I would like to thank BDA and Dental Armed Forces for asking me to be here today
‘Correct Decision-Making for Compromised Teeth and Failed Restorations’
BDA Armed Forces Study Day - 4th July 2019

Peter Briggs
Today is about honestly discussing where we are today and dealing with patients in 2019 and onwards - who are in possession of compromised and failing / failed teeth

Hopefully, I will be able to provide help and advice on what to do. I am not selling you anything other than my experience, knowledge, synthesis, reflections and opinion
Learning content

• To increase knowledge on how long restorations should last and how they fail
• Communicate confidently with patients on the reasons for failed restorations
• Understand biological maintenance & failure
• Discuss mechanical failure management strategies and the challenges they bring
### Standards for the Dental Team contains nine principles:

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<td>Communicate effectively with patients</td>
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<td>Have a clear and effective complaints procedure</td>
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<td>Work with colleagues in a way that is in patients’ best interests</td>
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<td>Principle 7</td>
<td>Maintain, develop and work within your professional knowledge and skills</td>
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<td>Raise concerns if patients are at risk</td>
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<td>Principle 9</td>
<td>Make sure your personal behaviour maintains patients’ confidence in you and the dental profession</td>
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Choose and do the right thing at the very beginning for service men and women & their families

Less is often better - GIRFT

I am sure molar teeth are the bread and butter of your decision making

I assume your performance indicators relate to the number of your patients unexpectedly needing dental Rx? – unexpected treatment need
General Themes in 2019

Restoration Longevity in England and Wales

Burke and Lucarotti, 2018

The ultimate guide to restoration longevity in England and Wales. Part 10: key findings from a ten million restoration dataset

F. J. T. Burke and P. S. K. Lucarotti

Key points

- Larger restorations of all types and in all types of teeth generally performed less well than smaller restorations. Crowns perform better in time to re-intervention than direct restorations, but worse, particularly for younger patients, in time to extraction.

- Patient treatment history is a major factor in the survival of restored teeth, both to reintervention and to extraction. The greater the previous spend on treatment, the worse the survival. Dentists' age has been shown to play a part in the present investigation, with restorations placed by younger dentists performing better for all types of restoration except crowns.
Restoration Longevity in England and Wales.
Burke and Lucarotti, 2018

• Larger restorations perform less well than smaller restorations
• Crowns perform best in terms of time to re-invention than direct restorations
• Crowns worse, particularly in young patients, in time to tooth extraction
• The greater the NHS spend at time treatment the worse the outcome
Regarding dentists: little difference between genders.

Better performance noted of all restoration type placed by younger dentists with exception of crowns.

For older dentists – the older the dentist - the poorer the survival prognosis – whether to re-intervention or extraction.

Prognosis of a tooth which receives a root filling in same course of treatment as the other restoration - is much poorer than for teeth without root filling.

Restoration Longevity in England and Wales.

Burke and Lucarotti, 2018
Restoration Longevity in England and Wales.
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• Unanswered question(s) – what happens and should happen at intervention?
• Today is about how we can optimise success and discuss what needs to be done at time of intervention of compromised teeth
• Think of the success / failure re-cycle?
Why?

• The population of England is set to increase from around 56 million to around 62 million in the period to 2040.
• This growth will however be experienced differently in different parts of England, and the character of some populations is set to change dramatically over the coming two decades.
• Imbalances within these factors are likely to precipitate substantial and enduring demographic changes: whilst numbers of those under 20 are set to increase by around 500,000 – declining from 23.7% to 22.1% as a share of the overall population, numbers of those over 65 are set to increase by over 5,000,000 – up from 18.2% to 24.4% as a share of the overall population.
I have always gained satisfaction from *task completion* and the more difficult the task the more I have enjoyed it – for me it is the satisfaction from achieving something worthwhile and empowering others to do the same & better
My own training is irrelevant to 2019

