

repairs or a new crown. After the crown falls out you can elect to have it re-cemented again with temporary cement or have it cemented permanently. If enough time has passed to decide with a fair degree of certainty that the nerve has survived, you may want to go permanent. Discuss this with your dentist, because the time needed to reach a reasonable safety zone varies from 3 months to three years. Clinical judgement and many complex individual case factors need to be taken into account, and even despite the best efforts, some nerves go on to die after permanent cementing (sometimes years later). You should also note that the cost of making your crown includes cementing it once only. If you elect to cement it with temporary cement, extra expense will be involved.

11) COULD THE NERVE IN MY TOOTH ALREADY BE DEAD?

Yes. Cracks in teeth can develop slowly and this can allow a slow ingress of bacteria into the nerve. As a result, the nerve can die in a manner that is less noticeable than usual. Nerves can become mildly sensitive to hot and cold, and then die, or they can die without any noticeable symptoms or pain. Many patients have teeth which, unknown to them, have dead nerves. Sometimes there are even dormant abscesses on these teeth and the patient still does not know.

12) IS IT SAFE TO LEAVE A TOOTH WITH A DEAD NERVE?

Sometimes you can get away with it for a while but unfortunately these teeth are like ticking time bombs. The low grade infection that is there can suddenly flare up and cause pain, swelling and pus. This usually happens when your immune system is down – often because of stress from an important life event. A dental crisis is the last thing you need at this time. It is best to treat it as soon as possible to minimise the size of the bone destruction that occurs at the end of the root, where the infection comes out of the tooth and into the jaw.

13) YOU SAID BEFORE THAT A CROWN WAS NEEDED IN ORDER TO AVOID THE NERVE DYING. IF MY NERVE IS DEAD, DO I STILL NEED A CROWN?

Yes, and even more so. You need a crown now to stop the existing crack (which was severe enough to kill the nerve), spreading down the root. This is called a 'vertical root fracture'. These nasty occurrences result in an untreatable problem and the tooth has to be extracted. Crowns are needed on 'dead' teeth even more so than teeth with living nerves, because dead teeth become surprisingly brittle and very prone to these unfortunate types of cracks. Regardless of how a nerve dies, crack or no crack, it is standard practice to put a crown on a

tooth that has had root canal treatment because of the high risk of this crack developing. If there is already a crack, then it would be unwise not to put a crown on it. Therefore, regardless of whether you have Cracked Tooth Syndrome, be it in a tooth with a living nerve or a dead one, you need the protective wraparound effect of a crown.

14) HOW SUCCESSFUL IS ROOT CANAL THERAPY?

The actual root treatment is about 95% successful. However, where there is a crack in the tooth which is not completely immobilised, a further 10% of those root treated teeth will get continuing pain when the tooth is bitten on, or sometimes pushed from the side. This is due to the crack movement irritating the tissue around the tooth known as the periodontal ligament. There is no treatment other than extraction for these rare cases. If you end up losing the tooth there are several options for replacement - an implant into the bone which supports a new tooth; a conventional bridge (caps on the teeth on either side of the gap, fused to a false tooth resting just above the gum); a Maryland bridge (like the conventional bridge but with special metal wings instead of crowns - but not universally applicable) or a partial denture. The advantages and disadvantages of each of these are discussed in other Patient Education Literature.

This document has been produced for the international dental profession. The English (US) dictionary has been used as the basis for the text.



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Cracked Tooth Syndrome

The treatment of Cracked Tooth Syndrome is fairly complex and you may not remember all the details mentioned to you at the time of your visit. To help you remember and to give you additional information, we are providing you with this brochure. Please read every word of it so you are fully informed, and mentally prepared for all eventualities, some of which can be time consuming and expensive.

1) WHY DO TEETH GET CRACKS?

Cracked Tooth Syndrome is a very common problem, usually affecting teeth that are heavily filled. The decay and subsequent filling causes a weakening of the remaining tooth structure. Like all materials, teeth are subject to stress fatigue. After many bites on the tooth, (stress cycles), a hairline fracture can develop, usually at the bottom corner of the cavity. If you are under a lot of psychological stress, you may also grind your teeth (usually at night).

2) DOES GRINDING MY TEETH MAKE IT WORSE?

Yes, and grinding is a very common habit. Almost every person will at some time in their life grind their teeth – usually due to stress. Unknown to you, grinding at night causes a massive increase (200-300%) in the stress and strain on your premolars and molars, especially if you have worn down your canine teeth and lost the protective “lift-off” effect they can give in sideways grinding jaw movements. You may benefit from either a night guard, or a permanent addition to your canines to protect the back teeth from cracking. You may also have susceptible tooth anatomy (genetic) or worn down fillings, where the “valleys” on top of the teeth are not shallow but deep. This puts a lot more sideways splitting forces on the tips of the tooth during chewing, which leads to cracking. Even unfilled teeth can get cracks.

