

DF1 Case Studies

Restorative Case



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North Western Deanery

Background

Miss O attended for a routine check-up following the birth of her daughter. She had a neglected dentition but was highly motivated to improving the situation and willing to embark on an extensive treatment plan to do so. There were a variety of dental disciplines covered in this case including basic periodontal care, restorations, extractions, root canal treatment, a bridge and a denture.

History

Reason for Attendance

- Routine check-up

Presenting Complaints

1. Aware of dental treatment need and wants to improve the situation but not in pain at the moment.
2. Concerned about the appearance of her teeth, particularly the upper front teeth.

Medical History

- Ms O is fit and well
- She has recently had a baby girl
- Ms O reports no allergies

Dental History

- Brushes with a manual brush and fluoride toothpaste

Social History

- Smoking: Currently quitting smoking
- Alcohol: Doesn't drink
- Stress: No stress at the moment

Family History

- No history of hereditary conditions (e.g. cancer, periodontal disease, etc.)

Examination

Extra-Oral

- Lymph Nodes: NAD
- TMJ: NAD
- Asymmetry: NAD

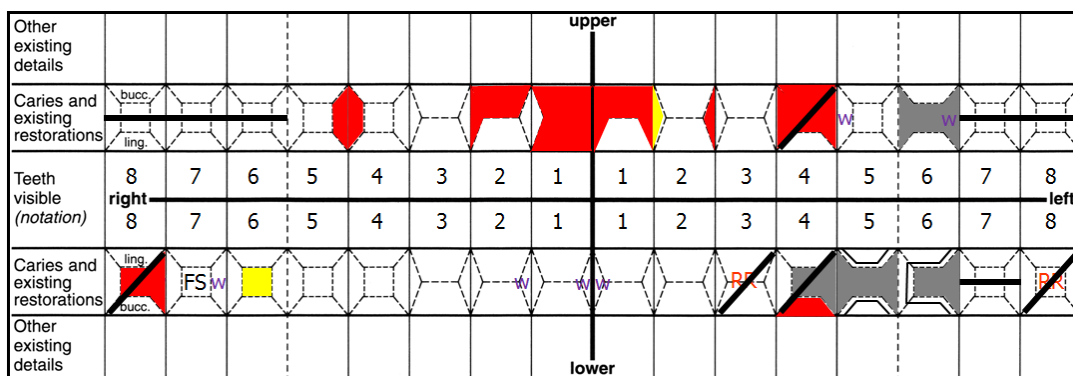
Intra-Oral

- Lips: NAD
- Labial Mucosa: NAD
- Buccal Mucosa: NAD
- Hard Palate: NAD
- Soft Palate: NAD
- Oropharynx: NAD
- Tongue: NAD
- Floor of Mouth: NAD
- Gingivae: Marginal gingivitis

Oral Hygiene

- Oral hygiene is inadequate
- Plaque and calculus present
- Patient states that she brushes twice daily

