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## Root canal treatment

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### Summary

- Root canal treatment is a dental procedure to replace a tooth's damaged or infected pulp with a filling.
  - Most people who undergo root canal treatment can expect a functional tooth after the treatment.
  - The treated tooth should last as long as your other teeth if you maintain good oral hygiene and see your dentist every six to 12 months
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Root canal treatment is a dental procedure that replaces a tooth's damaged or infected pulp with a filling. The pulp is the tooth's lifeline – its vessels, tissue fibres and nerves in the central hollow of the tooth keep it alive. The procedure to replace this damaged or infected pulp is also known as endodontic treatment.

Success rates for endodontic treatment are generally good. About 90 to 95 per cent of people who undergo root canal treatment can expect a functional tooth after the treatment. The treated tooth should last a very long time, provided that you maintain good oral hygiene and generally look after your teeth. Of course, no therapy or replacement will last as well as a healthy tooth.

### Tooth structure

A tooth is mainly made of a hard material called dentine. Enamel is the surface layer that protects the visible part of the tooth (crown). The part of the tooth that sits beneath the gum line is called the root. The root helps to anchor the tooth into the jaw. Generally, front teeth have only one root, while molars generally have up to three. Within each root, there can be multiple canal spaces.

The hollow centre of a tooth is called the pulp chamber. This area contains the blood vessels, nerves and pulp. The pulp is a sensitive tissue that provides oxygen, nutrients and feeling to the tooth. The pulp extends from the roof of the pulp chamber down into the bottom of each root canal. If it becomes infected, the entire space needs to be disinfected.

The main function of the dental pulp is to regulate the growth and development of the tooth during childhood. Once the tooth is fully formed, nutrition for the tooth comes from the tissues surrounding the root. Therefore, a tooth can function without its pulp and, in the majority of cases, can be kept indefinitely. After endodontic treatment, the tooth is 'pulpless', but it is not a dead tooth.

### Symptoms of tooth pulp damage or disease

A diseased tooth pulp may cause inflammation or infection. The symptoms of a damaged or diseased tooth pulp may include:

- unprovoked or spontaneous pain
- sensitivity to hot and cold drinks and foods
- pain when biting or chewing
- loosening of the tooth
- swelling of the gum near the affected tooth
- oozing of pus surrounding the affected tooth
- facial swelling.

Sometimes, tooth pulp may become damaged or diseased without presenting any symptoms. In these cases, the problem is usually diagnosed by special tests or x-rays during a dental check-up or treatment for other dental concerns.

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## Causes of tooth pulp damage or disease

There are many events that can lead to disease or damage to dental pulp. Some of these include:

- deep-seated and untreated dental decay
- decay beneath a deep filling
- trauma that damages a tooth
- habitual tooth grinding (bruxism)
- long-standing cracks in the teeth
- advanced gum disease.

## Complications of tooth pulp infection

If tooth pulp infection is left untreated, complications could include:

- **spreading infection** – once the pulp becomes infected, it loses its ability to fight the spread of the infection. If bacteria find their way into the pulp chamber, the bacteria will multiply. This can cause a severe infection or an endodontic abscess (a pocket or 'blister' of pus) when it spreads into the surrounding bone
- **localised bone loss** – the infection may spread around the ends of the infected root canal and erode surrounding jaw bone
- **loss of tooth** – the tooth may have to be removed, which interferes with the person's ability to bite and chew and may affect appearance if the tooth is near the front of the mouth. Tooth replacement with dentures, bridges or dental implants are costly and may not be possible or tolerated, especially if the infection has already caused advanced bone loss.

## Diagnosis of tooth pulp problems

The dentist will listen to your symptoms, examine your teeth and perform other investigations including taking x-rays. These x-rays also help the dentist to plan for the root canal treatment by revealing the number, size, shape and depth of the roots, which shows how complicated the procedure may be.

## Root canal procedure

You may need more than one visit to complete the treatment, depending on the difficulty of the procedure. The exact procedure chosen by your dentist may differ from the procedure outlined here. Ask your dentist for further information.

Root canal treatment has four main aims:

1. **removing active decay and infection** – any old or leaky fillings, tooth decay, infected nerve tissue, pus and debris are removed
2. **shaping the canals** – in order to be filled well, the canals within the tooth root need to be shaped into smooth, hollow tunnels that are free of irregularities where residual bacteria may sit. This shaping process involves small instruments, special disinfectants and medication. It may take a few weeks to months for these solutions to take maximum effect against stubborn bacteria within the tooth, and this step may have to be repeated several times
3. **filling the canals** – to prevent bacteria from re-infecting the empty canals in your tooth, they are permanently sealed with a long-lasting barrier material
4. **making the tooth functional again** – to make sure no bacteria from the oral environment can leak back into the tooth, a large, well-sealed restoration is put on the tooth (such as a crown). Teeth that require root canal treatment have sometimes lost considerable tooth structure due to previous decay or cracks, and may require further protection in the form of porcelain, gold alloy crowns or other similar materials.

## Cosmetic issues after root canal treatment

A normal tooth with a healthy pulp is yellowish-white in colour. A pulp-free tooth may eventually turn grey. The dentist can advise you on appropriate aesthetic (cosmetic dentistry) procedures.

## Who can perform root canal treatments?

All dentists are trained to carry out root canal treatments. Some dentists will refer complicated and emergency cases to an endodontist once your tooth has been assessed. Endodontists are dentists who are specialists in root canal treatment.

If you would like a specialist opinion, ask your dentist for a referral to an endodontist.

### Where to get help

- **Your dentist**
- **Dental Health Services Victoria** provide public dental services through the **Royal Dental Hospital of Melbourne** and community dental clinics, for eligible people. For more information about public dental services, Tel. **(03) 9341 1000** or **1800 833 039** outside Melbourne metro
- **Australian Dental Association Victorian Branch** Tel. (03) 8825 4600

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