal operative intervention
• Atraumatic treatment of dental caries (ART): hand excavators, adhesive materials
• Consider repair rather than replacement of restorations
Fluoride Products
Risk Assessment

How to assess risk?

• Previous caries experience
• Diet
• Salivary flow
• Oral hygiene
• Exposure to fluoride
• Changes over time
Minimal operative intervention
Caries removal

- Tissue saving cavity “design”
- Uses round burs and excavators to remove caries
- Materials used
  - Resin composites
  - Glass ionomers (GIC)
  - Resin-modified glass ionomers (RMGI)
Caries removal

- **Caries-infected dentine (remove)**
  - Outermost, superficial, necrotic zone
  - Mineral component extensively destroyed
  - High bacterial load
  - Dentine tubule structure is destroyed

- **Affected dentine (maintain)**
  - Inner layer
  - Less mineral dissolution
  - Collagen less damaged
  - Lower bacterial content
  - Dentine tubule structure gradually returns
Atraumatic Restorative Technique (ART)

- Access to caries
- Caries removal
- Cavity conditioning
ART Technique

• Cavity conditioning (20% polyacrylic acid):
  • Cleans the surface
  • Activates the calcium in tooth tissue
  • Increases surface energy
  • Increases the bond strength
ART Technique

- Restoration with high viscosity GIC
- Insertion of GIC into the cavity (finger pressure)
- Protection of restoration with a coating
- Check occlusion
- Re-apply coating
ART in the Elderly

Two-year survival of ART restorations placed in elderly patients: A randomised controlled clinical trial

Cristiane da Mata a,*, P. Finbarr Allen a, Gerald McKenna b, Michael Cronin c, Denis O’Mahony d, Noel Woods e
Clinical study

- Methodology: Randomised Clinical Trial
- Recruitment: Patients from a geriatric day hospital and a community centre
- All patients received preventative care including tooth cleaning and OHI
- Caries management: ART vs conventional technique with RMGI
- Follow up: 6, 12 and 24 months
- Restorations assessed according to defined criteria

Da Mata et al., 2015
Surfaces Treated

Da Mata et al., 2015
## Results

<table>
<thead>
<tr>
<th>Restorations status</th>
<th>6 months</th>
<th></th>
<th>1 year</th>
<th></th>
<th>2 years</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>ART</td>
<td>CT</td>
<td>ART</td>
<td>CT</td>
<td>ART</td>
<td>CT</td>
</tr>
<tr>
<td>Total assessed</td>
<td>118 (83%)</td>
<td>124 (78.4%)</td>
<td>127 (89.4%)</td>
<td>141 (89.2%)</td>
<td>96 (67.6%)</td>
<td>121 (77.2%)</td>
</tr>
<tr>
<td>Present, in good condition</td>
<td>108 (91.5%)</td>
<td>115 (92.7%)</td>
<td>111 (87.4%)</td>
<td>126 (89.3%)</td>
<td>74 (77%)</td>
<td>97 (80.1%)</td>
</tr>
<tr>
<td>Acceptable marginal defect or wear</td>
<td>6 (5%)</td>
<td>7 (5.6%)</td>
<td>8 (6.2%)</td>
<td>11 (7.8%)</td>
<td>8 (8.3%)</td>
<td>13 (10.7%)</td>
</tr>
<tr>
<td>Restoration partly or completely missing *</td>
<td>4 (3.3%)</td>
<td>2 (1.6%)</td>
<td>7 (5.5%)</td>
<td>4 (2.8%)</td>
<td>13 (13.5%)</td>
<td>11 (9%)</td>
</tr>
<tr>
<td>Caries present*</td>
<td>0</td>
<td>0</td>
<td>1 (0.7%)</td>
<td>0</td>
<td>1 (1%)</td>
<td>0</td>
</tr>
<tr>
<td>Cumulative survival proportions</td>
<td>96.6%</td>
<td>98.3%</td>
<td>93.7%</td>
<td>97.1%</td>
<td>85.4%</td>
<td>90.9%</td>
</tr>
</tbody>
</table>
ART - 2 Year Results
Survival Predictors

- Size of the cavity
- Number of surfaces (single x multiple-surface)
- Restorative material used
- Adequate removal of demineralized dentin
- **Presence of adequate caries control measures**
- Operator training/experience.
Clinical applications of ART

• Patient-friendly
• Cost-effective
• MID restorative approach
• Clinical environment: residential settings / medical comorbidities including dementia
• It can be performed by other members of the dental team
Pragmatic tooth replacement

- SDA is a “a dentition where the most posterior teeth are missing” Kayser 1981
- Direction of treatment efforts and resources towards preservation of the anterior and premolar teeth
- Molars are high risk for disease
- No removable prosthesis
Evidence for the SDA