Charting



● = Caries ● = Amalgam ● = Composite

Basic Periodontal Examination

1	0	1
2	1	2

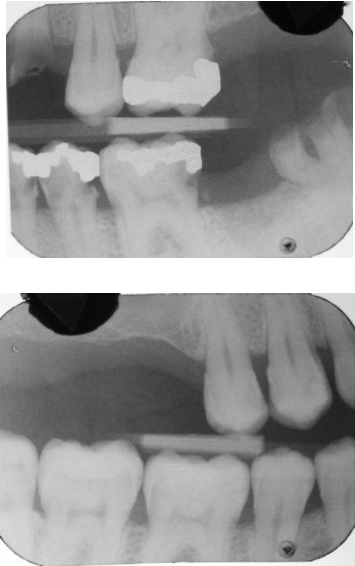

- Plaque retention factors: Cavities and calculus

Pre-Operative Intra-Oral Photographs



Special Tests

Radiographs

Initial Bitewing Radiographs					
	<p>Types of Radiograph: Right and left bitewings for interproximal caries assessment</p> <table border="1"> <tr> <td>543</td> <td>456</td> </tr> <tr> <td>87654</td> <td>4568</td> </tr> </table>	543	456	87654	4568
	543	456			
87654	4568				
	<p>Periodontal Bone Levels: Flattening of the alveolar interdental crests suggesting early horizontal bone loss</p>				
	<p>Calculus: UL6 mesial, UR4 distal</p>				
	<p>Caries: UL4 (gross), LL4 distal D2, LL5 mesial and distal D3, LL6 Distal D3, LR6 mesial early enamel lesion, UR4 distal D2, UR5 mesial D2</p>				
	<p>Restoration Deficiencies/Ledges: UL6 Distal deficiency - monitor</p>				
	<p>Pathology: Nil</p>				
	<p>Unerupted teeth/Retained Roots: LL8</p>				
	<p>Other: UL6 is clinically sound, monitor. Both films are Grade 1 Quality</p>				
Pre-Operative Radiograph UL1					
	<p>Type of Radiograph: Pre-operative radiograph to check apical status UL1</p>				
	<p>Periodontal Bone Levels: Normal</p>				
	<p>Calculus: Nil</p>				
	<p>Caries: UR1 mesial D3, UL1 mesially slightly into enamel (decided to monitor) and gross caries distally</p>				
	<p>Restoration Deficiencies/Ledges: UL2 slight mesial deficiency – restoration was placed recently, clinically feels fine – decided to monitor</p>				
	<p>Pathology: UL1 Rarifying osteitis at the root apex consistent with non vital response from UL1 upon application of cold</p> <p>Query radiolucency at apex UR2 – most likely superimposition of air within the nasal cavity. UR2 is not TTP and had a vital response upon application of cold. Keep under monitor.</p>				
	<p>Unerupted teeth/Retained Roots: Nil</p>				
	<p>Other: Estimated working length was 19.5mm. Grade 1 quality film</p>				

Working Length Radiograph



Type of Radiograph: Working Length Radiograph for UL1 endodontic treatment
Periodontal Bone Levels: Normal
Calculus: Nil
Caries: UR1 mesial D3, UL1 mesially slightly into enamel (decided to monitor)
Restoration Deficiencies/Ledges: UL2 slight mesial deficiency – restoration was placed recently, clinically feels fine – decided to monitor
Pathology: UL1 Rarifying osteitis at the root apex
Unerupted teeth/Retained Roots: Nil
Other: Size 20 file is 1.5mm short of the radiographic apex. Working length therefore 20.5mm. Grade 1 quality film

Dry Cone Radiograph



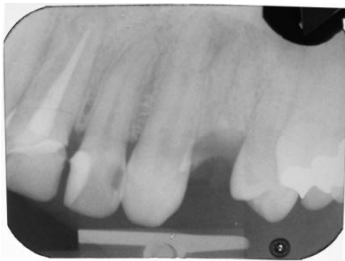
Types of Radiograph: Dry Cone Radiograph for UL1 endo
Periodontal Bone Levels: Normal
Calculus: Nil
Caries: UR1 mesial D3, UL1 mesially slightly into enamel (decided to monitor), UL2 distal D3
Restoration Deficiencies/Ledges: UL2 slight mesial deficiency – restoration was placed recently, clinically feels fine – decided to monitor
Pathology: UL1 Rarifying osteitis at the root apex
Unerupted teeth/Retained Roots: Nil
Other: Dry cone is 0.5mm short of the radiographic apex which is the intended length for the obturation. Working length correct at 20.5mm. Grade 1 quality film

