‘Correct decision-making in 2019 for compromised teeth and failed restorations’
BDA Forces Study Day - 4th July 2019
Management of Biological Failure:

- Examine biological failures such as periodontitis, peri-implantitis, caries, pulpal inflammatory conditions and periapical disease.
- Awareness and importance of assessment of the biological risk of a patient
- The implication of this risk to strategic decisions
- The long-term survival of teeth affected with periodontal disease
- Different pattern of disease for older patients
• Periodontal Disease and Compromise of Natural Teeth and Implants in 2019
We often blame someone else’s existing restorative work for the cause of gingival inflammation – remember crowns are usually over-contoured compared to natural teeth and therefore tend to deflect toothbrush bristles over and away from the gum – we do not usually need to replace them to resolve this problem - even when they are far from perfect.
Home cleaning and care is part of the Treatment – it starts with a tooth brush and a patient - we all need to be able to show and motivate people how to brush their teeth – fantastic BSP videos available for all

**Clearly Understood Goals**

- Make the gums bleed
- Make the gums sore - 2-3 weeks of pain
- Expect recession – where puffy inflamed gums
- Gums will turn pink rather than red / purple inflamed
- The gums will settle down – you will be able to clean as aggressively as you wish without bleeding or pain in a month

‘…..Inflamed and bleeding sites are the most at risk of long-term deterioration for patients with disease susceptibility….’

Westfelt E.
Supportive periodontal care, Scientific basis for long term success, Rationale of mechanical plaque control
Active periodontal disease will compromise the dentition and also impact on future decision-making with implants and Prosthodontics.

‘.....Inflamed and bleeding sites are the most at risk of long-term deterioration for patients with disease susceptibility....’
This is one of 20 essential papers that any dentist or DCP should read and understand.

A Long-Term Survey of Tooth Loss in 600 Treated Periodontal Patients


600 patients were below 50 years of age (Table 1), with 362 (60.3%) between the ages of 35 and 49. The average age of all patients was 42.

The distribution of patients according to years of maintenance can be seen in Table 2. Four patients originally had been treated more than 50 years before this survey, 19 more than 40 years before, and 60 more than 30 years before. The average duration of maintenance was 22 years and the median was 20 years.

At the original examination of all patients, and at reexamination, the periodontal condition was charted with the help of examination of each of the teeth.

Well-maintained (WM) group, lost 0 to 3 teeth (over 50% lost no teeth!).
Downhill (D) group, lost 4 to 9 teeth.
Extreme Downhill (ED) group, lost 10 to 23 teeth.

On the basis of these groupings, the study population was distributed as follows:

Well-maintained 499 (83.2%)
Downhill 76 (12.6%)
Extreme Downhill 25 (4.2%)
An evidenced-based scoring index to determine the periodontal prognosis on molars.

Miller PD Jr, McEntire ML, Marlow NM, Gellin RG.

Abstract

BACKGROUND: This retrospective study evaluates and assigns scores to six prognostic factors and derives a quantitative scoring index used to determine the periodontal prognosis on molar teeth.

METHODS: Data were gathered on 816 molars in 102 patients with moderate-to-severe periodontitis. The six factors evaluated (age, probing depth, mobility, furcation involvement, smoking, and molar type) were assigned a numeric score based on statistical analysis. The sum of the scores for all factors was used to determine the prognosis score for each molar. Only patients with all first and second molars at the initial examination qualified for the study. All patients were evaluated a minimum of 15 years after treatment.

RESULTS: The post-treatment time ranged from 15 to 40 years and averaged 24 years. When the study was completed, 639 molars survived (78%), and, of those surviving molars, 588 survived and were periodontally healthy (92%). In molars with lower scores (scores 1-3), the 15-year survival rates ranged from 98% to 96%. In molars with middle scores (scores 4-6), the 15-year survival rates ranged from 95% to 90%, and, for molars with higher scores (scores 7-10), the survival rates ranged from 86% to 67%.

CONCLUSION: The present results indicate that the periodontal prognosis of molars diagnosed with moderate-to-severe periodontitis can be calculated using an evidence-based scoring index.

