

Lasers in dentistry – a clinical case of tooth restoration

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A 32-year-old gentleman attended the practice presenting with sensitivity and food packing from a large cavity on the upper right side. He had been told by another clinician that his UR7 was extensively decayed and required extraction.

Upon examination, it was discovered that the patient had an extensive cavity that was heavily carious and very close to the pulp. The tooth was responding with a slightly exaggerated response to cold vitality testing, suggesting pulpitis.

The radiograph showed a deep distal radiolucency close to the pulp; however, there was a good amount of tooth tissue seen before reaching the level of the crestal bone. This suggested that if the soft tissue was reduced, there may be a chance the tooth could be saved.

Two treatment options were discussed with the patient:

- Extract the tooth
- Reduce the soft tissue by means of a surgical bur and then refine with the Gemini laser. This would be followed by placement of an intermediate core composite filling, which would overlay the cusps. Following this the vitality of the tooth would be monitored for one to two years before preparations for a ceramic crown. This treatment option would allow for the completion of root canal treatment, should symptoms/radiographic signs appear suggesting loss of vitality.

The patient was keen to save the tooth.

Preparation

Before caries removal was started, the bulk of the soft tissue was resected with a surgical bur. Care was taken not to carry this procedure out too close to the tooth, as the access to the UR7 was very tricky, and precise control could not be guaranteed.

Tissue reduction was then refined in a precise manner using the Gemini laser in gingivectomy mode on a dual wavelength. This mode allowed for precision cutting with the added benefit of instant haemostasis.

Additionally, this procedure rapidly allowed for a clear field of access. Usually, without the laser, this treatment would involve either a surgical flap, or involve considerable time waiting for haemostasis after resection using pressure. Instead, the Gemini laser allowed for precision cutting and haemostasis in just three to four minutes (Figure 1).

Next steps

Next the rubber dam was placed. This was aided by the Gemini laser, which allowed for ideal isolation, which was initially deemed unlikely. A good field of isolation was further created using tertiary PTFE tape and auxiliary isolating agents such as opal dam (Figure 2). Caries removal was then completed and the clean cavity was seen to be extremely close to the pulp (Figure 3).

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Figure 1: Precision cutting with the Gemini laser

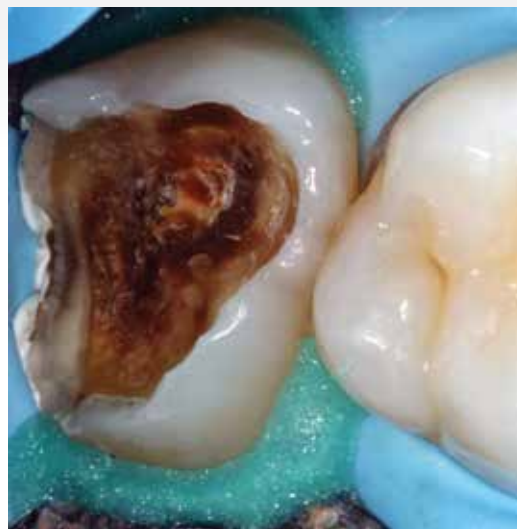


Figure 2: Creating a good field of isolation

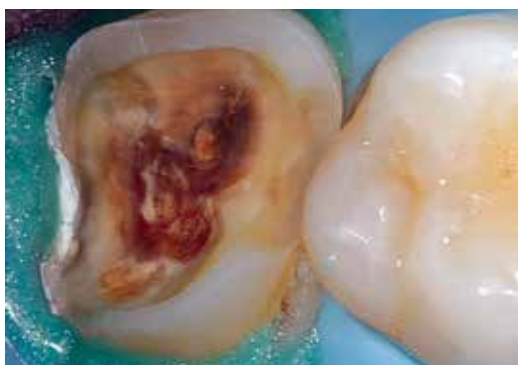


Figure 3: Cleaned cavity very close to the pulp



Figure 4: A desirable outcome was achieved

At this point, it was clear this was a case with a strong possibility for root canal treatment. Rather than just place a core filling and leave thin walls in occlusion which may fracture, it was decided to follow the techniques described by Didier Diestchi and Ricardo Ammanato to reduce cusps which were thinner than 1mm and plan to build up with a composite direct overlay.

This formed the core filling, and subsequent vitality could be monitored with low risk of cusp/wall fracture over the following two to four years. This provided a solid structure that was functional in occlusion and could be easily converted into preparation for a future ceramic/metal ceramic crown.

Final steps

This technique provided an opportunity to save a tooth without the need for a surgical flap. Bone sounding was completed to ensure the resulting margin was 3mm from the crestal bone and the patient was made aware of the possible need to lengthen the crown in the future if there

were concerns with retention.

Whilst the outcome of the initial overlay composite was not ideal aesthetically, a desirable outcome was achieved, which reduced fracture risk and provided the opportunity to monitor vitality over the following one to two years (before crowning) (Figure 4).

Conclusion

A primary observation of interest was the rapid response of healing following use of the Gemini laser. The final photo was taken only five days after the procedure, and shows remarkable change.

The patient reported very little discomfort, apart from feeling stiff (from keeping open so wide) due to the fact he has a very small opening.

In summary, the Gemini laser was the perfect tool for soft tissue removal and reshaping, accelerating healing and tissue regeneration.

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