Post Operative Endodontic Radiograph



Type of Radiograph: Post Op Radiograph for UL1 Endo
Periodontal Bone Levels: Normal
Calculus: Nil
Caries: UR1 mesial D3, UL1 mesially slightly into enamel (decided to monitor), UL2 distal D3
Restoration Deficiencies/Ledges: UL2 slight mesial deficiency – restoration was placed recently, clinically appears fine – decided to monitor
Pathology: Rarifying osteitis UL1 at the root apex
Unerupted teeth/Retained Roots: Nil
Other: RCT is about 1mm short of the radiographic apex, which is about 0.5mm short of the ideal length. Gutta percha appears well condensed Grade 1 quality film

Pre-operative surgical radiograph UL4



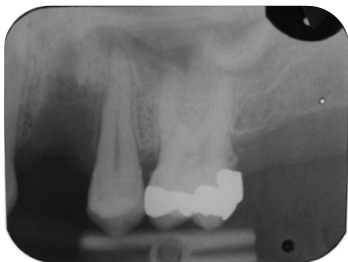
Types of Radiograph: Pre-op surgical radiograph to assess UL4 for extraction
Periodontal Bone Levels: Appears normal on this view
Calculus: Nil
Caries: UL2 distal D3
Restoration Deficiencies/Ledges: UL1 very slight distal deficiency of composite which is being kept under monitor
Pathology: UL1 Rarifying osteitis at the root apex Evidence of rarifying osteitis UL4 root apex
Unerupted teeth/Retained Roots: Nil
Other: Nil Grade 1 quality film

Periapical radiograph LL5 and LL6



Types of Radiograph: Pre-op radiograph to assess LL5 and LL6 apical status Apex of LL4 and retained roots LL8 are visible prior to extraction
Periodontal Bone Levels: Flattening of the alveolar interdental crests suggesting early horizontal bone loss
Calculus: Nil
Caries: LL4 mesial (gross, with buccal caries clinically) and distal D3, LL5 mesial and distal caries D3, LL6 distal D3
Restoration Deficiencies/Ledges: LL5 and LL6 distal deficiencies
Pathology: Nil
Unerupted teeth/Retained Roots: LL8
Other: ID canal just visible on radiograph and appears to be clear of the LL8 roots Grade 1 quality film

Periapical radiograph UL5 and 6



Types of Radiograph: Pre-op radiograph to assess UL5 apical status prior to bridge construction
Periodontal Bone Levels: Flattening of the alveolar interdental crests suggesting early horizontal bone loss
Calculus: Nil
Caries: Nil
Restoration Deficiencies/Ledges: UL6 distal deficiency that is sound clinically – this tooth is under monitor
Pathology: Nil
Unerupted teeth/Retained Roots: Nil
Other: Bony healing of the UL4 socket limited at this stage Grade 1 quality film

DPT Radiograph (Taken By Previous Dentist)

**Types of Radiograph:**

DPT radiograph used to assess relation of ID canal to LR8 and LL8 for extraction to eliminate the need for a new DPT which would expose the patient to unnecessary radiation

Periodontal Bone Levels:

Normal

Calculus:

Nil

Caries:

LR8 (gross), LL3 (gross), LL4, LL5, LL6, LL7 (gross – extracted before I saw the patient), LL8, UL4 (gross), UL2, UL1 (gross), UR2, UR4, UR5

Restoration Deficiencies/Ledges:

Nil

Pathology:

LL7 rarifying osteitis (LL7 had been extracted before I saw this patient)

Unerupted teeth/Retained Roots:

LL8

Other:

ID canals clear of the apices of the LR8 and LL8
Grade 1 quality film

Sensibility Tests

- **-50°C Spray**
 - UL1 had no response
 - UR2 had a positive response
 - LL5 and LL6 were responsive
- **Percussion**
 - UL1, UR2, LL5, and LL6 not tender to percussion

Pre-Operative Study Models



Diagnoses

1. Gross Caries UL4, LL4,LL3, LR8, and LL8
2. Caries UR5, UR4, UR3, UR2, UR1, UL1, UL2
3. Asymptomatic periapical periodontitis UL1
4. Slightly deficient UL2 composite mesial, deficient amalgam UL6 distal
5. Generalised Marginal Chronic Gingivitis

