2016 ‘Hands-on’ Tooth Preparation Course
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– 4\textsuperscript{th} November 2016 -

Anterior Tooth Preparation Course – SGUH Simulation Centre
‘Hands-On’ Didactic Teaching
Hands-on Tooth Preparation Course -
Clinical Simulation Laboratory,
SGUH 2016
A little about me

• In my day there was no VT or DF training year
• So initially I learned from my mistakes and experiences
• At 26 I realised that I needed to know and learn more from those who could ‘do’ dentistry better than me
• One of the things that I needed was to be ‘taught’ how to prepare teeth properly
• I was ‘beasted’ at EDH for 4 years – to achieve this
• Clearly much has changed we have better ceramics and as a result we now can take much less off teeth and still create good aesthetics
‘Phantom Head’ dentistry

• It taught me what I need to be able to do before I do it
• Allows me to execute practical skills until I can predictably achieve a satisfactory result
• It taught me the importance of reflective learning and to be self-aware of my limitations – so I can improve them
• It taught me to look at criticism positively – even though I did not always like it
Learning

- Know
- Know how
- Know do
- Show do
- More do
- Teach – know, how & do
Rules of the Day

- Get feedback from us and your colleagues
- Enjoy the day and have fun but and reflect on at you have done
- Lets try and do step by step approach – keeping together
• It’s not an exam – it’s a day to make mistakes
• We might take photos of your preps so we can discuss them as a group
• We will come round & offer honest **constructive** comments
• You will objectively score your preparations
Practical Day

Objectivise where we all are with the skill of tooth preparation
What is it that makes a good or poor tooth preparation?
Simulation Environment

• In practice you will rarely be preparing virgin teeth
• The teeth will be heavily restored, broken down or worn
• You may be replacing failed ‘fixed’ restorations
• In practice you are dealing with the quirks of the patient
Well what are we going to do today?
Make sure that you keep your standards high in your DF year

• Impression taking - Storey and Coward (2013)

(The 4 cases that did not specify contract type are included in the All Cases category)

Figure 2. Quality of the impressions of prepared teeth (NHS/Private/All Contracts)
What are we going to concentrate on today?

- Margin
- Taper
- Inter-occlusal space
- Matching reduction to tooth anatomy & material of restoration
- Producing an overall circular preparation shape
- Hold and control your hand-piece properly
- Know the dimensions of your burs – and why you are using them
Margin

• Position
• Shape
• Smoothness
• Extent

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Taper

- Wall taper – neo parallel
- Convergence taper
- Undercut avoidance
Inter-occlusal Space

What are we going to concentrate on today?

• Material Choice
• Functional / non functional cusp
• Verification

• Margin
• Taper
• Inter-occlusal space
• Matching reduction to tooth anatomy & material of restoration
• Producing an overall circular preparation shape
• Hold and control your hand-piece properly
• Know the dimensions of your burs – and why you are using them
Anatomical Tooth Preparation

- Knowledge of tooth anatomy
- Planes of reduction

What are we going to concentrate on today?

- Margin
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- Producing an overall circular preparation shape
- Hold and control your handpiece properly
- Know the dimensions of your burs – and why you are using them
Hand Piece control

- Do not be afraid to hold, with two hands
- Use index finder to stabilise the head of hand piece

What are we going to concentrate on today?

- Margin
- Taper
- Inter-occlusal space
- Matching reduction to tooth anatomy & material of restoration
- Producing an overall circular preparation shape
- Hold and control your hand-piece properly
- Know the dimensions of your burs — and why you are using them
Tools for the day:

Silicone putty & sharp scalpel blade
Burs
Plastic Teeth
Sharp pencil
I look at a Putty Index like an implant stent
(you need help and guidance with precision)
I look at a Putty Index like an implant stent
(you need help and guidance with precision)
It will demonstrate to you the truth. You are new to this so I would suggest that you use a putty index routinely.
Technical things that we can all objectively check with the Putty Index