- BDS (Hons) (1983) KCH / FDS RCS(Eng) (1986)
- MSc Eastman (1987-89) / MRD RCS(Eng) 1994
- Restorative Dentistry CCST (1994)
- Winston Churchill Fellow 1994
- Specialist Practitioner (1995 – present)
- Approximately 70 peer-reviewed publications in areas that we will describe today
- My own training experiences are no longer relevant to the needs of the future workforce
A retrospective study of root canal treatment in the armed forces

The outcome of root canal treatment. A retrospective study within the armed forces (Royal Air Force) by J. D. Peak, S. J. Hayes, S. T. Bryant, an P. M. H. Dummer Br Dent J 2001; 190: 140-144

Objective
The objective of this study was to investigate the outcome of conventional root canal treatment in a general practice setting within the Royal Air Force dental service.

Design
Retrospective review.

Methods
Teeth that had been root-filled for 12 months or more by Royal Air Force dental practitioners in patients attending a large Royal Air Force dental centre were included in the study. Following clinical and radiographic review the root fillings were classified as ‘definitely successful’, ‘probably successful’ or ‘failed’. The effect on success of several variables on the outcome was investigated.

Results
Out of a total of 406 teeth, 59% were maxillary teeth and 41% were mandibular teeth. Sixty-nine per cent of the total sample had pre-existing periapical radiolucencies. Cold lateral condensation of gutta-percha was the most widely used filling technique (64% of all cases). Fifty per cent of the teeth had root fillings within 2 mm of the radiographic apex, 32% were greater than 2 mm from the radiographic apex and 18% were overfilled. Cold lateral condensation was the most successful (92% overall) filling technique. Maxillary anterior teeth had a better success rate (96%) than other tooth types. Teeth with pre-existing periapical radiolucencies had a higher success rate (87%) than those cases where there was no pre-existing periapical radiolucency (80%). Root fillings that were less than 2 mm from the radiographic apex of the tooth had a higher success rate (88% overall) than those that were greater than 2 mm from the radiographic apex (77% overall). Of the 406 cases, 57% (n=231) were classified as definitely successful, 28% (n=114) were classified as probably successful and 15% (n=62) were classified as failures. Thus, the overall success rate combining definitely successful and probably successful root fillings was 85% (n=344).

Conclusions
Root fillings placed using cold lateral condensation of gutta-percha to within 2 mm of the radiographic apex of the tooth were associated with the best outcome.

In Brief
- Success rates of treatment modalities are an important part of evidence-based practice
- The technical quality of root canal treatment has a major impact on the outcome
- Teeth filled with laterally condensed gutta-percha to within 2 mm of the radiographic apex had the highest success rates

Out of the 406 cases, 57% (n=231) were classified as definitely successful, 28% (n=114) were classified as probably successful and 15% (n=62) were classified as failures.

Thus, the overall success rate combining definitely successful and probably successful root fillings was 85% (n=344).
This was the conventional wisdom on which I was trained. It was fun, you needed to have good hand-skills or you would be found out on ‘taught’ programmes - your reputation would be damaged. This was destructive dentistry and although initially predictable, offered few options at the time of failure. A few of us in the UK started to ask the questions in late 80s / early 90s – does this really make any sense?

We were all seeing too much of this – where the biology is sacrificed to meet mechanical objectives – this work required really good craft skills with little room for significant error – this signalled the need to change

Saunders & Saunders (1998) BDJ 20% non RCT’d crowned tooth displayed apical pathology
In 2019 our problem is that we are having to deal with new types of problems and failures.
Human Factors relevant to dental professionals
Identification of Human Factors for Future Dental Team workforce

Timeline:

1. **Values, Culture and Behaviour** - up-bringing / education / work place experience – is this fit-for-purpose and available for all in 2019?

2. **U/G Recruitment** – opportunities to identify those with appropriate values, behaviours, leadership potential, practicality, multi-level communication, life experiences and academic achievement – dentistry is tough career choice for someone who has poor verbal / non-verbal communication skills and little insight / self-reflection

3. **PG human factors** - develop: Clinical / Communication / Leadership / Professionalism – relevant for a dentist in 2030 and beyond
Dentistry – is it not all an ACT?