Treatment Plan

Emergency Treatment

- Patient was in no pain so no emergency treatment was required

Stabilisation Phase

- Fluoride Therapy (F⁻ varnish, and prescription of 1.1% NaF Toothpaste and 0.05% NaF mouthwash)
- Referral to Dental Therapist for: Oral Hygiene Instruction
Tooth Brushing Instruction
Scale and Polish
- Diet Advice

Restorative Phase

- Extract

8	4	8
34	4	8
- Restore

54321	12	56
56	12	56
- Root canal treatment UL1
- Post crown UL1
- Replace UL4 with bridge and utilise the shortened dental arch following healing
- Restore the edentulous saddles on the lower with a removable partial denture following healing

Maintenance

- Monitor UL6 distally that feels clinically sound
- Monitor the UL2 which radiographically appears deficient mesially, however restoration was placed recently by previous dentist
- Regular periodontal maintenance every 6 months upon completion of treatment

Amendments to Treatment Plan

- **Remove UL1 post crown from the treatment plan**

I decided with the patient that as the composite (which was originally placed on a temporary basis) was aesthetically pleasing to the patient and had not de-bonded, that it would be wise to keep this composite in place until it eventually fails. Once this occurs, a post and core retained crown should be discussed and planned. To removed the composite in the first instance would have been unnecessarily destructive and increase the risk of root fracture from a weakened tooth structure owing to the nature of a post-crown preparation.

Aspects of Treatment

Restorations

- A number of restorations were provided during the treatment of this patient. The aims of restorative treatment were to remove caries, improve function, and improve aesthetics.
- Posteriorly, amalgam was the material of choice owing to the large size of the restorations, low aesthetic requirement, more predictable contact points to allow reduction in food packing, self cleansing areas, and ease of placement.

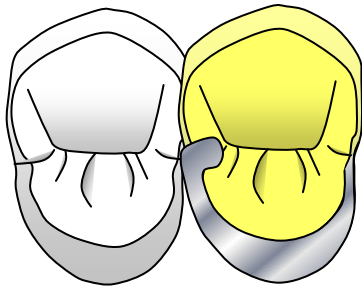


- Anteriorly, there is clearly an aesthetic requirement and composite resin was used to restore tooth substance destroyed by caries. The images below show the freshly placed composite restorations.

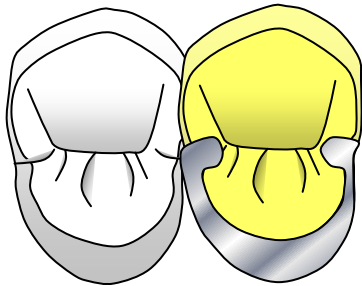


Bridgework

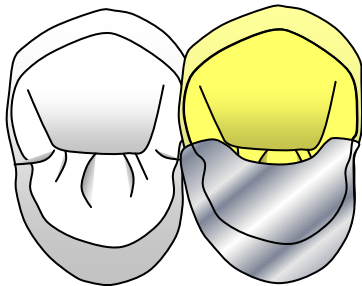
- Having extracted the UL4, the patient enquired about restoring the space which was visible in the smile line. I discussed a variety of options with the patient which were feasible and the likely prognoses. The patient was keen to avoid an upper partial denture to replace a single tooth, and preferred the idea of a bridge. The bridge would be more hygienic than a denture in that there is minimal coverage of gingival tissues, reducing the prospect of gingival inflammation.
- Various designs were discussed with the patient including single cantilever, fixed-fixed, resin retained, and conventional bridgework. The patient decided upon the minimally destructive resin retained single cantilever bridge, with a view to the possibility of 'upgrading' in the future to a conventional bridge if required.
- I discussed the bridge with my educational supervisor and presented a number of bridge designs detailed below:



Mesial rest seat and retainer coverage of the palatal wall (most minimal design)

