Current concepts in restorative dentistry
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Patching vs replacing:
Biodentine, High Density GIC & Composite
– which & where

Occlusal Factors, Adhesive Techniques & Crowning:
Composites vs cast metals vs ceramics

Current concepts in dentures:
Why older concepts work better
Why you shouldn’t ‘patch’

Treatment history of teeth in relation to the longevity of the teeth and their restorations: outcomes of teeth treated and maintained for 15 years.

...restored teeth experienced a higher incidence of failure compared with unrestored teeth.

...Complete crowns and abutments for fixed partial dental prostheses had fewer restorative failures when compared with teeth with complex multisurface restorations.

Why you should - opinion

- preservation of tooth structure
- reduction of potentially harmful effects on the dental pulp
- no need for local anesthesia, provided the repair is not extensive
- reduced risk of iatrogenic damage to adjacent teeth
- reduction in treatment times
- reduced costs to the patient
- good patient acceptance
- increased longevity of the restoration
- slowing of the “restorative death spiral”.

Why you should - observation

• 103 patients, a statistically significantly greater number underwent replacement than repair ($p = 0.004$).

• Patients undergoing repairs were significantly less anxious ($p = 0.008$) and had shorter procedure times ($p = 0.044$).

• Repairs were associated with minimal caries depth and less use of local anaesthetic.

• Conclusion: Failed restorations should be repaired where clinically possible, as they are quick and associated with less patient anxiety.
What influences the decision?

Repairing versus replacing restorations included:

- having graduated from dental school more recently,
- practicing in a large group practice,
- being the dentist who placed the original restoration,
- patients being older,
- the original restorative material not amalgam,
- restoration of a molar
- the original restorations involving fewer tooth surfaces.
Does it work?

- 246 repaired restorations
- 133 amalgam & 113 composite.
- 151 of (61%) were still in service without further intervention after 4.8 years.
- The annual failure rates: repaired amalgam 9.3%; composite 5.7% after 4 years.
- Restorations that were repaired due to fracture had a lower survival than those repaired due to caries.

• Bayesian probability to derive an overall conclusion about the hypothesis: ‘High-viscosity glass-ionomer cements (HVGIC) are inferior to silver amalgam as (load bearing) restorative materials for permanent posterior teeth’.

• The current evidence suggests **lack of support for the hypothesis** that HVGIC are inferior to silver amalgam as restorative materials for permanent posterior teeth.

• ..a wider range of clinical benefits for both patient and care provider, beyond appropriate restoration longevity for placing HVGIC based restorations may apply.
Systematic review

- Permanent dentition. Longevity of ART restorations is equal to or greater than that of equivalent amalgam restorations for up to 6.3 years and is site-dependent.
- No difference observed in primary teeth

Biodentine & HVGIC – indirect pulp cap

- Although no statistically significant difference was detected in the clinical efficacy of Biodentine/Fuji IX when used as indirect pulp capping materials in patients with reversible pulpitis, CBCT showed a significant difference in that most healed CBCT lesions had received Biodentine while most that did not heal received Fuji IX.

Inlays/Onlays

1. Have to remove undercuts that caries forms
   - More divergent for all-ceramics
2. Have to significantly reduce functional cusps
   - More reduction for all-ceramics
3. Long restoration margin to seal/maintain
Why veneer?

- **Improve Colour**
  - Bleach (external or inside/outside)

- **Improve Shape**
  - Composite
  - Composite veneer
  - Componeer

- **Improve Colour & Shape**
  - Bleach then composite
Composite vs porcelain

• There is no reliable evidence to show a benefit of one type of veneer restoration (direct or indirect) over the other with regard to the longevity of the restoration.

*Cochrane Database of Systematic Reviews, Issue 1, No: CD004347*
Veneer longevity - 10 years

- 1177 patients
- 2562 Porcelain veneers

Conclusions
“Overall, 53% of porcelain veneers in the study survived without re-intervention at 10 years.”

Burke & Lucarotti. Ten-year outcome of porcelain laminate veneers placed within the General Dental Services in England and Wales. J Dent 2009 37, 31-38
Prep Incisal bevel
loss of about 10% coronal tooth structure
Prep Incisal coverage & proximal reduction
Loss of 30% coronal tooth structure
Eruption

..20 patients with attrition..intrusion was on average 1.05mm and eruption was 1.47mm, and that more eruption than intrusion appeared to take place in the younger subjects...