I bet that none of you behave in your surgery and with patients as you do at home with your loved ones?
Resilience – why might this have changed?

- Evidence of change – helicopter parenting / ‘tiger’-parenting / expectation of excellence and success
- Downgrading of the importance of other relevant exceptional achievements that might guarantee TCUP / Resilience / team and other leadership
- Knowing and being exposed to what real talent looks like – realising the work we need to put in to improve
- Very negative connection to failure or criticism – as a result reflection and emotional intelligence can be a problem
- Pride / Loss of face / Protection of honour – can get in the way of the truth. We need to be truthful to ourselves and others on our performance
- No long game acceptance – push for instant excellence
Recent examples of excellent resilience

• FD – father (leading oncologist) diagnosed with terminal cancer during FD year, multiple operations, FD had to look after/support much younger siblings while mother cared for father. Never late or missed any study days. Went on to win clinical case presentation, exceed targets, top DCT post, published paper. *Why and what makes the difference?*

• FD - father passed away from sudden heart attack during BDS final exams. As oldest son had to support mother and sister during FD year, run family business etc. Always first person at study days, exceeded targets, always excellent feedback, DCT post, and even organised and funded own wedding in FD year. *Why and what makes the difference?*
Other examples...

• Difficulty in dealing with patient complaints (failure to see other person’s viewpoint)

• “Communication with the members of the team and being a team player taking into account what the nurse says and taking this seriously.” (from MSF)

• “little more open to advice from other members of the Practice team”... response to this by FD was “I graduated with distinction, I was top of dental school” “I know better than my trainers”
Mismatch between own perception of own abilities and that of ES’s/TPDs/senior dental team members:

• Difficulties in accepting negative feedback
• “I would like a maximum of 3 feedback points of which at least 1 must be positive.” I do not like negative feedback
• Hierarchical approach to team members – seen both with foundation dentists and foundation therapists; leading to team issues.
• Often the introduction of one such person can lead to complete destabilisation of long established team resulting in long standing dental nurse team members leaving practice
You will see that ‘Foundation’ Disciplines and Prosthodontics are well represented within the major risk groups – so we need to get appropriate expectation match in place at the beginning.

- 1 Endodontics
- 2 Crown & Bridge
- 3 Periodontics
- 4 Nerve Damage
- 5 Implants
- 6 Orthodontics
- 7 Veneers
- 8 Oral Surgery
Coping with the ‘dreaded’ complaint:

• Share with others – be happy to talk about it / accept criticism
• Hands-up ASAP where needed
• Try and think why someone has made a complaint about you – do not hate them – think why?
• What can I learn from it?
• Compartmentalise it – think of the balance of patient satisfaction see-saw throughout your career – take care of your physical and emotional well being
• Remember – we live in a complaining culture
Total self-assurance / confidence (even a hint of arrogance) when executing your skill – this is essential in dentistry – as the patient will soon pick up if you are not – same for boxers, circus acts, F1 drivers, brain surgeons etc.

The harder I work the luckier I seem to get
Luckily all personalities can get very good at something – there is room for us all, but.....
....it is our attitude, behaviour, values and reflection and insight and ‘open’ dedication to hard work and honing knowledge and skills which will dictate the height of our ceilings and our ultimate success – ‘humble’ to get better
Session 1 - Strategies for failing and failed restorations:

- Focus on diagnosis and the use of appropriate special tests to understand the problem.
- Assessment of predictable restorability versus tooth extraction.
- Awareness of the mode of failure and the factors that play a part in dictating long-term prognosis
- Planning for the future
- Understand how long restorations last and how they fail.
- How to effectively communicate and deal with a difficult and upset patient.
Am I up-to-date with the subject?
2018 publications – worth a read

Endodontic Tooth Survival

After four years the cumulative tooth survival rate was 95.4% for primary treatment and 95.3% for secondary treatment.

