

Endodontics

Lecture 1

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Introduction and Scope of Endodontics

Endo is a Greek word for "Inside" and Odont is Greek word for "Tooth". Endodontic treatment treats inside of the tooth. Endodontics is the branch of clinical dentistry associated with the prevention, diagnosis and treatment of the pathosis of the dental pulp and peri-radicular tissue.

OBJECTIVE OF ENDODONTIC TREATMENT

The primary objective of endodontic therapy is to create a biologically acceptable environment within the root canal system which allows the healing and continued maintenance of the health of the peri-radicular tissue. This objective can be achieved by eliminating the bacteria (source of infection) from within the root canal system, and sealing the root canal and tooth to prevent re-infection. Since nothing is as good as the natural teeth, one should take care of them.

The endodontic therapy is a necessary treatment to cure a damaged or diseased tooth. Endodontics has been defined as art as well as science of clinical dentistry because in spite of all the factual scientific foundation on which the endodontics is based, to provide an ideal endodontic treatment is an art in itself.

Endodontic treatment encompasses procedures that are designed to maintain the health of all or part of the dental pulp. When the dental pulp is diseased or injured. treatment is aimed at preserving normal peri-radicular tissues. When apical periodontitis has occurred treatment is aimed at restoring the peri-radicular tissues to health: this is usually carried out by root canal treatment, occasionally in combination with surgical endodontics.

SCOPE OF ENDODONTICS

Scope of endodontics includes following:

- a. vital pulp therapy (pulp capping, pulpotomy) .
- b. Diagnosis and differential diagnosis of oro-facial pain.
- c. Root canal treatment of teeth with or without periradicular pathology of pulpal origin.
- d. Surgical management of pathology resulting from pulpal pathosis.
- e. Management of avulsed teeth (replantation)
- f. Root end resections, hemisections and root resections
- g. Retreatment of teeth previously treated endodontically
- h. Bleaching of discolored teeth.
- i. Coronal restorations of teeth using post and cores

INDICATIONS FOR ROOT CANAL TREATMENT

Root canal treatment may be carried out on all patients where other dental procedures may be undertaken. Specific indications are

- 1. An irreversibly damaged or necrotic pulp with or without clinical and/or radiological findings of apical periodontitis.
- 2. Elective devitalization, e.g. to provide post space, prior to construction of an overdenture, doubtful pulp health prior to restorative procedures, likelihood of pulpal exposure when restoring a (misaligned) tooth and prior to root resection or hemisection.

CONTRAINDICATIONS FOR ROOT CANAL TREATMENT

- 1 . Teeth that cannot be made functional nor restored.
- 2. Teeth with insufficient periodontal support.
- 3. Teeth with poor prognosis, uncooperative patients or patients where dental treatment procedures cannot be undertaken.
- 4. Teeth of patients with poor oral condition that cannot be improved within a reasonable period.

ANATOMY OF DENTAL PULP

Pulp lies in the center of tooth and shapes itself to miniature form of tooth. This space is called pulp cavity which is divided into a pulp chamber and root canal/s starting from the orifice to the apical foramen. There are also accessory and lateral canals. The roof of pulp chamber consists of dentin covering the pulp chamber occlusally. Canal orifices are openings in the floor of pulp chamber leading into the root canals. The shape of root canal varies with size, shape, number of the roots in different teeth.

FUNCTIONS OF PULP

Pulp performs four basic functions:

- . 1. Formation of dentine
2. Nutrition of dentine
3. Innervation of tooth
4. Defense of tooth

ROOT CANAL CONFIGURATION

The shape of root canals is divided into four types:

Type 1: A single canal leaving the pulp chamber and continuing as a single canal to the root apex and opens in a single apical foramen. It refers to 1-1-1

Type 2: Two canals leave the pulp chamber then join each other at the apical third to open in a single apical foramen. It refers to 2-1-1

Type 3: Two canals leave the pulp chamber and continue as two canals to be opened in two separate apical foramina. It refers to 2-2-2

Type 4: A single canal leaving the pulp chamber, and bifurcating at the apical third into two canals and open in two apical foramina. it refers to 1-2-2 .

***Lateral canal:** Is a canal that is located approximately at right angle to the main root canal. Lateral canals are clinically significant; like the apical foramen, they represent pathways along which disease in the pulp may extend to periradicular tissues and occasionally allow disease in periodontium to extend to the pulp.

