Dr. Darren Donnellan B.D.Sc. *(Melb)*

General and Cosmetic Dentistry

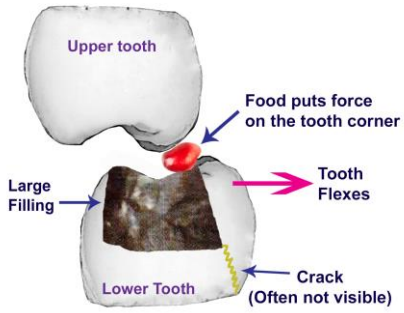
Cracked Tooth Syndrome

Cracked tooth syndrome (CTS) is an incomplete fracture of a vital posterior tooth involving the dentine (inner core) and possibly the dental pulp (nerve). Patients often present with a history of pain of varying intensity which can be difficult to locate. Pain generally occurs with biting and often there is sensitivity with cold, hot and/or sweet things. Sometimes patients will complain of a low "background ache".

The diagnosis of CTS can be difficult and is usually made after taking a history and reproducing the symptoms with several clinical tests. Radiographs do not show the cracks but may be useful in diagnosing associated problems. The treatment of CTS may be simple or complex depending on the position of the fracture. Since the fracture is not always visible, predicting the full course of treatment may not be possible at the outset.

How does it happen?

Cracked tooth syndrome is a common problem in adults and usually affects teeth that are heavily filled. The *decay and subsequent filling* cause a weakening of the remaining tooth structure. Trauma and bruxing (tooth grinding) are often related factors.



Like all materials, teeth are subject to *stress fatigue*. After years of functional load, a hairline fracture can develop, usually at the bottom of the cavity.

Why does it hurt to bite on?

As the tooth flexes microscopically, the nerve is stimulated via tiny tubes (dentinal tubules) which are situated in the dentine (inner core), that run down to the nerve. Pain is often worse when the biting pressure is released.

Why does it sometimes hurt with hot, cold and/or sweet?

Cracks can allow food, liquids and air to come into direct contact with some of the dentinal tubules. These tubules contain "nerve-like" processes that are directly stimulated causing pain. If the crack extends into the nerve itself, bacteria will eventually reach the nerve causing extreme pain.

What is the treatment for CTS?

The best solution to CTS is to bind the tooth together with a 'cap' or 'crown' (same thing). If the crack is a small corner crack a corner covering filling may suffice. In order to ensure the effectiveness of this and to exclude the likelihood of the nerve being involved, a metal band may be temporarily cemented around the tooth. If all goes well a crown can then be constructed.

Alternatively, a semi-permanent solution may be considered in the form of a cusp (corner) covering restoration. If all goes well with this treatment it is generally advisable to proceed with a permanent full crown.

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Original Restoration

Overlay Restoration

Full coverage Crown

What are the advantages of a full crown?

Because a crown is bonded over the entire tooth it seals off the crack and the sources of bacterial leakage. The nerve is given its best chance of recovery because it has been hermetically sealed and the crack has been immobilised. In addition to this, the chance of further cracks developing is eliminated.

Does a crown guarantee the nerve will stay healthy?

No! Although a crown greatly improves the long-term outlook for the nerve, the Dental literature would suggest that about 10-15% of CTS teeth that have been crowned will eventually need the nerve treated

What happens then?

If the nerve needs to be treated, a hole can be safely made in the top of the crown to access the nerve for cleaning (root canal treatment). This is later restored in a filling material to match the colour of the crown or a new crown can be done.

How successful is root canal treatment?

The dental literature puts the success rate of root canal treatment at about 95%. In a CTS tooth, a further 10% of root treated teeth will continue to have pain when the tooth is bitten on. This is due to the crack communicating with the tissues around the tooth root known as the periodontal ligament. There is no treatment other than extraction in these cases.

If you end up losing the tooth, there are several options for treatment:

- An implant in the bone which supports a new tooth.
- A conventional bridge
- A Maryland bridge (like a normal bridge but with a special design to minimise the degree of tooth loss).
- A partial denture.

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