Fundamentals of Endodontics
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Practical Hands-on course
St George’s Hospital, SW17 0QT
St George’s Dental Simulation
Today

• Take the opportunity to enjoy the facilities
• Remember that endodontics is a team sport – it is difficult to do on our own
• As a profession we need to be looking at ways of improving clinical outcome
• We need to break down our goals into important small doable tasks
Small things that we need to do well

• Access
• Canal(s) location
• **Small Scout Files (#08 / #10)** to confirm presence and patency of root canal(s) – very important for re-treatments
• **Preparation** – Coronal, Mid and Apical thirds
• Obturation
• Coronal Restoration
Why do we need to do these well?
What endodontic skills are we going to need throughout the life of our patients?

• We all need to know and understand the important factors that influence Endodontic outcome
What factors have been proven to make a difference to endodontic outcome?
We all should all have read this critical review on Endodontics  
Ng et al. (2008 a & b) Int Endod J 41: 6-31

• Pre-operative apical area
• Root filling ending within 2 mm of radiographic apex (instrumentation and obturation)
• Voids within the root-filling (obturation quality)
• Satisfactory restoration coronal seal (post-Rx Rest Dent)
Electronic Pulp Tester - a great tool

Get the patient to hold the pulp tester and let go when they feel something.
Presence of pre-operative area

• Why do you think this is important?
• How long will it take to heal after treatment?
If no sign of healing or radiographic improvement at 24 months then likely not to have worked
Should see an improvement or resolution by 24 months
Root filling ending within 2 mm of radiographic apex (instrumentation and obturation domains)
Electronic Apex Locators
always use the tip (not the clip) - your nurse can put hold it on the head of the hand-piece it doesn’t need to be on the file.
Gauging & Diagnostic radiographs in a digital age

- Learn to use and trust an EAL – it’s right as long you can get predictable Zero readings and it’s not ‘jumping’
- Prepare the root canals with tip of EAL placed on the hand piece as you work
Verify apical size of master GP point with plastic Maillefer ruler to apical gauge - GP points vary massively – cut flush with scalpel blade then you have an apically ‘gauged’ master GP point that can be seated within the root canal this will help keep your RCT within the root canal
Teeth with apical areas you will get an approximate 12% drop-off in outcome per mm short of ideal length.
‘Golden Rules’

• Never put an unmeasured endodontic instrument into a root canal
• Use your pre-operative radiographs to help provide a guide on likely working length(s)
• Share measuring responsibilities – nurse with measuring block responsible for clearly instructed measurement of all files
• Careful gauging and pre-cementation radiographs please
Ng et al. (2008 a & b) Int Endod J 41: 6-31

• We are now probably as good as we can get “ARE WE THERE YET?”

• The older techniques hold up well

• Irrigation and ‘bug-killing’ are extremely important when apical periodontitis is present

• We must all ‘crack’ a predictable obturation technique
Ng et al. (2008) Int Endod J 41: 6-31
Irrigation & Cleaning is the key

- Ultrasound – 1 minute per canal using and ultrasonic needle and 15ml of 6% hypochlorite.
- Addition of U/S gave a sevenfold increase in the chance of a negative culture could be obtained at the end of the procedure.
- U/S significantly reduced colony forming units (CFUs)

Increasing ‘bug-killing’ with hypochlorite

• Warm - 1% at 40 degrees is as effective as 5.25% at room temp
• ‘Pump’ with final GP – 30 seconds per canal with EDTA then 30 seconds with hypochlorite immediately prior to obturation
• This has been shown to make a big difference to outcome for both de-novo and revisions (EDH / USA)
Re-treatments – you want to get down to the working length ASAP

International Endodontic Journal (1994) 27, 75–81

Retreatment or radiographic monitoring in endodontics

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Summary
The aim of this clinical study was to assess 1032 endodontically treated roots in relation to: (i) the success rate of retreatment (612 roots)—only cases that had recall examinations of 6 months or longer

Introduction
Studies have shown that success rates of root canal therapy generally approach 90% (Lewis & Block 1988). When treatment fails, retreatment rather than extraction is usually indicated (Allen et al. 1989), but the
Re-Treatment usually means removing a GP - do not be scared of the stuff it will not bite!
Success rates

• 31-96% based on ‘strict’ criteria
  – Complete resolution of periapical lesion
• 60-100% based on ‘loose’ criteria
  – Reduction in size of existing periapical lesion

80-82%

Can we predict if our Endo is going to work?

Pre-operative:

- Presence of periapical lesion (49% lower)
- Size of periapical lesion (14% lower for every 1mm)
- Presence of sinus (48% lower)
- Presence of root perforation (56% lower)

*Ng, Mann & Gulabivala; International Endodontic Journal, 2011*
Predictive Discussions with the patient

• CAP with exudation - presence of sinus (48% lower)
Is our Endo 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*
Early patency and drainage is very important with teeth with CAP.
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
We must protect the investment
Satisfactory restoration - coronal seal (post-Rx Rest Dent)
Post Endodontic Restoration and Cuspal Protection
Non-vital posterior teeth # unfavourably
Vital teeth fracture more favourably (supra-gingival) and thus are usually restorable.
Survival rates in NHS

- Tooth still in mouth and asymptomatic
- RCT of 174 lower 6s
- 12 NHS practices
- Salford (NW England)
- 90% retained at 5 years
- Most failures in first year
- 10% failure: 15 extracted, 1 retreated
- Statistically significant difference if tooth crowned

Protect your hard work!

- Reduce the risk of coronal leakage by cutting back GP - so the whole pulpal chamber can be filled.

Saunders & Saunders Coronal leakage as a cause of failure in root canal therapy: a review’
Endod Dent Traumatol (1994)
www.hodsonhousedental.co.uk
Endodontic Failure & Revision
Re-treatments

• The poorer the quality of the primary root filling in situ – the easier and more predictable will be your re-treatment
• Ideally you want to revise a short poorly obturated root filling with no iatrogenic damage!
• You can then expect a 80% positive outcome (NG et al 2011)

The ‘Toronto’ study
Sometimes we will need to carry out apical surgery – we must do it properly
Coronal Issues
Skills we need you to all display today

- Think about preparation – break up into coronal / mid / apical (Hand / Protaper and Recipirication)
- Apical patency / Apical gauging / Apical tune
- Irrigation – dynamic pumping / EDTA / Hypochorite
- Obturation – vertical warm and cold lateral condensation
- Intermediate and long-term coronal seal
The End

I thank you for your invitation and attention.