Cracking the code of fractured teeth

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The need for an endodontic skill set within the profession is higher than it has ever been. Culturally and socially, there have been significant changes in patient perception to the news that a tooth is in trouble, where the solution is either root canal treatment or removal. I am old enough to have treated patients who needed the replacement of complete dentures that were a “wedding gift” in their youth. As a gesture of goodwill to the bride in waiting, wholesale extractions and the provision of complete dentures were gifted to ensure the absence of dental problems or expense throughout their new found love.

How things have changed. Patients can now attend seemingly determined and adamant that they will not have teeth removed, despite our professional opinion that unfortunately may be wholly different to what they want or would like. Indeed, if a tooth is clearly unrestorable, exhibiting a lack of coronal tooth tissue or a significant apical lesion, patients may already be sensitive to the fact that it cannot be saved. A resigned look may come over their faces, confirming their fears. What could be a more difficult patient and professional situation in endodontics? The cracked tooth.

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We are aware that cracked teeth are difficult to diagnose owing to the clinical picture being variable and inconsistent between patients and their presentations. Of course, parafunction has been shown to increase the risk of crack and subsequent fracture. Outside of continual habitual forceful actions in patients who brux, solitary incidents of biting down on something unexpectedly hard, such as an olive stone, are also common. Such catastrophic incidences may be more common in undermined, weakened heavily restored teeth. The prevalence increases in patients who are middle-aged and is greater in females than males, with the overwhelming majority affecting posterior teeth. The fate of such teeth varies from simple repair of a busted cusp to the need for endodontics and extraction. One interesting feature in the literature seems to point to teeth with steeper cuspal inclines being more susceptible to fracture. This morphological feature is likely to result in the wedging effect of deep cusp–fossa relationships between teeth. Frequently first molars have been implicated as common teeth to fracture owing to their closeness to the masseter muscle and the temporomandibular joint hinge. When loss of vitality is considered and root canal treatment is delivered, protecting what remains to prevent crack formation seems to be the consensus through cuspal coverage. This apparent susceptibility may be caused by a weakened tooth, but may also be due to the loss of proprioceptive feedback that the now-removed pulp once provided on occluding.

Cracked teeth provide patients with an odd experience. The pain is brought on when they eat a Snickers with their coffee on a Tuesday morning (between 7.30 and 7.32 a.m.), chewing from side to side, and on the fifth stroke of their mandible from left to right they get a shooting pain. Forget simple hot and cold sensation; the pain can be brought
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on by things that the patient likes eating the most. So, you are there looking at the patient, looking at the tooth, back at the patient hoping that tapping this tooth will provide a reaction to aid your tentative diagnosis of apical periodontitis. Nothing from the patient, not even a whimper. “Hmm. Let’s take an X-ray … Long-cone periapical please.” You take your Hubble Telescope-type magnifiers and examine the radiograph. You change the contrast in the hope of seeing something of note, nothing. The patient protests: “I get the pain every now and then, but when it happens, it’s really something else … can’t you see anything?” You sit the patient back down again and look at the amalgam filling despite being fairly unconvinced with your antics. The next riddle is how to treat, if at all. Although you cannot be 100 per cent sure that there is a crack, it might not propagate, it may stay the “same” and the patient may not need any treatment as long as he avoids the tooth. What about their Snickers though?

Some patients may accept this. Generally, patients are in two camps with whatever diagnosis we provide them with. Some are proactive “Right there’s a crack, you can’t mend it. Let’s whip it out—I’ve still got another six teeth in my top jaw I can chew on, no worries”, while others are reactive “You know, let’s just sit on it and if it gives me a problem, then I’ll come back”, to which you may reply it could catastrophically snap or fracture. The alternative, and the evidence for this is fairly light on the ground at the current time, is to instigate strategies to reduce the likelihood that the tooth will become more symptomatic—in other words, you want to brace the crack. Similar to my uncle’s wrinkly belt and his ever expanding waistline, you can hear the leather strain as he tucks into his pie. What did we get taught? Use a copper band or an orthodontic band, both of which may be difficult to source in primary care. Or we could crown the tooth and risk it going pulpectic. I imagine that to be so humbling. Having fitted the crown, you drill straight through it two days later. Indeed, whatever you do, the tooth may be unsaveable.