Dahl concept limitations

• Works more slowly in older
• Worse more posteriorly & multiple units
• Bruxists
• ?Amaelo/dentino cases
• Class II Div 2/Div 1
More predictable success of Dahl

- Younger patients
- Localised wear – anterior erosion
- Class I (±)
- Class III (±)
In minimal preparation remember that the preparation is to accommodate the properties of the material

• Ceramics – advantages & shortcomings
• Metals – advantages & shortcomings
• Composites – advantages & shortcomings
Occlusal factors

- Not the functional occlusion that breaks teeth/restorations
- PARAFUNCTION is important
- Look at fingernails
Dynamic occlusal relationships

• Very difficult to produce planned guidance in composite at chairside
• Can easily plan and execute in laboratory fabricated restorations
Crown longevity - 10 years

- 47,474 crown restoration occasions
  - Metal crowns 68%
  - All-porcelain 48%

Conclusions

“Full-coverage all-metal crowns have longer survival times before re-intervention than metal-ceramic crowns and all-ceramic crowns...”

Burke FJT & Lucarotti PSK Ten-year outcome of crowns placed within the General Dental Services in England and Wales. J Dent 2009 37, 12–24
Poor retention – ‘new’ solutions

- Actually really old solutions with new luting agents
Pulpal Effects of crowning teeth

• About 20% periapical pathology
  – (cross-sectional studies) after 20yrs\textsuperscript{1,2}

• Ceramometal crown
  – Pulp Survival rate\textsuperscript{3}
    • 84% 10 yrs
    • 81% 15 years

\textsuperscript{2}Saunders WP & Saunders EM. Br Dent J. 1998,185, 137-140
\textsuperscript{3}Cheung et al. Int Endod J. 2005, 38, 521-530,
Crows & pulp

- Fixed-fixed bridge abutment
  - Pulp Survival rate
    - 71% 10yrs
    - 66% 15yrs

Increasingly destructive preps
Healing within 4 months!

by Biodentistry.eu on 2014-10-07 in News

M 1.7 MO Fuji IX 16 DO Fuji IX 15 DO GCP-Fill

LATEST NEWS
- We Welcome Tomasz Kupka 30 May 2015
- Dutch Article: RVM Warns Dutch Government for BPA 12 March 2016
- Partial removal of carious dentine increases of full carious removal is always more successful. 21 November 2015
- Glass (coronar) restaurations are as successful as amalgam and are considered as permanent restorations. 21 November 2015
- We Welcome Prof Tamer Tziker 8 June 2015

ABOUT
Biomimetic Dentistry is a new way of dentistry which takes advantage of the natural mineralization processes in the mouth without using harmful products.

ANDROID APP
BIOMIMETIC APPROACH
TOOTH PRESERVATION AND DENTAL CONSERVATION

Tooth preservation and dental conservation lie at the heart of biomimetic dentistry. Biomimetic dentistry, a type of tooth conserving dentistry, treats weak, fractured, and decayed teeth in a way that keeps them strong and seals them from bacterial invasion. In dental practices around the world, Biomimetic Dentistry has practically eliminated cutting teeth down for crowns and destructive root canal treatment. Patients are happier and often spend less compared to conventional treatment. Want to learn more? Visit our Continuing Education Area for available courses.

Biomimetic dentistry is conservative. Our group's philosophy is "less dentistry is the best dentistry," or better said: "There is no dentistry like no dentistry." Much of the amputation of tooth structure can be eliminated with modern science and medicaments. We can say that tooth preservation and dental conservation lie at the heart of biomimetic dentistry. The economic implications of not needing the advanced, invasive care seen in traditional (amputational) dentistry, have profound positive effects on people's lives. We can now help patients create a healthy and happy mouth with

Cavities & Fillings
Biomimetic dentists work smaller with the goal of removing less natural tooth structure. We use advanced materials and techniques to create the strongest bond possible so teeth with biomimetic fillings can last a lifetime.

