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Pan London Didactic StR Teaching Session – Reciprocation Course

Restorative Dentistry 2015

Date: 9th July 2015    Venue: Dental Simulation suite at QMUL    Time: 2.00pm - 6.00pm

Course leaders: Peter Briggs (QMUL) and Graeme Bryce (Eastman)

The session will focus on the following learning aims:

- The theory and clinical practice of Reciprocal Single File (Reciproc) compared to other rotary file systems for use with primary and secondary endodontics
- Understanding the potential advantages and disadvantages of Reciproc and Protaper – and how to get the best from these techniques
- How difficult cases can we tackle with Reciproc?
- Assessing the place for such systems within a resource-limited NHS department.
- Thinking through a business plan and strategy that outlines the cost effectiveness (or not) for transferring to a single file system
- Discuss the demands and importance of root canal treatment in secondary care
Graeme and I welcome you to QMUL

- We have a lot to get through this short pm simulation session
- There is a mix of mono-StRs an Rest Dent SpRs – so lets work well together
- I would like to thank to Janis Haddow from QED and all the team at QMUL for making today possible
- For me it is great to see the Pan London sessions going from strength to strength
Who am I to educate you?

- I was lucky enough to be trained by Chris Stock, Karl Nehammer, Julian Webber, Kishor & Simon Cunnington

- My MSc project was endodontics about and automated in-vitro-dentine preparation (ultrasound)
Why an interest in Endodontics?

- It is all down to you and your nurse (no one else)
- Nothing to stop you setting up your ‘no-blame’ environment
- We need to accept that it is difficult to do well and rise to the challenge
- Let’s be honest it is the most difficult thing practically to consistently do well in dentistry – rise to the challenge
Single File System is our main focus today
With reference to:

**NHS Endodontic Commissioning Guides**

- **Level 1** – no more than 30 degrees of curvature
- **Level 2** – greater than 30 but less than 45 degrees of curvature and well condensed root filling obturated short of ideal WL with no complicating factors
- **Level 3** – Greater than 45 degrees of curvature – previous RCT with anatomical and iatrogenic complications (overfill, edge, perforation etc.)
Evidence on Reciprocation – Single File Endodontics and its relevance to all of us
The RECIPROC® system

Instruments

• Benefits:
  • Higher flexibility
  • Reduced cyclic fatigue
The RECIPROC® system

Sizes and dimensions of instruments

Narrow canals
- R25
- Sizes and dimensions:
  - 16 mm
  - Ø 1.05 mm
  - 3 mm: 0.49 mm
  - 2 mm: 0.41 mm
  - 1 mm: 0.33 mm
  - 0 mm: 0.25 mm

Medium canals
- R40
- Sizes and dimensions:
  - 16 mm
  - Ø 1.10 mm
  - 3 mm: 0.58 mm
  - 2 mm: 0.52 mm
  - 1 mm: 0.46 mm
  - 0 mm: 0.40 mm

Large canals
- R50
- Sizes and dimensions:
  - 16 mm
  - Ø 1.17 mm
  - 3 mm: 0.65 mm
  - 2 mm: 0.60 mm
  - 1 mm: 0.55 mm
  - 0 mm: 0.50 mm
Reciproc

• Three sizes (R# 25, 40 and 50) with matched paper and final fit GP points
• Can use from the start of preparation
• Some say that you can create the guide path with them
• They are tough and used with an aggressive ‘pecking’ action
The RECIPROC® system

Design
Single File Endodontics – just suitable for simple (UGs, DFs & GDPs) or can it help us with more complex level 2 & 3 cases?

Reciprocation – an alternating back-and-forth movement

*CW and CCW movements determine amplitude of reciprocation*
Where am I coming from?

• To introduce you to a relatively new approach
• A single file system to provide preparation and shaping of coronal, mid & apical part of root canal (matched paper and GP points)
• In theory can tackle difficult anatomy (we will see today and you can make up your own minds)
Trend towards single-use

• Studies have shown that current cleaning and decontamination procedures could not completely remove remnants of tissue adhering to instruments *(Sonntag 2009)*.
Practical Tasks

- Preparation
- Obturation
- Removal of your root fillings

We will be working on plastic blocks and plastic and extracted teeth
Pre-bend and ‘Watch-Winders’ movement of #10 K file in combination with AL – you all need to have this skill – particularly for re-treatments and canal sclerosis.
Clinical procedure
after reaching 2/3 of the working length with R25

- Hand instrument ISO size 10 used for working length determination goes to working length without being pre-curved.