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with the suspicious eye. It looks the same as every other asymptomatic amalgam you have ever placed during your career; your thumbprint is uncanny. As your senses have been sparked, the eye of faith takes over: there is a bit of faceting on the cusps, there are some craze lines, the patient does tend to wear her restorations. “It’s cracked, the tooth is cracked.” Your patient creeks their neck up to look at you more intensely: “Can you fix it?” You see our patients, as much as we do, are perplexed by cracked teeth. The tooth looks “normal”, feels “normal” outside of the occasional painful episode; why can it not be “mended” or “stuck together again” like some old china vase?

The diagnostic conundrum is over. On balance, you know what the problem is, as does the patient now,
A dental nurse in a specialist setting complained of toothache all of a sudden with no prior warning or preamble. The pain was excruciating; it was visible on her face. Her expression was tethered on the side of this incredibly painful upper first molar. She would hold the suction with one hand and her cheek with the other. She could not bite or chew and the dentists she worked with all sympathised. She saw one endodontist in the unit and, despite all the signs being inconclusive at the time, he suggested a crack (Fig. 1). Of course, it was at the back of everyone’s mind that this tooth was unrestored and she had a pristine mouth. She saw a second endodontist in the practice owing to the escalation of her symptoms. By this time, she wanted the tooth extracted, but the romantic amongst us all felt the tooth could be saved, so it was extirpated! The pulp positively nuked and the tooth dead. That should have sorted it right? Unfortunately, her symptoms continued. Could it have been something atypical? She had been stressed and grinding. More deliberation, still no further was the diagnosis. The tooth was dressed once again, with a change in the medicament. Still no joy. A restorative dentist then proceeded to drill the crack out and restore with composite. Still no joy. The tooth was taken out of occlusion when one dentist noticed the development of periodontal ligament widening on one of the long-cone periapical radiographs. The root canal treatment was completed jointly by two excellent endodontists and the second mesiobuccal canal was located. Under any other circumstances, it was a fantastic clinical outcome. Unfortunately, the pain was unabating (Fig. 2). Let us see as much as we can. A CBCT scan was taken that was also inconclusive (Fig. 3). Was it something to do with the sinus? The radiographic report was suggestive, but again nothing conclusive. Towards the end of the two weeks, the patient marched herself into the office of the exodontist to have the tooth extracted. Misery. We had failed.

With the tooth in hand and a wry smile, the nurse dipped the tooth in disclosing solution, which identified one large crack in the furcation area of the palatal root with several accessory ones (Fig. 4). The relief was palpable on her face. Despite losing a tooth, the culprit had finally been identified. It seems as though the mechanical failure of teeth, unlike our old adversary, bacteria, has the ability to trump us, from diagnosis through to treatment, despite our best intentions, knowledge and experience.

The question that crosses my mind as I see the slow but steady increase in “crackitis” is how are we going to manage this contemporary problem? Will we see the emergence of crackologists? The first step is raising awareness among patients and the profession. Patients need to stop themselves from grinding their teeth needlessly during the day and have to instigate strategies to reduce the likelihood of parafunction in the night. One emerging issue is psychological health. Patients are increasingly stressed and depressed, which is a recognised risk factor. One fairly paradoxical issue is that medication may actually increase the likelihood of bruxism, so the pharmaceutical industry may be perpetuating the problem in that stressed people who already grind are medicated and grind even more.

Cracking the code of fractured teeth is going to be difficult and will be a contemporary challenge for us all. One of my trainers from yesteryear, who had more wisdom than Yoda, once said, “From these words never depart, lips together and teeth apart”.

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