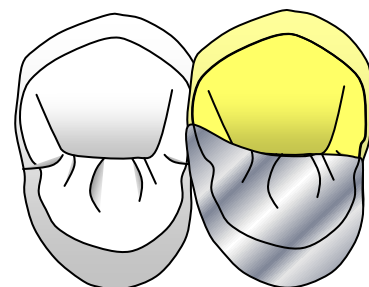


Mesial and distal rest seats and retainer coverage of the palatal wall



Reduction of the entire palatal cusp to allow for a more rigid metal retainer and larger surface area for retention

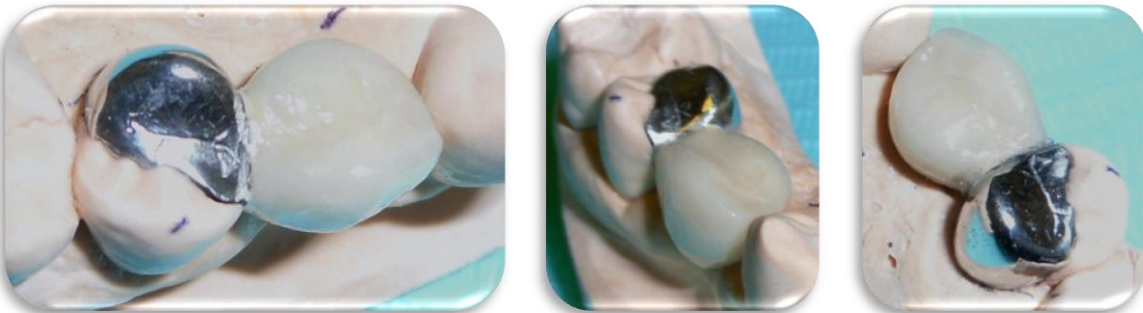
- The final design of the bridge (right). I decided to incorporate as much surface area as possible whilst still utilising a minimal preparation. The preparation included the whole of the palatal wall and was about 0.7mm thin with a palatal chamfer. Mesial caries was noted which was not extensive radiographically. The caries was removed and featured into the bridge design as an onlay. The 'inlay' portion provided easy location and seating of the bridge, incorporates retention and resistance form, and also acts as a mesial rest.



- Images of the preparation and bridge are shown below:



Images showing model of bridge preparation. Pencil line outlines the extent of the preparation. The mesial 'inlay' preparation is visible. Palatal preparation is minimal along with occlusal reduction.

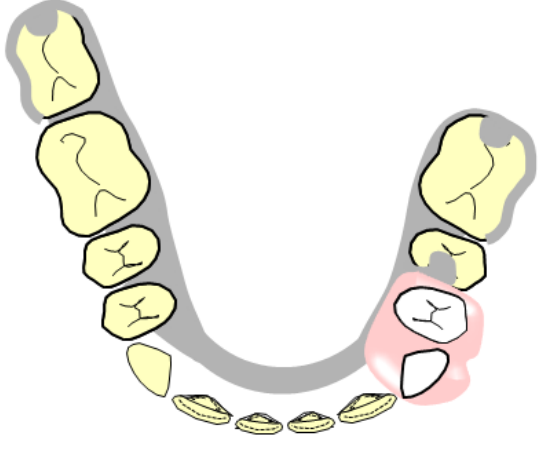


Images showing the bridge placed on the model



Images showing the bridge after luting intra-orally. We can see that the metalwork is flush and well seated. On the buccal view no metal work can be seen between the Pontic and Abutment owing to careful consideration at design and preparation stages of the extension of the metal work. Shade is good and the mesial contact point of the Pontic is good.