- **Margin** (dimension / depth / height / consistency / smoothness)
- **Taper** (appropriate for restoration DBC 15-20 degrees / undercut)
- **Adequacy of Reduction** (compared to pre-operative putty)
- **Overall shape** of preparation
- **Appropriateness of preparation for the material choice** of the restoration
Putty Index – please use them for your patients to improve your anatomical awareness
If you have time make two pre-preparation putty indices:

Cut one from **buccal to palatal** in middle of crown - to use as a preparation guide

Cut the other **across incisal edge**

They will give you different information
Burs – you need to select the right type and size of burs for the job you need done

Tools for the day:

Silicone putty
Burs
Plastic Teeth
Sharp pencil

Know and understand the relevance of the burs you use – need ones with a 1.2 - 1.5mm tip thickness
Tools for the day:

Tapered Broad Chamfer

&

Tapered Broad Shoulder
1.5mm reference = shank of all fast hand piece burs
Tools for the day:

Silicone putty
Burs
Plastic Teeth
Sharp pencil
Plastic Teeth – we have lots to practise on – this is a good place to make mistakes
Basic things

- Handpiece control – smooth cutting
- Holding the handpiece right – ‘parallelism’ control
- Using two hands for extra control when needed
- Bur selection
- Knowing bur size
We will not ask you to do anything that I cannot
Tools for the day:

Silicone putty
Burs
Plastic Teeth
Sharp Pencil

Axial reduction and undercuts

Use sharp pencil at each of the four line angle to check for undercuts
If you can see all four then no undercuts – if not you have an undercut
Objectivise undercut assessment – should be able to see the 4 points at each of the line angles with mirror – this means no undercut(s) present

Use sharp pencil at each of the four line angle to check for undercuts

If you can see all four then no undercuts – if not you have an undercut

Axial reduction and undercuts
Draw on the labial aspect of your teeth prior to preparation to:

- Identify the maximal labial contour
- Understand the directions of the two labial planes
- Identify mesial and distal marginal ridges
- Anatomy of different teeth is different
Multi-Plane Labial Reduction
Two / three plane tooth reduction which relates to crown anatomy. Worn teeth end up thick at incisal tips.
1\textsuperscript{st} Clinical Task

A ‘Winged’ VMK anterior tooth preparation
Porcelain Fused to Metal Crowns accounts for more than 85% of all prescribed crowns in the UK.
What is the preparation that we need to execute ‘to allow’ or to facilitate’ a PFM?

• Full cast alloy metal core that provides support for all the ceramic (the cut back)
• Metal ‘only’ coverage on palatal / lingual aspect of tooth to involves ICP and initial incisal guidance contacts
• Fully ‘supported’ labial, interdental and incisal Ceramic
What is the best occlusal preparation that we need to execute to make the best use of a PFM?

- Metal ‘only’ coverage / preparation on palatal / lingual aspect of tooth
- This will take ICP and initial incisal guidance contacts loads
- You will provide labial space for both metal and ceramic
- You will ask the technician to fully wax up tooth / teeth prior to labial incisal cut-back – ensuring ceramic has satisfactory ‘support’
### WPFM Preparation

#### Preparation Specifications:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incisal Reduction:</td>
<td>1.5 mm</td>
</tr>
<tr>
<td>Labial Shoulder:</td>
<td>1.2 mm</td>
</tr>
<tr>
<td>Palatal Chamfer:</td>
<td>0.5 mm – for metal only</td>
</tr>
<tr>
<td>Palatal Reduction:</td>
<td>0.7 - 1.0 mm for Metal only</td>
</tr>
<tr>
<td></td>
<td>1.2 mm for both Metal &amp; Ceramic</td>
</tr>
<tr>
<td></td>
<td>(palato-occlusal (gingival) 2/3s)</td>
</tr>
<tr>
<td></td>
<td>(palato-incisal third)</td>
</tr>
</tbody>
</table>
Appropriate for Parafunctional Cases

The wing happens automatically where the palatal metal preparation meets the labial and interdental porcelain and metal preparation.