3) WHY DOES IT HURT TO BITE ON?

As the tooth flexes microscopically, the nerve is stimulated. There are tiny fluid filled tubes (“tubules”) which are situated in the dentine (the inner core of the tooth, below the enamel). These tubules run down to the nerve and as the tooth flexes microscopically, the crack opens and closes, sucking and pumping on these tubules, causing fluid to push and pull on the sensitive nerve.

4) WHY IS IT SOMETIMES SENSITIVE TO HOT AND COLD?

The nerve is aggravated by the crack and by the bacteria being pumped into it via the tubules. It becomes inflamed because

of the toxins in the bacteria. A classic symptom of nerve inflammation is excessive sensitivity to hot and cold.

5) IF I DO NOTHING, WHAT EVENTUALLY HAPPENS?

The crack continues to slowly propagate (spread) like a crack in glass. Sometimes the crack goes off to the side and the fragment of tooth breaks off. The crack can also go deep into the root and at times right into the nerve. Teeth can often go for months in a stable, yet inflamed condition. Sometimes they seem to get better, only to suddenly get worse. It is hard to predict the course of the untreated tooth, but usually it is a slow downhill slide as the crack deepens. It is not a good idea to leave it, because a small crack can be treated effectively but a bigger one can lead to root canal treatment or even extraction if you are unlucky. The nerve can be attacked by the bacteria, leading to extreme sensitivity to hot and/or cold and a persistent ache in the tooth as it dies, usually of moderate to severe intensity. The infection in the nerve can then spread into the bone underneath, causing an abscess. This pain is usually severe and not always effectively controlled by pain killers or antibiotics.

6) WHAT IS THE BEST WAY TO TREAT CRACKED TOOTH SYNDROME?

Unless the crack is immobilised the tooth is very likely to deteriorate. Although various methods have been employed in an attempt to stick the crack together, chewing forces are extremely powerful, and these ‘patch up’ solutions are fairly unpredictable and ineffective. The only real solution is to bind the whole tooth together with a ‘cap’ or ‘crown’ (same thing), so that any chewing force moves the tooth as a whole, rather than splitting it apart.

7) ARE THERE ANY OTHER ADVANTAGES TO A FULL CROWN?

The crown is bonded over the entire tooth - this seals all the micro-cracks and the variety of sources of bacterial leakage coming from the joints in the patchwork of fillings typically in these teeth. The nerve is now given its best chance at recovery because it has been hermetically sealed and the crack has been immobilised - but not necessarily a complete immobilisation.

8) WHAT COLOUR WILL THIS TOOTH BE?

Most people prefer a natural appearance; therefore porcelain fused to metal crown is made in most cases. You can have gold if you prefer, or if you want something really natural

looking, choose one of the new all porcelain crowns (metal free). Because most cracked teeth have large black amalgam fillings, an improvement in appearance results, which is some compensation for the time and expense involved.

9) CAN YOU GUARANTEE THAT THE NERVE WILL RECOVER?

No! Despite the best treatment about 10% of cracked teeth have nerves that go on to die. This is because the tooth can still move slightly within the bone and this slight movement can flex the crack from underneath, despite the crown on top. There are also occasions where the existing bacterial damage is so substantial, that the nerve goes on to die regardless of what we do. Early treatment is therefore recommended to minimise the size of the crack and the extent of bacterial invasion.

10) WHAT WILL HAPPEN IF THE NERVE DIES?

Quite often an abscess will develop. This means that the dead nerve remnants will need to be removed and the inside of the tooth cleaned and sealed. This process is called Root Canal Therapy (RCT) or Endodontic Therapy. A small hole is made in the top of the crown (the crown can not be removed without the risk of breaking the tooth or crown) and access obtained to the nerve for cleaning. Later on, the hole is filled in with a permanent, white plastic filling or porcelain inlay, sealed to the tooth and the crown. It is a pity to have a hole in the crown, because it may weaken the crown slightly, but it is a quick and uncomplicated solution to the problem and has very few long term problems. The white filling will match the crown reasonably well but don't expect it to be absolutely invisible against the top of the crown. For most people, it's not a problem. If the hole really worries you, a new crown can be made if you don't mind the additional expense.

There is another option and that is to initially cement the crown with temporary cement, so that in the event of the nerve dying, the crown can be removed and re-connected later when the RCT is completed. This avoids having a hole drilled through it, but comes with its own set of problems – and you must decide if you are prepared to accept these. Firstly, if the crown is put on with temporary cement, it will eventually come off. Depending on the type of cement and the retentive ability of the crown, this could be three months to five years. Usually, 99% of the time, the crown will come off and you will notice it and retrieve it, so that all ends well. However, you may bite on it, break it or the opposing tooth, or swallow it accidentally - so you need to consider these possibilities before you make your decision, because you may need to pay for the cost of

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