Comment in

Authors’ response. [J Periodontol. 2014]
The Miller-McEntire Score for Molars Provides an Evidence-based Approach to Assigning Periodontal Prognosis for Molar Teeth. [J Evid Based Dent Pract. 2015]

PMID: 23726028  PMCID: PMC4104765  DOI: 10.1902/jop.2013.120675
[Indexed for MEDLINE]  Free PMC Article
Periodontally involved molars tend to survive very well. The post treatment time ranged from 15 to 40 years and averaged 24 years. When the study was completed, 639 molars survived (78%), and of those surviving molars, 566 survived in health (89%). In molars with lower scores (1, 2, and 3) the 15-year survival rates ranged from 99% to 96%. For scores 4, 5, 6 the 15 year survival rates ranged was 95% to 90% and for molars with scores of 7, 8, 9, and 10 the survival rates ranged from 86% to 67%.

Conclusions—Our results indicate that the periodontal prognosis on molars diagnosed with moderate to severe periodontitis can be calculated using an evidence-based scoring system.

Key words/phrases
Prognosis; Smoking; Tooth Mobility; Periodontitis; Long-Term Care; Molar
Patients must ‘earn’ their RSD (professional therapy) if lots of inflammation (means suboptimal OH) - it is a waste of time providing RSD for longterm change. No use starting with the scaling!

Minimally-Invasive Non-Surgical Periodontal Therapy

Abstract: Periodontitis is a complex disease that has both oral and systemic consequences. The treatment of periodontitis may be both surgical and non-surgical but, in recent years, there has been a shift towards managing disease non-surgically in preference to surgery. Fundamental to all types of therapy is the patient’s role in disease control, in the form of self-performed plaque control, and it is important that the patient understands this. Non-surgical periodontal therapy has a long history and has traditionally been carried out using a variety of hand and powered instruments, the objective being root surface disinfection by the removal of plaque, calculus and contaminated root cementum. However, over the last 30 years or so, it has become apparent that calculus does not cause disease, cementum does not become significantly infected and bacteria and their toxins are only loosely adherent to the diseased root surface. This has led to the development of less invasive instrumentation principles which may be better for patients, more cost-effective and more easily applied in different clinical settings.

Clinical Relevance: This paper aims to describe and justify a minimally-invasive approach to patients with periodontitis, to clarify the terminology used and to suggest how these principles may be applied.


Patients must earn their right to RSD
Over the last 10 years the risk of failure for implant therapy for patients with a previous history of or active periodontal disease has become apparent.

Many implants are placed for teeth lost due to periodontal disease.

From 2006 onwards - there is no excuse for clinicians not to clearly warn patients, with a history of periodontal disease, that they have a significantly greater risk of peri-implantitis.

Baseline expectation of peri-implantitis is 20% of implants and 1 in 5 patients.

This risk further increases with modifying patient risk factors e.g. plaque, BOP, smoking, Diabetes etc.
Smoking & Compromise

• Smoking is a very significant risk factor for implant compromise and failure, especially if patient is susceptible to periodontal disease.
• If you do proceed with implants for patients with Perio and Smoking - it should be made crystal clear that the risks of complications, failure, loss of implants and loss of bone are much higher.
• Plaque score should be excellent, BOP % less than 10% with evidence over 12-24 months of stable attachment apparatus and periodontal parameters

**Complication rate over 10 year period:**

- Smokers with Perio = 40%
- Smokers without Perio = 6%

For Smoking and Perio = 20% greater failure & 7 times greater complications when compared to smokers without perio

**Smokers with a history of Periodontitis = Survival rate: 80%**
cf 100% for smokers with no history of periodontitis over a 10 year period.
Roccuzzo et al (2012)

- Total number of implants 146
- Implants lost during the study period = 18 – 12.3%
How did the periodontally-involved teeth perform in the same study period in the same patient group?