Post-operative factors relevant to survival of root filled teeth were:

- The presence of a cast restoration coronally (positive)
- Two proximal contacts (positive)
- Cast post and core (negative)
- Terminal tooth (negative)

• Vital tooth - Should I RCT a Tooth prior to my direct / indirect restoration?
Results:
A total of 538,967 restoration placements were obtained from the data over a period of 11 years, of which 30,073 were root fillings.

Conclusions:
• Survival of restorations in teeth with and without root canal fillings indicated that those with root-canal fillings have shorter intervals before re-intervention than teeth without root fillings.
• Restorations on root canal treated anterior teeth with post and cores had the lowest survival time.
Regarding dentists: little difference between genders

Better performance noted of all restoration type placed by younger dentists with exception of crowns

For older dentists – the poorer the survival prognosis – whether to re-intervention or extraction

Prognosis of a tooth which receives a root filling in same course of treatment as the other restoration - is much poorer than for teeth without root filling
Post Restoration Endodontic intervention risk
vital pulps requiring endodontic intervention

Risks:
• Number of surfaces of the build-up restoration
• Restorative material used – GIC / Comp / Amalgam
• Full coverage restoration
• Thickness of the thinnest part of dentine over the pulp
• Tooth type – anterior more risk than posterior
• Problem will become apparent in first year

Yong et al (2018)
The extent of tooth preparation and the thickness of the remaining dentine overlying the pulp (Christensen 2002, Murray et al 2008)
Decision Making

sometimes it is easier than others
This what we want to avoid
- Emergency Care Management -
ULQ soon after bridge placed – AIP UL6
The implication to the patient is considerable

Assume that you are the patient. How would you feel if this happened to you 6 months after the bridge was fitted?
I’ve been a Specialist for nearly 25 years and I am still very cautious drilling through restorations ‘blind’ to facilitate Endodontics – I would say in 2019 we should consider ‘geographical dynamic CBT-guidance’ - this is me in action – you will see why! – very nearly an untowards incident / event

difficult and I am ‘meant’ to be half good at it
Do you feel that a Dentist 2 years post-graduation should be able to manage a patient (acute pain management, drill through or remove bridge and complete temporary restoration and potential RCT UL6) independently?

Poll locked. Responses not accepted.
Assume diagnosis is AAP UL6 and the patient keen if possible to preserve.

Poll locked. Responses not accepted.

- 57%: Drill through bridge and RCT UL6 and simply restore access
- 29%: Remove bridge, RCT UL6 and then replace the indirect restoration
- 14%: Unsure
The need for endodontic therapy of UL6 abutment has driven sensible restorative treatment planning options for the ULQ – it makes a big difference long-term planning.
Reflections for decisions

- Patient did not want to wear a denture and was prepared to fund an individual OI to replace UL3
- Single teeth are easier to deal with at failure – she will be in her 80s then and I will have retired (Randow 1992)
- RCT’d UL6 with decent coronal ferrule as a single unit has a very good prognosis (Salehrabi and Roststein 2004; Doyle 2006, Ng et al 2010 & 2011)
- It is always better having removed restoration prior to RCT (Abbott 2004)
- OI UL3 – decent prognosis - best method to replace missing canine in this circumstance (Pjetursson et al 2008) – over 95% survival at 5 years and 90% at 10 years. Same study confirms drop off of success of conventional cantilever bridges years between years 5-10 – we know how they fail
My reflection

• UL5 - checked with temp off – vital pulp response with EPT – good prognosis with remaining tooth tissue present (Palmqvist and Soderfeldt, 1994)

• If I had left UL bridge – with RCT UL6 – my view is this would have accelerated the failure of the restoration and led to significant damage / loss of one or both of the abutment teeth (Scurria & Badia, 1998; Foster, 1991)

• I accept others and NHS contract would make people do this differently – and their approach would be right. I would be happy for a RPD / Co Chrome if patient was happy with the concept – it would have been safer aesthetically – Cobalt Chrome 75% success at 5 years dropping to 50% at 10 years
Critical time-lapse until Endo Rx required after restoration = 9 months

Risk factors:

- Composite Restoration
- Restoration Size - 2 or more surface restoration
So – do I need to RCT a vital tooth with deep cavity before direct restoration?

