Root resorption is the loss of dental hard tissues through osteoclastic cell action. In the primary dentition, this can be desirable, allowing roots to resorb and the exfoliation of teeth. But in the permanent dentition, these effects are undesirable and can lead to potential loss of the affected teeth. The process is thus deemed to be pathological (Patel and Ford, 2007).

Resorption can be classified as internal or external. Internal resorption usually has traumatic or infective etiology (Bakeland, 1992). Etiological factors for external resorption can include trauma, inflammation, tooth re-implantation, tumors, cysts, impacted teeth, orthodontic tooth movement, abnormal occlusal loads, certain dental treatments, or systemic disease (Bakeland, 1992). A diagnosis of idiopathic root resorption is usually considered after excluding the known factors.

Biologically, it is thought to be caused by damage to or loss of the cementoid layer on the root surface. This allows the osteoclast cells to attach to and resorb the root surface. Microorganisms from the gingival sulcus, or from bacteria colonizing the tubules, may then provide further stimulus for the resorption to continue (Patel and Ford, 2007; Nanci and Bosshardt, 2006).

The case study in this article will consider multiple idiopathic external cervical root resorption (MIECRR) and the difficulties that may be posed in its management.

Case study
Presentation
This 21-year-old female patient attended in between her routine recall appointment complaining of “tooth sensitivity” from the lower anterior mandibular area. It was mainly to cold and lasted as long as the stimulus was present. She had also become aware of a pink appearance to the teeth but did not feel any tenderness on biting.

The patient had mild asthma but otherwise was fit and well. She took no medications apart from inhalers for asthma (which she only took when involved in sports activities) and had no known allergies. The patient was a regular attender, a nonsmoker, and drank below her limits of alcohol consumption. There was no recent trauma to report, nor had the patient had any form of teeth whitening. She had orthodontic treatment completed more than 6 years before presentation.

Comprehensive extraoral and intraoral examinations were carried out, which revealed a fully dentate arch with some restorations in her molars and upper incisors. She

Educational aims and objectives
This article aims to present a case study highlighting the difficulty of managing and rehabilitating multiple idiopathic external cervical root resorption.

Expected outcomes
Implant Practice US subscribers can answer the CE questions on page 41 to earn 2 hours of CE from reading this article. Correctly answering the questions will demonstrate the reader can:
• Be aware of the unpredictable nature of multiple idiopathic external cervical root resorption.
• Realize the importance of a flexible approach to treatment in these cases.
• Visualize treatment for a specific patient with type of idiopathic external cervical root resorption.
• Identify some common features of external cervical root resorption.
• Identify some options for restorability and maintenance of lesions when managing patients with multiple idiopathic external cervical root resorption (MIECRR).

Usman Hameed, BDS, graduated from Manchester University in 2007 and currently practices at Standish Street Dental Practice in Lancashire, United Kingdom. He is a member of the Royal College of Surgeons and has a certificate in implant dentistry. In 2009, he returned to Manchester University as a clinical teaching fellow in restorative dentistry and has moved on to mentoring on a Master’s degree in dental implantology. His special interests are minimally invasive dentistry, implant placement, and restoration. He is currently working toward obtaining a master’s degree in restorative dentistry.
had fixed retainers on her upper and lower anterior teeth. The patient’s physical appearance was a normal, incisal Class III with an anterior open bite and the LR3 in crossbite. There was gingival swelling around the LL2 and LL3 with the classic “pink spot” lesions of external cervical root resorption (Figure 1). The teeth were sensitive to cold, not tender to percussion. Periapical radiographs show the extent of the lesions on the LL2 and LL3 (Figure 1).

**Diagnosis and planning**

The LL3 and LL2 teeth were deemed unrestorable, and after discussion of all the options, the patient decided on dental implants. An implant was to be placed in the LL3 area, and a cantilever implant-retained bridge would be placed to replace the LL2 and LL3. The patient had a high lower lip line and medium tissue biotype. Due to the extent of the lesions and location of the teeth in the arch, the patient was pre-warned that the bone levels may not be ideal, and grafting of the area may be required following extraction.

**Treatment**

The teeth were extracted atraumatically, revealing a significant buccal bone dehiscence. Bone grafting was carried out with a xenograft bone substitute and membrane, followed by soft tissue closure. The patient had a hypersensitive gag reflex and did not want a denture. A temporary pull-down splint with acrylic teeth was made for the immediate postoperative phase before a chairside temporary bonded bridge (using fiber-reinforced ribbon) was made as the occlusion was favorable. The pontic lengths were kept short to maintain as much soft tissue as possible.

The implants were placed at 12 weeks following bone grafting. Radiographs throughout treatment were all good. At 12 weeks following implant placement, a temporary bridge was placed to shape the soft tissues, and once their condition was satisfactory, an open-tray impression was taken for a titanium abutment and zirconia bridge.