***Accessory canal:** Is one that branches off from the main root canal, usually located somewhere in the apical region of the root.

Accessory and lateral canals connect the pulp to the periodontal tissue, but many of these canals are sealed by cementum and/or dentin, however many remain viable which make them a source of spread of infection even after successful debridement of the main canal. Accessory canals can be exposed by removal of cementum during scaling and root planning, which establishes a communication between the oral cavity and the pulp, which can lead to necrosis

***Apical foramen:** It is a foramen at the apex of each root through which blood vessels, nerves and lymphatic that supply the pulp enter. The location and the shape of the apical foramen may undergo changes as a result of functional influence on the teeth.

BASIC PHASES OF TREATMENT

There are three basic phases of treatment:

1-The Diagnostic phase in which the disease to be treated is “determined” and the treatment plan developed.

2-The Preparatory phase in which the contents of the root canal are removed and the canal is prepared to receive a filling material.

3- The obliteration Phase in which the canal is filled or obliterated with an inert material to obtain an adequate seal as close as possible to C.D.J. (cementodentinal junction).

If there is a defect in any phase, the endodontic treatment will not be succeeded.

Who performs an endodontic therapy ?

Generally, all dentists receive basic education in endodontic treatment but an endodontist is preferred for endodontic therapy. General dentists often refer patients needing endodontic treatment to endodontists.

Why does patient Feel Pain?

When pulp becomes infected. it causes increased blood flow and cellular activity, and pressure cannot be relieved from inside the tooth. This causes pain. Pulp can even die without causing significant pain; it may depend on pain threshold and pain reaction of the patient.

How can You Tell if Pulp is infected?

when pulp gets inflamed, it may cause toothache on taking hot or cold, spontaneous pain, pain on biting or on lying down. On occasion a damaged pulp is noticed by drainage, swelling, and abscess at the root end (Fig. 2). Sometimes, however, there are no symptoms,

Why does patient Need Root Canal Therapy

Because tooth will not heal by itself, the infection may spread around the tissues causing destruction of bone and supporting tissue. This may cause tooth to fall out. Root canal treatment is done to save the damaged pulp by thorough cleaning and shaping of the root canal system and then filling it with gutta-percha (rubber like) material to prevent recontamination of the tooth. Tooth is permanently restored with crown with or without post.

What are Alternatives to Root Canal Therapy ?

If tooth is seriously damaged and its support is compromised, then extraction is only alternative.

What is Root Canal Treatment Procedure?

Once the endodontic therapy is recommended, your endodontist will numb the area by injecting local anesthetic. After this a rubber sheet is placed around the tooth to isolate it. Then the opening is made in the crown of the tooth and very small sized instruments are used to clean the pulp from pulp chamber and root canals (Fig. 2). After thorough cleaning and shaping of root canals (Fig. 3), they are filled with rubber like material

called guttapercha. which will prevent the bacteria from entering this space again (Figs 4 and 5). After completion of endodontic therapy, the endodontist places the crown or other restoration so as to restore the tooth to full function (Fig. 6).

Will the Tooth Need An Special Care or Additional Treatment after Endodontic

Treatment?

Patient should not chew or bite on the treated tooth until the patient has had a tooth restored

by the dentist. The non-restored tooth is susceptible to fracture. so patient should visit the

dentist for a full restoration as soon as possible not more than one month. Most endodontically treated teeth last as long as other natural teeth. In a few cases, a tooth that has undergone endodontic treatment does not heal or the pain continues. Occasionally, the

tooth may become painful or diseased months or even years after successful treatment. Often when this occurs. re-treating the endodontic procedure can save.

Can All Teeth be Treated Endodontically ?

Most of the teeth can be treated endodontically. But sometimes when root canals are not accessible, root is severely fractured, tooth cannot be restored or tooth doesn't have sufficient bone support it becomes difficult to treat the tooth endodontically. However, advances in endodontics are making it possible to save the teeth that even a few years ago would have been lost. Newer researches, techniques and materials have helped us to perform the endodontic therapy in better way with more efficiency. Since introduction of rotary instruments and other technologies reduce the treatment time the concept of single visit is gaining popularity nowadays. It has been shown that success of endodontic therapy depends on the quality of root canal treatment and not the number of visits. In the modern world, single visit endodontics is becoming quite popular.

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