Preparation can be finished with R25.

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The RECIPROC® system
VDW.SILVER® RECIPROC® motorC

- I would suggest that you need an Endo motor that allows reciprocation and continuous rotary NiTi systems
Clinical procedure
Selecting the correct RECIPROC® instrument

Pre-Operative Radiograph DECISION

- Canal is completely visible
  - Hand instrument ISO 30 goes passively to working length
    - Yes
    - $R_{60}$
  - Hand instrument ISO 20 goes passively to working length
    - No
    - $R_{40}$

- Canal is partially or completely invisible
  - $R_{25}$

Passively means that the instrument goes directly to working length with a gentle watch winding movement (small right left rotations) but without filing action.
Clinical procedure

Ensure you have achieved a straight line access to the root canal entrance.

Move the instrument in a slow in-and-out pecking motion. The amplitude of the in-and-out movements should not exceed 3 mm. Only very light pressure should be applied. The instrument will advance easily in the canal. One in-and-out movement = 1 peck. Remove the instrument from the canal after 3 pecks.

In this way, continue root canal preparation with RECIPROC® until to approx. 2/3 of the canal length.
• After preparation of approx. 2/3 of the root canal length, the working length is determined.
Clinical procedure

Glide path management

- Hand instrument ISO size 10 used for working length determination only goes to working length if it is **pre-curved**

→ Glide path up to ISO 15

If the ISO size 15 hand instrument goes to working length **without being pre-curved**, finish root canal preparation with R25.

If not, complete preparation with hand instruments

Abrupt curvature tooth 47, root canal preparation was finished manually
Dr. Ghassan Yared
Clinical procedure
Irrigation management

• Time saved for final irrigation
• Ultrasound activated irrigation
• R25 complies with requirements for shaping prior to ultrasonic irrigation
Let us start with simple plastic block, establish guide path, WL & patency with #10 hand SS and then use R#25 - 3 Pecks and Out
Reciprocation – ‘S’ shapes canal
Complex Block – with hand capitulation after every set of pecks

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The faster preparation should give more time to concentrate on 3D Irrigation – right to the apex -
Go away and start on the simple block

Course Timetable:

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>2.00pm</td>
<td>Introduction (Peter Briggs / Graeme Bryce)</td>
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<tr>
<td>2.30pm</td>
<td>Clinical use with Reciproc &amp; ProTaper on Simple and Complex Endo-Vu Blocks / plastic teeth &amp; extracted teeth</td>
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<tr>
<td>3.30pm</td>
<td>Obturation (3D Warm Vertical GP – to include instruction on selection of final GP point, Hand Gauging of root canal apex &amp; Verification of final master GP point and Vertical Warm Obturation)</td>
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<tr>
<td>4.30</td>
<td>Use of Reciproc to re-treat and removal of GP root fillings</td>
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<tr>
<td>5.30pm</td>
<td>Assessment and Reflection of rotary and reciprocation files, identification of further training needs &amp; discussion of set ISFE examples</td>
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<tr>
<td>6.00pm</td>
<td>Wash Up and Close</td>
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Endodontic Warm Vertical Obturation

two components: apical down-pack followed by warm backfill – goal is a the creation of a well adapted ‘void less’ root-filling ending within 2mm of radiographic apex (Ng et al 2008)
Always use the correct GP points for the correct system you are using
Ensure that your tapered GP points fit well within the root canals and have been apically gauged – the process can only work predictably if you have
What do we need to do prior to Obturation?

• We need to confirm the apical gauge
• This involves using a hand K file passively (without any rotation) and working out what apical size fits tightly at the apical stop
• It improves the apical fit of the point to optimise future seal and reduce the risk of creating overfill
• This can be done ‘Early’ or ‘Late
Establish apical gauge

• After use of R#25, #40 or #50 use a suitable sized hand SS K file to find out which size fits and binds to your apex at the ideal WL
• Gentle index finger push vertical pressure – no twisting / rotation
Verification of the apical size of your final GP point with plastic Maillefer ruler or gutter cutter
Verification with plastic Maillefer ruler – GP points vary massively – cut level with scalpel blade then you have a gauged point
Direct Gauging of Final GP point – place point in root canal and trim apex until point seats and directly verifies to apex preparation
Master GP point try-in and radiograph

- Select master GP point that matches both your chosen apical gauge and taper
- Verify the apical size of the point using either an apical gauge ruler or a gutta-cutter
- Now the apical end of your chosen GP point matches that of your master K-File (gauging instrument)
Master GP point try-in and radiograph

