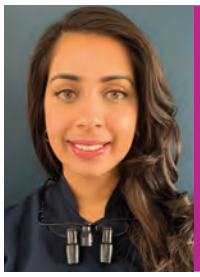
The curious case of the cracked upper centrals

Janine Sohota explains how she repaired large buccal fracture lines in both central incisors that extended subgingivally and also palatall



Dr Janine Sohota graduated from Birmingham Dental School in 2012, since then she has worked around Warwickshire and London in private practice.
Utilising a minimally invasive, ethical approach, Janine believes in providing patients with exceptional care and the most natural, realistic results possible.

A 52-year-old female patient attended Bilton Dental Clinic for a routine examination.

The patient had good dental health and her oral hygiene and periodontal condition was optimal. The only cause for concern were the large buccal fracture lines in both the central incisors that extended subgingivally and also palataly.

Over time, the patient noticed the cracks deepening, and the level of staining associated with the fracture lines was becowming unsightly (Figure 1).

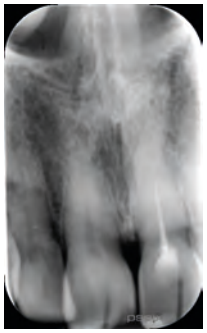
Figure 1: The patient noticed cracks deepening, and the level of staining associated with the fracture lines was becoming unsightly

The patient had been aware of the fracture lines for many years but the aetiology was unknown. The fracture line was approximately 2mm wide and had a depth of 2-3mm in places (Figures 2 and 3).

Sadly, she was becoming more self-conscious when smiling and talking. When I asked her if she had considered having cosmetic treatment she disclosed that this had never been offered to her before.

Figures 2 and 3: The fracture line was approximately 2mm wide and had a depth of 2-3mm in places

There was no doubt this was a complex case, but at this stage with the cracks expanding there was imminent and inevitable risk of vertical root fracture long term. Hence, treatment was needed not only to improve aesthetics, but also to save the upper centrals (Figure 4).



Figures 4 and 4a: With the cracks expanding there was imminent and inevitable risk of vertical root fracture long term

I took a periapical film, the UR1 had no pathology or evidence of a root fracture. The UL1 had been previously root filled, although there was no apical area, the root filling was short (Figure 4a).

A full examination was completed along with clinical photographs and radiographs, the patient had an incisal relationship of class 2 div 1 with bilateral class 1 molar relationship (Figure 5).

Figure 5: The patient had an incisal relationship of class 2 div 1 with bilateral class 1 molar relationship

The lower anteriors had mild crowding, there was little incisal edge tooth wear. The temporomandibular joint and soft tissues were all healthy.

Restorative options

During the consultation I discussed the options with the patient:

1 Do nothing (which I advised against because the risk of long-term fracture resulting in extraction would be inevitable)

2 Composite bonding to fill in the cracks

3 Place two E.max crowns, which would be bonded onto the teeth. I explained that this option would have superior aesthetics to composite bonding and the crowns would encompass the entirety of the teeth, subsequentially holding them together to support and resist any further fracture.

The patient was more inclined to try option three.

Differential treatment plan

- Hygienist visits to remove subgingival/supragingival deposits and full oral hygiene instruction
- Refer to an endodontist for re-root canal treatment of the short root filled UL1. Although there was no apical pathology, I was not satisfied with the longevity of the root filling, which was placed some years ago. I could not risk of a future apical area or abscess once a crown had been placed
- Impressions for study models and clinical photographs to allow treatment planning
- A wax up was requested from the laboratory. It was decided that the retroclined UL2 could be improved with a no-prep E.max veneer. The patient was happy to consider this option in addition.

After analysing the casts, it was decided that the best aesthetic and functional option for this patient would be two E.max crowns with subgingival margins to hold the remaining core of the teeth together.

Prepping the teeth for crowns would also be the perfect opportunity to correct the imbricated central incisors. Also, the UR2 was noted as being slightly instanding. A no-prep E.max veneer would help perfect the smile line.

