



Management of symptomatic vital posterior teeth with suspected cracks

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Anecdotally, the increased stresses of recent years have resulted in more patients presenting with suspected cracked teeth. Cracks can extend into dentine, to the pulp, obliquely under cusps, deeper into the root, or originate in the root.¹ Only some cracks will be symptomatic. Long-standing cracks are more likely to be stained, but this does not correlate to symptomatic involvement.

Split teeth or mobile fragments are relatively straightforward to manage, requiring extraction, or restoration after fragment removal. Milder symptomatic cases are often more complex. Common symptoms associated with a crack may have other causes that should be considered or excluded.

Thorough history-taking, clinical and radiographic examination will help winnow down a wide range of differential diagnoses:

- Tenderness on biting may occur with cuspal flexure (around caries, marginal leakage or a crack), gingival or periodontal inflammation, occlusal overload, apical periodontitis.
- Sharp sensitivity to cold may occur with caries, marginal leakage, exposed dentine, a crack which extends into dentine.

Diagnostic tips:

- Replicate the patient's symptoms with clinical tests (e.g. isolated tooth or cuspal bite-testing, applying the reported exacerbating thermal stimulus to individually isolated teeth) to pinpoint the tooth/teeth involved.
- Pulpal status should be determined especially if there is a history of pulpal symptoms.
- If a coronal crack is suspected to be contributing to symptoms, its presence should be confirmed visually. Remove all restorations (and caries) to examine the tooth structure, ideally under

magnification. Drying the tooth and transillumination especially will reveal whether cracks are present, superficial or extend more deeply. Light will not transmit across cracks between cusps (Fig. B).

- Deeper cracks extending into the root may be associated with a narrow deep periodontal pocket, but consider the context of the patient's overall periodontal condition. Check probing depths again after restoration removal, when access to the interproximal areas will be much easier.

Management:

As always, treatment planning should be driven by confirmed diagnoses. Clear patient communication is important – intraoperative findings contribute to the diagnostic process and treatment options can be finalised even after "treatment" (e.g. restoration removal) has been started.

In teeth with visually confirmed coronal cracks and pulpal status that is no worse than reversible pulpitis, placing full cuspal coverage overlays (direct or indirect) will resolve most symptoms in most cases, and most pulps should remain vital (93% after 4-7 years).^{2,3}

Removing all pre-existing restorations and all caries (including affected dentine, which contains bacteria) to place an ideal overlay means that it does not need to be revisited if the patient has persistent or worsening symptoms – the tooth should be reassessed for the next stage of appropriate treatment. Cracks themselves do not need to be removed, except for any segments containing visible debris.

Indications for endodontic treatment in cracked teeth are the same as for teeth without cracks, i.e. determined by the pulpal diagnosis. Endodontic treatment should not be initiated to manage reversible pulpitis if crack management (restoration removal, full

cuspal coverage) has not been performed to control exposed dentine and cuspal flexure. Timely management will minimise progression of pulpal involvement.

Symptomatic cracks can be complex to manage. Involving the patient helps them understand it is a highly individualised situation that may evolve, requiring ongoing management. Suspected risk factors (e.g. bruxing, dietary habits) should also be managed with their participation.

References:

1. Rivera EM, Walton RE (2015) Longitudinal tooth cracks and fractures: an update and review. *Endodontic Topics* 33(1), 14-42.
2. Opdam NJ, Roeters JJ, Loomans BA, Bronkhorst EM (2008) Seven-year clinical evaluation of painful cracked teeth restored with a direct composite restoration. *Journal of Endodontics* 34(7), 808-11.
3. Signore A, Benedicenti S, Covani U, Ravera G (2007) A 4-to 6-year retrospective clinical study of cracked teeth restored with bonded indirect resin composite onlays. *International Journal of Prosthodontics* 20(6), 609-16.

Additional references available on request.



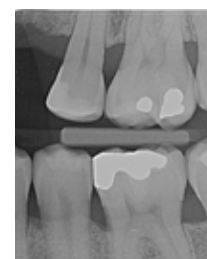
A. Tooth 25 (pain on biting, vital pulp, normal periapical tissues)



B. Cuspal fracture confirmed on transillumination



C. Direct overlay placed



D. Postoperative BW