PB 2016
Note how the palatal chamfer slides round the outside of the ‘wing’! – compare my 2-2016 PFM and E-max layered preps
Preparation of worn anterior teeth
Temporisation of worn lower incisors
link & cement with Poly F

Place suck down over prepared teeth with temp material in between - Then cure, finish and polish.
The uppers were done in the same way
Porcelain Fused to Metal Crowns accounts for more than 85% of all prescribed crowns in the UK
Palatal Metal – Occlusal Surfaces

- Good wear properties
- Reduces extent of palatal tooth preparation - allows the lower teeth to be longer
- Less brittle than porcelain
Where are the weaknesses and what do you think might happen in the future?
Porcelain ‘popped’ at UL3 – stresses leading to micro-crack and then macro-crack propagation

What would I do differently?
Take the metal support up and over the incisal edges of the teeth for parafunctional / attritional patients.
WPFM Preparation

Preparation Specifications:

Incisal Reduction: 1.5 mm
Labial Shoulder: 1.2 mm
Palatal Chamfer: 0.5mm – for metal only
Palatal Reduction: 0.7 - 1.0 mm for Metal only (palato-occlusal (gingival) 2/3s
1.2 mm for both Metal & Ceramic (palato-incisal third)
The ‘Wings’

- Because of better ceramics we now only need a 1.2 mm labial shoulder (for metal and ceramic)
- If you need a 0.5mm palatal chamfer (for metal only)
- Then you will end up with interdental ‘Wings’ where the different dimensions of the margins meet
The wing is where the palatal metal preparation meets the labial and interdental porcelain and metal preparation.
We need to get the palatal chamfer margin right and note how it slides round the outer aspect of the ‘wing’!
Common errors with WPFM Tooth Preparation:

Single labial plane reduction – look carefully at the tooth before you start to work out what you should aim for

Inappropriate change of Labial Plane
Uneven labial shoulder – want consistent depth

‘Universal’ preparation – no information on what surface should be covered by porcelain and metal and which surfaces should be covered by metal alone – think where you want metal only, where metal and ceramic and what this means to your preparation

Gouging and lipping of labial shoulder – think about bur choice.

Start off by placing your margin supra-gingival and then refine near the very end to avoid you placing your Margins too deep

Aim for labial margin, at or just below gingival level, and palatal margin supragingival
Here are some other aspects that you need to consider:

**Winged preparation** – this provides the technician with information about where you wish the ceramic/metal junction to be positioned. **Obvious demarcation interproximally and palatally** where the preparation changes from having sufficient space for metal and ceramic to having metal alone. **Think** very carefully how much and where you need to remove tooth tissue - and why? **Measure the tips of your burs** and understand how much tooth needs to be removed.
Go do it - a ‘Winged’ PFM preparation on one of your maxillary central incisor (UL1)
Feedback and Reflection
Common errors displayed with WPFM Today:

Over-preparation in some areas and under-preparation in others

Over taper

Undercuts - check with sharp pencil and mirror at the line angles

Too aggressive incisal length reduction - think how much you need

Not enough interproximal space between preparation margins and adjacent teeth - technician must be able to section the die - so there must be enough space between the prepared tooth / teeth
Try not to take too much off the very valuable parts of the tooth – work on improving drill precision and control – use your other hand to control and guide the drill
Axial Height

Minimum 2mm Ferrule
Parallelism is essential for retention on short teeth
Retention - the direction of the path of insertion (occlusal direction)

Resistance form any other lateral direction

A function of:
  - Taper
  - Surface area/bulk of preparation
  - Surface roughness

Jorgensen 1955
WPFM Objective Feedback Scoring

• Please fill in the quality assessment sheets when you have finished
• A total score of 17 is possible
• There is space for reflective learning comments good and bad
• I want you all to discuss this with your DF trainers / tutors