Using the wax up I then placed a direct mock up using Temp-Smart (GC gaenial) for the patient to see for herself. She was happy with the results and keen to proceed with treatment.

Once the re-root canal treatment had been completed on the UL1 we were then ready for the prep appointment (Figure 4b).

Prep

A facebow was taken using the Artec system (Figure 5a).

Figure 4b:

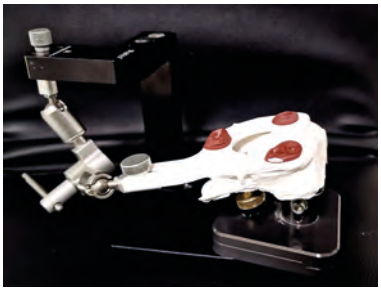
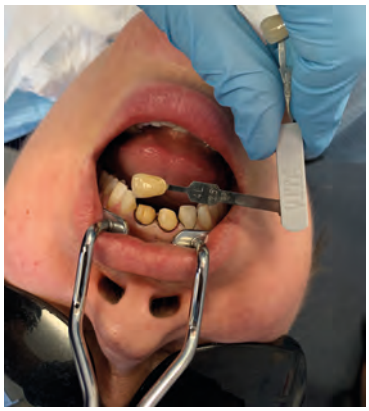


Figure 5a:

'The purpose of a facebow is to register the relationship of the patient's maxillary arch in three planes of space and transfer this information into an articulator that can be adjusted to simulate the patient's jaw movements. The relationship is two-fold: to establish the functional relationship of the maxillary arch to the axis of rotation for proper function and to analyse the aesthetic relationship of the maxillary arch to the patient's face for optimal aesthetics.' (Lee, 2012)

I prepped the two centrals with subgingival margins (chamfers all round). I requested a Dawson stop palatally on both crowns to ensure anterior guidance (Figure 6/6a). Two-stage putty wash impressions were taken with retraction cord. The stump shade was noted.



Figures 6 and 6a: I requested a Dawson stop palatally on both crowns to ensure anterior guidance

Figure 6b: I requested that the lab send me the work back unglazed

I requested the lab to use an A2 shade for the body of the crowns with incisal translucency and a warmth with orange/brown tones cervically. A high opacity E.max ingot was used and then E.max Ceram layered over the top. A high opacity ingot was key to block out the dark stump shade of the root filled UL1.

I requested that the lab send me the work back unglazed (biscuit bake). This would allow me to assess shading/translucency/occlusion and shape in order to make changes as required (Figure 6b).

On the try in appointment I used the Variolink try-in paste. I was pleased that the dark core of the UL1 was not shining through, however I felt the shading was too pale. It lacked the warmth of the natural teeth. Also, the patient had natural lines/micro fractures within the enamel of her adjacent teeth. I requested some of these effects to be added.

I rounded off the the incisal edges and explained to the patient, maybe she would consider a no-prep veneer on the UL2 in future as it too was very slightly in-standing. The patient was not concerned by this and decided to stick with the three units we had initially agreed on.

The patient was left in temporaries for another week whilst the lab refined the work.

Final results

These crowns were bonded on using Variolink DC luting system by Ivoclar Vivadent.

The patient was ecstatic and left a brilliant review, which speaks for itself.

Figures 8-10: Final crowns in situ

Reflection

This was a fantastic case to do and with the help of my talented ceramicist (Calin from Jova Art lab) we achieved brilliant aesthetics.

The aim is not simply to make a crown but to in fact mimic nature. Standards are extremely high and both patients and dentists are wanting natural results where dental work is undetectable.

With the advent of minimally invasive dentistry patients are now able to consider more long-lasting, aesthetic treatment options with minimal destruction to tooth tissue.

Hopefully in the future we may place a no-pre veneer on the UR2 too.

References

Lee T (2012) The Use of a Face Bow for Function and Esthetics. Inside Dental Assisting 8(2).

'I have recently had two crowns fitted on my two front teeth which meant I had to spend a lot of time at Bilton Dental practice. Each time I was made to feel at ease and all work was done efficiently and pain free. I am so pleased with the final result; I can't stop smiling!'