• Accepted by the majority of clinicians. Kanno and Carlson 2006

• SDA can provide sufficient oral functionality and comfort. Witter, de Haan et al. 1994; Witter, Creugers et al. 2001

• No negative impact on TMJ health. Witter, van Elteren et al. 1988; Sarita, Kreulen et al. 2003

• Evidence of underutilisation. Guiney, McKenna et al. 2011
Restoration to a SDA

- Most patients will not retain a natural SDA
- Can provide a SDA using fixed prosthodontic options: bridgework, resin composite, dental implants
- Use of Resin Bonded Adhesive Bridgework has been shown to significantly improve patient satisfaction. *Jepson, Allen et al.* 2003
Resin Bonded Bridgework

• Simple and effective tooth replacement option
• Limited use in general practice
• Systematic review: survival of 87.7% after 5 years. Pjetursson, Tan et al 2008
• RBB placed by dental students, survival of 84% in Cork Dental Hospital. Howard-Bowles, McKenna, Allen 2010
• Evidence based protocol
Clinical protocol for RBBs

Case Selection
1. Cantilever designs are favoured over fixed-fixed.
2. Short spans replaced.
3. Only one opposing contact on the abutment wing.
4. No contacts on the pontic, especially in lateral excursions.

Tooth Preparation
1. 0.7mm preparations carried out on the lingual or palatal surfaces of the teeth.
2. The preparation is confined entirely to enamel and includes a chamfered finishing line.
3. The margins should finish at least 1mm above the gingival margin, short of the proximal contact area and fade out towards the incisal edge.
4. Occlusal support is gained in the anterior dentition by the placement of an occlusal seat in the cingulum area.
5. On the posterior teeth (premolars and molars) occlusal seats are placed on the mesial and distal marginal ridges.
6. A seating groove is placed on the longest wall next to the pontic area on abutment teeth.
7. Reduction of the axial walls of the abutment teeth should allow for a single path of draw for the prosthesis.
8. No temporary restoration is required as the preparation is only in enamel.
9. Full arch impressions are taken using an addition silicone impression material.
10. Retraction cord is usually not necessary as preparations finish supragingivally.

Howard-Bowles, McKenna, Allen 2010
Clinical study

Assessed for eligibility (n=183)

Excluded:
- Not meeting inclusion criteria (n=27)
- Declined to participate (n=24)

Randomised (n=132)
Stratified for age and gender

RPD GROUP (n=65)
SDA GROUP (n=67)

Data collected:
- Baseline
- 1 month post treatment
- 6 months post treatment
- 12 months post treatment

Analysed (n=46)
Lost to follow-up (n=21)
Excluded from analysis (n=0)

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Lost to follow-up (n=21)
Excluded from analysis (n=0)
Results: Oral Health related Quality of Life

*A reduction of 5 scale points represents the Minimally Important Clinical Difference (MID)*
Applications of the SDA

The impact of rehabilitation using removable partial dentures and functionally orientated treatment on oral health-related quality of life: A randomised controlled clinical trial

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Conclusions: In terms of impact on OHRQoL, treatment based on the SDA concept achieved significantly better results than that based on RPDs 12 months after treatment intervention (trial registration no. ISRCTN26302774).

Clinical significance: Functionally orientated treatment delivery resulted in significantly better outcomes compared to removable dentures in terms of impact on OHRQoL.
## Cost of Treatment

<table>
<thead>
<tr>
<th>Factor</th>
<th>SDA Group (n=46)</th>
<th>RPD Group (n=44)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment appointments (n)</td>
<td>4.5</td>
<td>8.6</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Follow-up appointments (n)</td>
<td>0.7</td>
<td>2.3</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Materials costs (€)</td>
<td>26.61</td>
<td>22.37</td>
<td>0.01*</td>
</tr>
<tr>
<td>Laboratory costs (€)</td>
<td>234.71</td>
<td>346.09</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Labour costs (€)</td>
<td>122.73</td>
<td>217.91</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Total cost of treatment (€)</td>
<td>384.05</td>
<td>586.37</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>

*(statistical significance p<0.05, t-test)
Cost-effectiveness of tooth replacement strategies for partially dentate elderly: a randomized controlled clinical trial

The cost-effectiveness ratio was therefore 1:1.84 in favour of SDA treatment. **Conclusion:** With an increasingly ageing population, many patients will continue to benefit from removable prostheses to replace their missing natural teeth. From a purely economic standpoint, the results from this analysis suggest that the treatment of partially dentate older adults should be focused on functionally orientated treatment because it is simply more cost-effective.
Summary

• Increasing numbers of dentate patients with some form of cognitive impairment
• Clinicians should think pragmatically but not compromise care
• Personalised and effective prevention is key
• All operative interventions should be minimally invasive where possible
YOUR HEART AND LUNGS LOOK GOOD, TOO.