A combined surgical and nonsurgical approach to repair an external root resorption utilizing a nano-particulate bioceramic root repair material

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Introduction

The applications of bioceramic compounds in endodontic therapy range all the way from their nonsurgical use as a root canal sealer, a pulp capping material, or an external repair material to their surgical applications for root repair and apicoectomy procedures. The first bioceramic compound introduced, MTA (Tulsa Dental, OK) was derived from Portland cement and has proven to be a valuable root repair material for surgical applications.[1] More recently, medically pure nanoparticulate bioceramic formulations (that have been engineered from the ground up) have improved on some notable shortcomings of MTA by addressing the clinical handling challenges associated with this first generation material.[2] In addition, the removal of heavy metals, that can cause tooth staining in MTA repaired cases, has also been addressed with these newer 2nd generation formulations.

This new family of compounds known as EndoSequence BC Sealer, Root Repair Material (BUSA/Brasseler USA, Savannah GA) has shown significant clinical handling advantages over MTA for both nonsurgical and surgical applications. Due to their nano-particulate size and viscosity, these materials can now be used as a sealer and/or filler for root canal obturation, as well as for the surgical repair of root defects and apicoectomy procedures.

This clinical case report demonstrates the use of EndoSequence Bioceramic formulations for both the nonsurgical root canal treatment and the surgical repair of an extensive external root resorption defect in a single central incisor.

Case Report

A 28 year old female presented with a chief complaint of discomfort and swelling around the front tooth (Figure 1). She explained that she was seeking a third opinion after being told twice that tooth #9 was not salvageable and had to be extracted. Clinical evaluation and radiography revealed that tooth #9 was decayed and had to be extracted. Following cleaning and shaping of the root canal with EndoSequence BC Syringeable BioCeramic Putty was condensed down to the apex prior to back filling the root canal with EndoSequence Bioceramic Putty material (Figure 2).

The immediate post operative radiographs show the extent of the root repair with the Paty in this tooth (Figure 8). Following normal post operative healing the patient was evaluated at 6 months and two years, where the gingival tissue was observed to remain healthy and probing was found to be within normal limits (Figure 9). At this point, the surgical repair procedure was deemed successful. The post operative esthetics were completely acceptable to the patient and no tooth staining was noticed as a result of the material used to repair this tooth thereby improving esthetics.

Conclusion

External root resorption and other aggressive forms of cervical root resorption are challenging when they cause significant root damage. These lesions can sometimes be monitored carefully, but may require intervention or treatment at all. However, when endodontic involvement results in pulpitis and later infection of the resorption defect, extraction of the tooth or surgical repair of the root are the only viable options. In cases where direct surgical access with good visualization of the defect can be achieved, the use of modern bioceramic formulations (which are easy to apply to the site and have demonstrated excellent biocompatibility, bonding, and hydrophilic qualities) may be a preferred clinical choice. In this clinical case, the use of nanoparticulate bioceramic formulations, both EndoSequence Syringeable BC Root Repair Material (BUSA/Brasseler USA, Savannah GA) were demonstrated. Long term follow up of the healing of the gingival tissues and acceptable esthetics were achieved in a tooth that was otherwise deemed unsalvageable. The ease of clinical handling during surgery and a lack of dentin staining were noted. Further studies in this area are warranted in order to explore the true potential of this family of compounds in root repair applications, as well as all other aspects of endodontic therapy, where direct contact between biological tissues and biocompatible repair material is essential to success.

References