• **No** - if no symptoms present suggestive of irreversible pulpal damage
• **No** if 1 mm or more dentine thickness (on BW) over the pulp after caries removal – restore and control leakage?
• **No** if the implications to the restoration and patient are clearly understood of endo flare up (and responsibilities) after restoration (valid consenting)
So – do I need to RCT a vital tooth before Indirect Restoration?

• **More likely Yes** – if caries present before an indirect restoration preparation for bridge abutment (Reuter and Brose 1984)
• Should you Re-RCT a Tooth prior to a new Direct or Indirect Restoration?
When no or only small radiographic evidence of periapical pathology is present and clinical signs and symptoms are absent - no treatment (mean monitoring period 6 years) appears to result in complications in a small percentage of cases, despite what appears to be a less than ideal root filling.

- Monitoring led to: status quo 94.8%; healing in 2.4%; failure in 2.8% of canals
- If radiographic monitoring alone is contemplated there should be no suspicion of more sinister pathology or plan to change restoration / coronal seal.
- Retreatment is clearly indicated when a periapical radiolucency is accompanied by clinical signs and/or symptoms, and the relative success of such treatment rises to 91%
If no significant radiographic signs of improvement at 24 months then NSRCT not likely to have worked
Success of your or another’s RCT - will be known by 24 months (over 96% probability)

- Wu and Wesslink (2002)
- Also confirmed by Ng et al 2004.
Do I need to revise the Endo Rx before Re-Restoration?

• Asymptomatic tooth?
• Evidence of apical periodontitis?
• Size of apical area?
• Is and will the root canal system accessible? - if not why not?
• What function will the tooth provide?
• What are the risks of re-doing the RCT and have I got the skills to do it?
• ‘Lock-in’ – will access to endodontic care be complex – e.g. a post core to be used?
Two molars

• Asymptomatic LL67 - both teeth RCTd many years ago
• Then ‘crowned’ with PFM - now poor crown margins and likely caries – ODS wants to re-crown the teeth
• LCPAs: Periapical / Furcation Radiolucency LL7
Is our re-Endodontics going to work?

Intra-operative:
- Achieving patency (Two-fold increase)
- Canal prepared short of terminus (12% lower for every 1mm short)
- Long root filling (62% lower odds of success)
- Using Chlorhexidine as irrigant (53% lower)
- Using EDTA (Re-RCTx) (Two-fold increase)
- Inter-appointment swelling/pain (47% lower)

Ng, Mann & Gulabivala; International Endodontic Journal, 2011
Non-Vital or previously RCT’d tooth – requiring restoration -

Key factors to take into consideration:
• Clinical signs / symptoms of disease
• Problem will become apparent in first year
• Can I please add – ease of accessibility for the Re-RCT after restoration & the quality of the in-situ RCT?

Yong et al (2018)

Never ever use the presence of a post to drive decision-making – it should be the strategic worth, what you are asking of the tooth, amount of caries, remaining supra-gingival tooth tissue present and the risk to reward of the other options.
Tier 2 / 3 Dismantling – Metal and Glass Fiber Posts
People have these skills – never use as a reason alone to extract restorable teeth (Abbott, 2004)
Good example of a terminal molar tooth: Patient informed that the only option for his LL7 was extraction and OI.
Is our Endo going to work?

**Post-operative:**

- Good coronal restoration (**Eleven-fold** increase in odds of success)

Ng, Mann & Gulabivala; International Endodontic Journal, 2011
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).**
How long should we wait until restoration after RCT? Warn of tooth vulnerability
‘Correct Decision-Making for Compromised Teeth and Failed Restorations’

BDA Armed Forces Study Day - 4\textsuperscript{th} July 2019

Peter Briggs