• Seat GP point within the root canal and check length of seat matches with your chosen reference point

• In multi-rooted teeth consider cutting off the points level with the chosen reference points

• Posteriorly, I am happy to take off the rubber dam off quickly to record the LCPA radiograph – then straight back on with the RD
GP try-in
– digital sensor -
Pre-operative factors that made a difference to outcome:

- 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)

Is our 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)
The Vertical Heated Down-pack

Practical & technical knowledge
Select a correct ‘sized’ and ‘tapered’ GP point
Work out which plugger can get down to within 4mm from apex
Apical Obturation – Continuous Wave

- Confirm that heating tip and a Buchanan plunger can reach to within 4mm of WL
- Mark this length (WL minus 4m) with a silicone stopper
- Coat the master cone apically with a thin layer of sealer and insert to WL firmly
- Use the heating tip horizontally at 200°C to burn off GP at orifice point of canal
- Then with heat ‘on’ push vertically in one slow movement until you reach WL minus 4mm.
- Stop heat and maintain apical pressure for 10 seconds then quick buzz of heat and out
- Buchanan pluggers to WL minus 4mm – silicone marker please
The Vertical Heated Down-pack to WL minus 4mm
Apical Obturation – Schilder’s incremental vertical warm condensation – to get more controlled heat and pressure to apex

• Same as for continuous Wave – **Gauging and Verification** of Final GP point
• Work out WL minus 5
• Start with size 12, then a 10, an 8 & if necessary a until last (smallest tip) reaches WL minus 4
• **Maintain apical pressure** for 10 seconds **buzz and out**
• **Buchannan pluggers to WL minus 4mm** – silicone marker to reference point please
Apical Obturation – Schilder’s incremental vertical warm condensation – to get more controlled heat and pressure to apex
Warm Backfill Obturation

• Set the GP extruder to right temperature - 200°C.
• Only bend needle when **full of** GP
• Insert the needle to length, **hold for 3 seconds and then express molten GP into the canal in increments of 3mm.**
• Condense the GP with the cold **Buchanan pluggers**
• Repeat until 3mm short of canal orifice
Obturation 3DScihler Vertical with Warm Backfill
Lateral Condensation – gold standard
No go try and remember the problems with the plastic blocks and teeth

• They melt – do not over heat
• The GP point may ‘core – out’
• Accept that you will leave GP core behind- we will show you how to retrieve / remove it
Revision Level II & III

www.hodsollhousedental.co.uk
Try an use a R#25 to re-treat and remove your GP

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Foundation (perio / endo), core design, preparation, impression, static jaw registration, temporisation, crown construction, try-in, cementation and polish
Agreed Standards of achievements

E-max Monolith UR6 – single strategic RCT’d tooth

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Endodontic revision that we can predict to work – Level II?

- The poorer the quality of the primary root filling in situ the easier and more predictable will be your re-treatment. You can then expect a 80% positive outcome (NG et al 2011) if you can achieve your objectives.

- Ideally you want to revise a short poorly obturated root fillings!

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The ‘Toronto’ study
Endodontic revision we can predict is likely not to work – Level III?

- High risk: perforations, resorption, ledges, blockages, iatrogenic error – anything that stops you reaching your objectives – in this case ledge within curved MB1 (stopping me reaching an ideal length) and not also able not able to identify MB2

The ‘Toronto’ study
Learning expertise / proficiency

• Knowledge
• Experience
• Critical feedback
• Raise bar of your own expectation
• Benchmark against others
• 10,000 hours – to fully master an expert skill
Scenarios and ISFE questions

Preparation for Summative ISFE examination - Scenarios:

Outline the steps you would need to put in place to incorporate a new clinical technique (e.g. single file Endodontic System) to your NHS Hospital service.

Where do you think endodontics sits within secondary care? What cases should a Consultant in Restorative Dentistry take on for treatment? What local managed clinical network would you like to see in place for endodontics?

Your new Str says that: ‘...I have been taught that it is fine to cement a single cone that matches the final apical file of Protaper (F1, 2 or 3 / Reciproc R#25, 40, 50) – what’s the problem?....’ How would you as a trainer approach this problem?

How would you go about proving that Reciproc is more (or less) effective – when compared to conventional techniques within the following domains: Time Efficiency, Cost Effectiveness, Post-op Flare Ups & Clinical Outcome
The End

Handouts and literature

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