Upon taking a radiograph to check the seating of the abutment, there was an incidental finding of cervical radiolucencies on the LL4 and LL5 (Figure 3). There were no clinically visible signs or symptoms. Full
mouth radiographs were subsequently taken, which showed cervical radiolucencies on teeth LR6, LR3, LR2, LL1, LL4, and LL5. A provisional diagnosis of multiple cervical external root resorption was made.

A specialist referral was made, though the patient was due to travel soon after for 3 months and would not see the specialist until her return. The patient’s general medical practitioner conducted blood tests to rule out any systemic imbalances before she embarked on her travels, which all came back normal (Liang, et al., 2003).

The bridge design was modified to become a screw-retained zirconia bridge with a titanium abutment. It was fitted as a temporary measure until her return. The patient was made aware that her condition made it difficult to predict its progression and was aware of the guarded prognosis to several teeth.

Due to her travel plans, the decision was made to extract the LL4 and fill the LL5 before her departure. The LL5 cavity was mechanically cleaned and restored with GIC due to its extension subgingivally (Al-Momani and Nixon, 2013; Heithersay, 2007).

Upon her return, the restorative specialist confirmed the diagnosis of idiopathic external cervical root resorption, and at the time of writing, the plan is to allow the condition to stabilize or “burnout” and then consider her options for dental rehabilitation.

Discussion

Few cases of multiple idiopathic external cervical root resorption exist in the literature. It appears to be a progressive condition, and there has been no detectable frequency for its occurrence, regions affected in the dentition, or whether single/multiple quadrants are involved (Liang, et al., 2003). It has been reported to most frequently affect medically unremarkable younger females, and some of the reported cases had hormonal abnormalities (Nanci and Bosshardt, 2006).

Common features of external cervical root resorption include (Liang, et al., 2003; Heithersay, 2007; Patel, et al., 2009):

- “Pink spot" lesions on teeth affected or normal appearance
- Asymptomatic, or with thermal sensitivity in late stages
- Normal gingival appearance or chronically inflamed gingival appearance
- Pocketing can be localized to the lesion, and the cavity can be probed if there are supragingival margins. Unlike caries, the probe does not stick — lesions are hard and smooth to probe
- Commonly incidental finding on radiographs
- Radiographically, lesions begin at the mesial or distal cementoenamel junction with a scalloped margin, which can undermine the enamel and spread down the root surface
- Time from discovery of initial lesion to involvement of other teeth can vary from months to 9 years
- Absence of periapical inflammation as pulp is not usually involved
• Root canal appears intact on radiographs
• Initial radiolucent lesion due to granulomatous infiltration of lesion
• Later stages may have radiopaque flecks as the fibro-osseous nature of lesion develops

When managing patients with MIECRR, the long-term restorability and maintenance of the lesions need to be considered. There have been many described techniques from surgical exposure and debridement then restoration with glass ionomer, composite, or MTA (Al-Momani and Nixon, 2013; Nikolidakis, 2008). Periodontal surgery may be required to expose the repair to be able to maintain oral hygiene in the area (Nikolidakis, 2008).

Usually, most teeth require extraction as patients usually present in the later stages of the lesion progression or when there are symptoms. In the cases of multiple tooth loss, restorations of the resulting edentulous areas will be either with bridges, dentures, or dental implants.

There is limited evidence on the impact of MIECRR on implant osseointegration (Dewan and Fairbrother, 2014). There are links to polymorphism in the IL1-beta gene, which is a proinflammatory cytokine involved in inflammatory responses, osteoclast formation, and bone resorption (Maria, et al., 2010; Urban and Mincik, 2010; Bolhari, et al., 2013).

However, some evidence has illustrated those with this genotype showed no association with the failure of dental implants or increased incidence of peri-implantitis (Rogers, et al., 2002; Hultin, et al., 2002). A familial pattern has been described in some cases (Neeley and Gordon, 2007; Sarvania and Meyer, 1989).

Conclusion

In cases such as this, no definitive treatment can be formulated at the outset as the disease is progressive. The priority is to assess the extent of the ECRR and the restorative prognosis of each tooth. Counseling the patient about the condition and its unknown etiology is important, and long-term management is essential. If multiple teeth are lost, then the only options may be a removable prosthesis or implant-retained prostheses.

Initially, this case appeared to be localized external cervical resorption — however, it progressed into a case of multiple external cervical root resorption.

The importance of good planning, which allows flexibility when it comes to the long-term dental rehabilitation, is crucial. This case was restored with a screw-retained implant prosthesis, which will allow the implant fixture to be used when or if future implant restoration is considered as part of a bigger dental rehabilitation treatment plan. Furthermore, it will reduce the surgical treatment required by the patient.

It would be considered prudent to screen family members as appropriate to diagnose any cases of root resorption in its early stages and hopefully improve the restorative prognosis of their teeth.

REFERENCES