Denture Design

Lower Denture	
	<p>Rests LL7 distally (within amalgam restoration) LL5 mesially (within amalgam restoration) LR7 distally</p> <p>Clasps Occlusally approaching clasp LL6 and LR7</p> <p>Connectors Major connector – lingual bar</p> <p>Other Instructions Cobalt chromium framework and clasps</p>

- A partial denture was considered the only feasible option for the lower arch as potential bridge abutments (LL2 and LL5) would be too weak to support the prosthesis replacing the LL3 and LL4. Implants were out of the question as the patient could not afford them. I decided on a Co-Cr partial denture to replace the LL3/4 space.
- The saddle was outlined and support was to come from both the mucosa and the teeth. Rest seats were incorporated on the LL6 and LR7 for tooth support. Occlusally approaching clasps were used to engage the natural buccal undercut on the LR7 and LL6. Bracing and reciprocation to the clasps was to be offered by the cobalt-chromium framework. A rest seat was incorporated on the LL5 to offer some indirect retention. The major connector chosen was a lingual bar as a hygienic major connector with good tolerance
- The framework that arrived from the dental laboratory followed the prescription with the exception of the major connector. On the framework from the lab, a lingual plate was used as the major connector. This connector offered excellent bracing, indirect retention and rigidity, and the framework was flush to the lingual surfaces of the lower anterior teeth. The downside to this major connector is its tendency to encourage plaque formation. I emphasised to the patient the importance of good plaque control and demonstrated how to clean the denture.
- Below are some images of the lower Cobalt-Chromium denture which was retentive in-situ.



Post Operative Intra-Oral Photographs



Reflection on Practice

Patient Management

I have enjoyed treating this patient and seeing the transformation in not only her smile, but also her attitude to her dental health. When I first saw this patient, it was clear that there was high treatment need and good treatment planning and visit plans were required to carry out the appropriate treatment effectively and in as few visits as possible for the patient. I dedicated some time to this in one of my tutorials with my educational supervisor, and her advice with regards to the management of this patient was valuable.

Treatment

There has been a wide variety of treatment performed on this patient involving basic periodontal therapy, restorations, extractions, endodontics, a bridge, and a cobalt-chrome partial denture. I found some of the composites quite tricky owing to the extensive tooth structure lost due to caries. One area I am aware I struggle with is using the celluloid strip to create good contact points. I discussed this with my educational supervisor in a tutorial, practiced on some extracted teeth, and observed her placing a class IV restoration. I used these techniques when placing the anterior composite restorations and was very pleased with the results.

Deciding on the bridge design was difficult as there were many different options for the replacement of the UL4. I took advice from a few of the dentists in the practice and the opinion was split 50:50 between conventional and a resin bonded approach. One of my DF1 study days was focused on resin retained bridgework, and the speaker discussed the different types of design that could be utilised posteriorly to provide an effective bridge. Upon discussion with the patient, we both agreed that a resin retained bridge would be the most appropriate prosthesis in this case.

Team Working

I utilised the expertise of our dental therapist for the periodontal aspect of this patient's treatment. I felt that her input would help to keep Miss O motivated throughout the treatment and also to monitor her oral health. I consulted with the therapist to discuss progression with oral hygiene, which had vastly improved. Having decided that there had been significant improvement in the patient's oral hygiene, which was consistent, I felt that an upper bridge and lower chrome denture would be suitable upon healing of the extraction sites.

Communication with the laboratory was important, and I felt this was effective with the bridge which fulfilled all the requirements of aesthetics and function. As mentioned above, the Co-Cr framework was made slightly different to my prescription, and whilst the denture fitted very well, I would have liked the laboratory to have discussed this with me. The reason for the construction of a lingual plate was due to insufficient sulcus depth on the master cast to create a lingual bar. I asked the laboratory in future to let me know about these types of issues so that I am informed, and can make a decision whether to proceed with the change in plan, or to provide a better impression.

Future Practice

The treatment of this patient has taught me how to develop a realistic treatment plan on a patient with high treatment need. It has been highlighted to me the issues that can arise due to a lack of communication between the clinician and laboratory and pre-empting problems is an important part of communication with the laboratory.