Roccuzzo et al (2012)
During the 10-year SPT, 129 teeth were extracted, corresponding to 6.0% of the 2143 teeth – compared to 12.3% of implants lost over the same time period.
This is a problem and informs us about biological risk for future OI Rx
Judgement in 2019 & beyond
Surely, we should be most interested in maintaining attachment levels - but why does everyone ‘over focus’ on pocket depths? –

New periodontal classification attempts to quantify extent of existing disease and risk of new disease (but is very complicated)
Patient’s must be shown how to clean beneath their pockets – single-tufted brush or ‘verticalized’ Tepe - sub-gingival home plaque therapy
Management of Biological & Mechanical Failure:

• With aid of operating microscopic HD videos Peter will outline the revision-skills needed for dealing with failing restorations in 2019
• Explore mechanical failures such as de-cementation, restoration/implant and denture fracture.
• Re- restorative / revision strategies
• Getting the most from the endodontically treated tooth
• Improving the predictability of post cores
Scenario 6

- UL45
- Past acute symptoms – previous antibiotics given by emergency dentists
• **Dental History:** Recent ACUTE PAIN UL45 area, three courses of Abs by emergency dentist. Patient is quite motivated with several crowns. Doesn’t want to wear a denture and aesthetically shows UL45 on smiling. UL45 RCT’d and restored 7 years previously. Daughter getting married in 3 months – neither crown has de-cemented since they were fitted

• **Medical History:** ASA II – Hypertension – Drug-controlled, 62 year female, non-smoker and drinks little alcohol. No known allergies and willing and able to tolerate dental Rx
Examination:

EO: high and wide lip-line showing UL45. Good mouth opening no obvious TMJ problems.

IO: oral mucosa healthy, good saliva, oral Hygiene good and no deep pockets. Class 1, stable occlusion, posterior crowns.

TP:
Examination:

Dentition: No periodontal pockets. Stable class I occlusion with R and L canine guidance. 7 PFM posterior crowns present

BPE Scores:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
Examination:

**UL45:** PFM crowns with occlusal and palatal ceramic. Both TTP but firm, buccal tenderness to digital palpation around both teeth. No discharge / sinus and no detectable marginal defects with either crowns.

No evidence of problems of remaining dentition.
Special Tests: LCPA – patient had copy of a LCPA of UL456 in 2008
Poll – what is your diagnosis of the clinical problem(s) associated with UL45 at time of assessment?

Answer:
1. Acute Pulpitis
2. Chronic Pulpitis
3. Cracked tooth teeth
4. Chronic periapical periodontitis
5. Acute periapical periodontitis
Discussion – what in your opinion is the most important reason below (select one) for the apical infection present?
Poll – from the history presented what are the treatment options available for the patient to manage the recurrent infection with UL45?

Answer:
1. Extract & Replace
2. Apical Surgery
3. Dismantle and Re-RCT
4. Not sure
Poll – which one of the following factors do you think will most influence your decision?

Answer:
1. NHS / Private (Funding of Rx)
2. Skill of dentist
3. Experience of dentist
4. The wishes of the patient
5. Tooth restorability
6. Unsure
Discussion – In your view are the ‘stripped down’ UL45 predictable to restore?
Poll – will UL45 require posts for their predictable restoration?

Answer:
1. Yes
2. No
3. Unsure
Poll – how long will the post-restored premolars last?

Answer:
1. Less than 12 months
2. 5 years
3. 10 years
4. 20 years
5. No idea
Poll – with all things equal which option would you want if you were the patient from the history given?

Answer:
1. Accept crown restorations and refer for apical surgery
2. Dismantle crowns, re-RCT and re-restore with new post / cores / crowns
3. Extract and restore space with a partial denture
4. Extract and restore space with a conventional / resin bonded bridge(s)
5. Extract and restore space with implant(s)
6. Refer to NHS secondary care for opinion
7. Watch and monitor
Discussion – Assuming posts can be removed do you think that UL45 can be predictably be endodontically revised?
Discussion – If yes, what is the most important factor(s) for success of the Re-Endodontic therapy?
Poll – How long would you wait after re-RCT before providing definitive post / core / crowns?

Answer:
• No delay
• 1 month
• 3 months 6 months
• Not sure
Question 17 – What level of endodontic complexity (as outlined within the Restorative Dentistry Commissioning Guide) is the re-treatment of UL45?

Answer:
1. Tier I
2. Tier II
3. Tier III
What was done?

