Clinical Protocol
Root Canal (Endodontic) Treatment

Effective 1 January 2014

Protocol
Benefit allocated to limit and subject to benefit management guidelines and scheme rules.

Definition
Endodontics is concerned with the form, function and health of, injuries to, and diseases of the dental pulp and periradicular region, their prevention and treatment. The aetiology and diagnosis of dental pain and diseases are integral parts of endodontic practice (European Society of Endodontology).

Guideline
Benefit in accordance with scheme rules and available limits. No general anaesthetic benefit for endodontic treatment, including surgical endodontics (apicectomies).

General Information
The principles of endodontic therapy are complete debridement of the canal system, removal of the smear layer formed by instrumentation of the canals, and the removal of the bio-film from the entire canal system. A bio-film is a structured community of bacteria within a protective polysaccharide matrix.

Modern root canal treatment is a specialised area of dentistry, utilising sophisticated equipment and instrumentation. Microscopes are used to make the root canal system of a tooth visible. Rotary files, manufactured from nickel-titanium revolutionised endodontic treatment. Apex locators accurately indicate the length of teeth and systems to rinse and fill the root canals have been developed.

All this is of no value if the operator cannot accurately access and identify all the canals in the root/s of the teeth to be treated.

The use of an endoscope to facilitate endodontic treatment is described in an article in the October 2009 edition of Quintessence. The instruments described actually combined the magnification properties with irrigation and suction as well as surgical micro instruments to prepare the canals. This technology is in its infancy and the cost is a restrictive factor to general use. It has still not gained widespread popularity.

The use of rubber dam during endodontic treatment is essential to protect the patient against the accidental aspiration or swallowing of instruments and materials. It also improve treatment outcomes.
due to the fact that the root canal systems is isolated from bacteria in the saliva or other sources of contamination during root canal therapy.

Unfortunately it is a concept that is not widely practised in South-Africa, and indeed throughout the world.

A series of steps or procedures facilitate endodontic therapy, and the success of treatment is based on these steps.

A well designed access cavity, offering straight line access to the canals, and properly exposing all canals, are essential.

Access can be hampered by restorations placed on the teeth, such as porcelain or metal crowns. Calcifications in the pulp of teeth, known as pulp stones, could block access to canals. The root morphology of teeth could be of such a nature that access is extremely difficult, e.g. curved, S or bayonet shaped canals.

Once access is achieved, canals must be cleaned and shaped to accept the root canal filler. The aim of root canal therapy is to clean the entire root canal system, including lateral and communicating canals to remove all organic materials, and sealing these canals in order to prevent the entry of any bacteria or other organisms into them.

This is achieved by instrumentation in the shape of files, currently manufactured from nickel-titanium. These files can be hand files, manipulated by the dentist’s fingers, or rotary files fitted to a slowly rotating electric motor. Current techniques to shape canals include the crown-down and pre-enlargement techniques. It has been shown that cutting files produce cleaner cut canals and less trapped debri. Other factors are the taper of the instruments and the terminal diameter. These two factors are interrelated and influence the successful irrigation of the canals. Several file systems recently became available offering minimal instrumentation with maximum cleaning and shaping of root canal systems.

A number of irrigants have been advocated over the years to rinse canals. It must destroy spores, viruses and bacteria. It must also be capable of breaking down vital and necrotic pulp tissue in the entire root canal system. Rinsing of the canal system with sodium hypochlorite is done regularly during instrumentation. It is even more effective when heated and given time to work. Extreme care should be taken to avoid accidents with sodium hypochlorite as it can lead to serious damage to living tissue.

A chelating agent assists to ensure that the instruments glide down the canals and prevent blockage of the lateral canals. Chelating agents are also used to facilitate instrumentation in very small canals, or in canals with difficult and odd shapes. Ethylene-diamine-tetra-acetic acid (EDTA) is used for this purpose. It is a surfactant which lowers surface tension and removes the smear layer to facilitate the effect of the rinsing solution.

Instrumentation is undertaken to the apical constriction of each canal in the root/s of the tooth. It is currently understood that coronal seal of the canal is the most important to ensure the success of root canal therapy.

The canals are filled with gutta-percha and an endodontic sealer or cement.
Root canal sealer is essential to assist in filling irregular spaces in the root canal system, to enhance the seal of the gutta percha cones and to penetrate into inaccessible areas such as the dentinal tubuli.

Radiographs are absolutely essential to locate canals, study the morphology of the roots and canals, confirm length and shape of canals and confirm proper shaping and sealing of canals.

Risks and complications of root canal therapy include fracture of instruments, perforation of canals or the tooth, incomplete sterilising and instrumentation of the canal system, failure to identify canals, accidental infusion of sodium hypochlorite into surrounding soft tissues, incomplete sealing of the canal system. All or any of these could lead to failure of the root canal therapy with recurrent infection as a result.

Re-treatment of failed root canal therapy is regularly undertaken and often results in identification of previously missed canals.

Optimal root canal treatment is a very successful procedure with a success rate in excess of 90%. It is also, contrary to popular belief, not an exceptionally painful or even uncomfortable procedure.

When injury to the pulp of the tooth occurs, irreversible inflammatory conditions could result. This eventually lead to pulp death. In the length of the root the canals exhibit an endless number of configurations with communicating and lateral canals.

The objective of endodontic treatment is to clean and eliminate the total contents of the root canal system of a tooth.

A Taiwanese study found that 93% of more than 1,5 million endodontically treated teeth were still in the patients mouths after five years. In the General Dental Services in the UK, 1 040 565 root canal treatments were done on adults in 2002 – 2003. The cost of this was 55 451 112 Pound! This did not include endodontic procedures on children or surgical endodotics. It is specifically mentioned that there is concern about the quality of the treatment provided. This is also of concern in South Africa.
References