Crowns
Biomimetic dentists use advanced materials and adhesives to build up teeth to a natural strength and resilience. Specialized techniques allow us to make our dental work respond to daily use just like a natural tooth, reducing stress and cracking.
New orthodoxies: Adhesives are always better than mechanics

• Is it not actually better to use adhesion to augment mechanical principles?
Bridges

- May be less invasive than you think
- What is the restorative status of possible abutment(s) – can you use what is there?
Compromises

- Thickness – ceramic = space/(retention?)
- Aesthetics – metal – minimal prep
- Durability – composite

- Pulp space
- (para)functional loading; resistance form

- Expectations vs wishes
Why are fixed-fixed bridges a potential problem?

- Differential tooth movement under loading – stresses the luting cement
“Dentin is exposed during resin bonded fixed partial denture preparation if current tooth preparation guidelines are followed...the region of the grooves consistently exhibited dentin exposure.”

Analysis of clinical variables influencing survival revealed that design of the restoration and experience of the operator providing the restoration were significant factors. Resin-retained bridges made with minimal tooth preparation are shown to be superior in terms of longevity than those for which other types of tooth preparation is made. Patient satisfaction with their treatment was high.

Most failure (20%) in first 4 years
80% 10+ year survival
Don’t place under rubber dam
Keep to low numbers of pontics
Use cantilever design if possible
# To prep or not to prep

<table>
<thead>
<tr>
<th>No prep</th>
<th>Prep</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reversible</td>
<td>• Irreversible</td>
</tr>
<tr>
<td>• Higher success rate</td>
<td>• Usually within occlusion</td>
</tr>
<tr>
<td>• Often occlusal interference</td>
<td>• Easy to locate</td>
</tr>
<tr>
<td>• Difficult to locate</td>
<td>• May expose dentine</td>
</tr>
<tr>
<td>• Often need incisal coverage (may affect aesthetics)</td>
<td>• Higher failure rate</td>
</tr>
</tbody>
</table>
Put in high

- Occlusion will “bed in”
  - Dahl Principle
- Not always it won’t
Conventional bridges
A systematic review of the survival and complication rates of all-ceramic and metal–ceramic reconstructions after an observation period of at least 3 years. Part II: fixed dental prostheses

- 5-year survival of metal–ceramic FDPs (94.4%) was significantly (P<0.0001) higher than the survival of all-ceramic FDPs (88.6%).
- … fractures (framework and veneering material) were significantly (P<0.0001) higher for all-ceramic FDPs compared with those of metal–ceramic FDPs.

Bridge longevity - 10 years GDS

- Abutments
  - 6,800 conventional
  - 1704 resin bonded

- Conclusions
  “Survival of conventional bridge abutments has been shown to be 72% at 10 years, this being similar survival time to crowns. Various patient factors and bridge type were also found to influence survival.”

• “conventional single unit cantilever bridges can perform well... double and distal cantilever bridges should be used with more caution..

• In general, a bridge of more than four units is high risk...

Double Abutting

- Longer bridge (more units = more flexible)
- Forces are transmitted to distal retainers
- Cement failure may arise
- Bridge then retained by anterior retainer
- Caries of (usually) distal retainer
Why not go straight to implants?
Summary

• Best to be minimal - so always try patching
• Dahl as first line approach to gain space
• Dentine bonded composites +/- bleaching first
• Eventually you may need fixed prostho – most conservative prep possible - ? biomimetic
• (non prep) resin-bonded cantilever bridges first
“Never”

- Double Abut
- Use a post retainer
- Use an apicected tooth
- Place a bridge in active Perio disease
- Place a bridge because the patient wants one
“Always”

- Question whether you can leave a space
- Think “minimally invasive”
- Warn patients of pulp/tooth death
Dentures - Partial
RPI

- Rest (mesial)
- Plate (distal guide plane)
- I bar (gingivally approaching clasp)
Engages undercut (activates & stresses tooth)
3 arm, RPI and indirect retention

Rotates into undercut (deactivates)

Engages undercut (activates)
flexible dentures

Flexure of Connector

Direct Support
?

Increased alveolar resorption

No Indirect Support
Not without some advantages though
Dentures – Complete. Recent = 1981
Fig. 2.—Direction and point of application of force required to stabilise a lower denture.

Fig. 3.—Direction and point of application of reciprocal force required to stabilise upper and lower dentures.
Fig. 17.—Transverse section of stable dentures in the

Fig. 18.—Transverse section of unstable dentures built
AMAP

• As Minimal As Practicable
• What is possible often depends on the patient rather than a dogma