STRIP DOWN AND DISMANTLE
Once posts out – patency, cleansing, preparation of apex, gauging, verification, dynamic pumping & Obturation, followed by MTA protection

Fox and Gutteridge (1997) – temp posts leak +++++

An in vitro study of coronal microleakage in root-canal-treated teeth restored by the post and core technique.

Fox P*, Gutteridge DL

Abstract

The aims of this study were to compare coronal microleakage around cast and prefabricated post and cores and to examine the coronal seal achieved by temporary post crowns. Thirty extracted, single-rooted, human teeth were prepared chemomechanically, root filled with gutta-percha and sealer and prepared for a standard post. Three groups, each of 10 teeth, were restored with either: (i) cast post and cores cemented with zinc phosphate cement; (ii) prefabricated posts and composite cores cemented with a composite luting cement; or (iii) temporary post crowns cemented with a temporary zinc oxide-eugenol cement. The teeth were thermocycled and placed in Indian ink for 1 week, then demineralized and rendered transparent. Linear coronal dye penetration around the posts was measured and recorded. Results indicated that while cast post and cores and prefabricated posts and composite cores produced a good seal, leakage was significantly greater with temporary post crowns (P < 0.05). It is concluded that to prevent re-infection of the root canal system, it may be preferable to restore the tooth immediately with a prefabricated post and composite system rather than place a temporary post crown and subsequently a cast post and core.
Fit & Cementation of Indirect Posts
Temps and definitive cast metal posts
‘Correct decision-making in 2019 for compromised teeth and failed restorations’
BDA Forces Study Day - 4th July 2019
Management of Mechanical Failure:

• With aid of operating microscopic HD videos Peter will outline the revision-skills needed for dealing with failing restorations in 2019
• Explore mechanical failures such as de-cementation, restoration/implant and denture fracture.
• Re- restorative / revision strategies
• Getting the most from the endodontically treated tooth
• Improving the predictability of post cores
Kit and Tooling - Zirconium
Case Examples of Compromised Failing Restoration and Teeth:

- Monitoring Surviving / Failing extensive fixed restorations:
- Root resection – to resolve Endodontic Infection
- Tier 1 and 2 prosthodontic and endodontic revision skills
- Messaging to patients
Decision-making – act or watch?
- do no (further) harm -
Watch / Monitor / Patch / Intervene & Remove or Replace? – let’s look at what happened to this patient over 26 years with fixed restorations that are far from perfect – she was informed by a specialist in 1992 that she needed all her fixed restorations removing, unrestorable teeth extracting and partial dentures fitted in 1991 – patient did not want this.

We cannot control inflammation – this is the job and role of the patient.
Long-term monitoring – is acceptable

26 years later 2018
• Informed patient – understands the present and future - together with the implications of dealing with failing / surviving restorations.
• Understands the mode(s) of future restoration(s)
• Aware of frequent need for follow up and fire-fighting
Demolish / Extract / Repair / Palliative Dental Care?
Multiple linked-bridges – Fluoride / SPT / Clinical & Radiographic Monitoring / Apical Surgical revision
Acute apical infection from previously apicected LR2
Success / Failure / Failing Survival

High impact rear-exhausted fast speed surgical handpiece – controlled irrigation stream rather than air-pressured water spray - we all need one in 2018 and beyond
Compromise – the Grey Areas
Structural problems common – Restored Roots and Teeth will wear out!
Fiddly Stuff! – but is this the best approach? – this has given her 26 years of fixed function
Prognostication in Periodontics: Science or Art?

**Abstract:** It has long been assumed that clinicians are able to predict the course of periodontal disease and advise patients about the longevity of individual teeth; the evidence challenges this concept and suggests that clinicians are unable to do this with any degree of success. Periodontal therapy can be highly effective in the long term and questionable teeth can be retained for long periods. These facts have important implications when deciding whether or not to remove a tooth and consider some form of tooth replacement. The advent of dental implants has further complicated this decision-making process. In addition, the fate of dental implants in periodontally healthy patients is not as predictable as it is in the periodontally healthy.

**CPD/Clinical Relevance:** This paper highlights the difficulties clinicians face when determining the prognosis of periodontally questionable teeth in terms of whether to extract or retain such teeth. It also examines the survival of implants in periodontally susceptible patients.

*Let’s see what happens* is actually very sensible. ‘Time is a powerful diagnostic tool, though many patients are unimpressed by it’ (Raymond Tallis, *Hippocratic Oaths 2004*).

*Dent Update 2018; 45: 496-505*
Periodontally involved molars tend to survive very well.
DIFFERENT CLINICAL TIER 2 SKILLS – MONITORING SURVIVING RESTORATIONS OR INTERVENTION (REVISION / REPAIR / REDO)?

Executing some skills come with bigger risks than others – you do not want to be in the position that you only offer what your skill-set allows – that is not valid consent.
‘Correct decision-making in 2019 for compromised teeth and failed restorations’
BDA Forces Study Day - 4\textsuperscript{th} July 2019
Intervention Case Example: Tier 1 and 2

Endodontic and Tier 1 Prosthodontic Skills
What was done for UL5 and why?

- I investigated and treated the UL6 first. This resolved most of his symptoms.
- ODS asked whether UL5 should be cuspally-protected. If so Re-RCT first?
- I felt yes – followed by DO Nayyar AF short term – followed by preparation for modified cast alloy ¾ metal crown restoration maintaining intact mesial marginal ridge
- Cemented with conventional cement – as I knew that I would struggle to control moisture at base of box for resin cements.
- I ensured enough conventional resistance and retention form
How long do you wait until restoration after RCT?
Can always consider cuspal-protection with either amalgam or direct composite or definitive core and resin provisional crown

Pratt I et al. http://dx.doi.org/10.1016/j.joen.2016.08.006 - Published Online: September 10, 2016

Results:
• Type of restoration after RCT significantly affected the survival of ETT (P = .001).
• ETT that received composite/amalgam build-up restorations were 2.29 times more likely to be extracted compared with ETT that received crown (hazard ratio, 2.29; confidence interval, 1.29–4.06; P = .005).
• Time of crown placement after RCT was also significantly correlated with survival rate of ETT (P = .001).
• Teeth that received crown 4 months after RCT were almost 3 times more likely to get extracted compared with teeth that received crown within 4 months of RCT (hazard ratio, 3.38; confidence interval, 1.56–6.33; P = .002).
Re-do Prosthodontic Skills – Tier 1?
Modified ¾ crown preparation - both teeth and crowns were done at different times
UL6 first – due to wish complexity of diagnosis (crack / CAP / Sinusitis / atypical pain)
Tier 1 UL6 and Tier 2 UL5 – Endo Revision Skills -
‘Correct decision-making in 2019 for compromised teeth and failed restorations’
BDA Forces Study Day - 4\textsuperscript{th} July 2019
Mrs M is a 49 year old patient who attends complaining that her maxillary complete acrylic denture has broken in half on numerous occasions. The patient doesn’t like the gaps between her mandibular teeth. She is a type II diabetic and takes Glazide 30mg tablets since 2015. Smokes 10 cigarettes a day. Social drinker.
• There are good bone levels
• No obvious sign of caries and no evidence of periapical pathology
Question

- Why do you think upper acrylic denture has fractured?
What type of new maxillary denture would you make?

Answers:
- Another acrylic
- Re-enforced acrylic
- Colbalt chrome palate
- Other
What type of new maxillary denture would you make?

- Cobalt chrome palate: 50%
- Re-enforced acrylic: 50%

- MK
- SE
- CL
- YP
- KJ
- MO
This patient ‘precipitated’ these papers
The lower jaw
A series of retrospective cohort studies also reported that increase of abutment teeth mobility and fracture of denture base were observed more frequently in acrylic resin-based RPD than metal based RPD.

Acrylic resin-base had a 5 times greater risk of patients not wearing the denture.

The main reason for ‘not wearing’ was problem with abutment teeth in the acrylic resin-based RPD; whereas it was replacement in the Co-Cr-base group.
‘Correct decision-making in 2019 for compromised teeth and failed restorations’
BDA Forces Study Day - 4<sup>th</sup> July 2019