Case Selection For Endodontic Treatment

After the clinician has identified an endodontic problem, the process of case selection and treatment planning begins. The dentist must must ask himself two questions:

1. Whether patient's needs are best served by endodontic treatment or if another approach is preferred?

2. Whether the clinician is capable of handling the case or would it be better to consider referring the case to a specialist (Endodontist)?

To answer the first question we must determine the indications and contra-indications for root canal treatment.

Indications:

1. Pulpal affection due to pulp or periapical pathosis.
2. Pulpal affection due to traumatic injury.
3. Facilitation of restoration (Intentional Endodontic Treatment).

Contra indications:

There are very few true contra indications for root canal treatment.

1. ***Insufficient periodontal support***: These are teeth with minimal bone support and grade III mobility.

2. ***Non restorable teeth***: The purpose of endodontic therapy is to provide a biologically acceptable substructure that will support the coronal portion of the tooth. If the teeth cannot be restored to function following root canal treatment as those with extensive root caries below the bony crest,

massive resorption, caries in the furcation area and jeopardized crown root ratio, extraction will be inevitable.

3. ***Vertical fracture***: Teeth associated with vertical root fracture are generally hopeless and indicated for extraction.

4. ***Condition of the remaining dentition***: If the patient is poorly motivated with poor oral hygiene and several missing teeth, then extraction and a removable prosthesis is warranted.

5. ***Non strategic teeth***: Teeth that have no present function or possible future prosthetic value, should be extracted if signs of inflammation or infection develop.

To answer the second question and the decision about when to treat and when to refer depends on different factors, which are considered, contented contra indication and may be related to the patient, to the tooth or to the dentist.

Patient related contented contra-indications:

1. ***Age of the patient***: Endodontic therapy can be successfully performed on patients of any age. The very young patients may present special problems such as during cleaning, shaping and obturation of immature roots, while older patients may present other difficulties such as calcified canals together with critical systemic medical conditions.

2. ***Local anesthesia***: Some patients may have allergies to local anesthetics, difficulty with anesthesia may transform a cooperative patient into a

budding dental phobic. If difficulty is encountered in obtaining profound anesthesia, referral should be considered.

3. ***Physical limitations***: If a patient cannot be suitably reclined or if the mouth opening is such that access is compromised, referral should be considered. A second molar in one patient may be easier to manipulate than a premolar in another patient. In extreme situations, root canal treatment maybe impossible and extraction maybe considered.

4. ***Patient financial status***: Full disclosure is required prior to endodontic treatment because the cos of treatment maybe higher than what the patient can afford. Generally, the cost of endodontic treatment and a restoration is less than that for extraction and replacement with a prosthetic appliance.

5. ***Patient motivation***: Patient should be aware and convinced of the need for maintaining and restoring the affected tooth. Therefore, education of the patient is very important to realize the role of the natural dentition and the need to keep the affected tooth functioning.

6. Patient availability.

Tooth related contented contra-indications

1. ***Abnormal canal configurations***: These are examples for abnormal pulpal and root anatomy that can make canals inaccessible and may need special handling, referral maybe required. i.e.

   a. Tortuous canals
   b. Dens invaginatus
   c. Severely curved canals

d. C-shaped canals,
e. Taurodontism
f. Lingual developmental groove
g. Aberrant extra canals i.e. Mid mesial canals, Upper premolar with three canals and Mandibular premolars with a deep bifurcations.

2. ***Immature apex***: These teeth present difficulties in cleaning, shaping and obturation. However, multiple techniques are present to deal with such difficulties, referral maybe required.

3. ***Root resorption***: Patients with internal or external root resorption are high risk cases that should generally be referred for evaluation and treatment.

4. ***Hyper calcification***: Calcification of the pulp chamber obscures the internal anatomy and makes negotiation of canals difficult sometimes impossible. This may result in iatrogenic errors during root canal preparation i.e. ledging, perforation and canal transportation. In severe cases, surgical intervention maybe required to properly treat the tooth. Referral maybe required.

5. ***Crown/Root ratio***: An unfavorable crown/root ratio that exceeds 1:1 is more susceptible to eccentric occlusal forces, and hence prognosis is poor. Sometimes these teeth maybe indicated for extraction, but before a decision for extraction is made referral to a prosthetic dentist for an accurate evaluation maybe necessary.

6. ***Periapical conditions***: Presence of an intraoral sinus tract, extraoral sinus tract or periapical lesion is **not** a contra-indication to conventional endodontic treatment. However, conjugation of surgical and non-surgical procedures might be required, referral maybe required.

7. ***Tooth location and malpositioning***: Generally, third molars especially maxillary molars are difficult to reach, particularly in patients with limited mouth opening. Rotated, tipped, or crowded teeth may also complicate isolation, access, as well as inhibit adequate cleaning, shaping and obturation, Referral maybe required. In extreme cases these cases maybe indicated for an extraction.

8. ***Retreatment***: Generally, teeth are more difficult to retreat than to treat the first time. Endodontists are more skilled than general practitioner in diagnosing and managing failed endodontic cases. Referral is generally required.

9. ***Iatrogenic problems***: Perforations, ledging, broken instruments, canal blockage…..etc. any of these endodontic mishaps require special handling to correct the problem. Referral is required.

10. ***Traumatic injuries***: Teeth subjected to trauma require proper emergency handling and specialized procedures with prolonged follow up periods. Most of the time referral is required, unless the clinician is properly trained and has the necessary knowledge and skills to handle these cases.

11. ***Cracked tooth***: Cracked teeth are often difficult to diagnose and treat. Symptoms can vary from vague pain while chewing to extreme pulpalgia. Definitive diagnoses must be achieved before treatment. These are difficult cases, when in doubt refer to a specialist.

12. ***Endodontic-periodontic lesions***: If there is doubt about whether the problem is endodontic or periodontal, the patient should be referred. An

endodontist or a periodontist or both can best differentiate endodontic from periodontal pathosis.

13. ***Persistent signs and/or symptoms***: If pain and/or swelling persist or develop after treatment with no apparent cause the patient should be referred. These symptoms maybe caused by lack of debridement, lack of obturation, missed canals, root fractures and so on. Extraction, retreatment, or surgical intervention may be required.

14. ***Approximation to vital structures***: Relationship between the operative area and adjacent vital structures such as the mental foramen, mandibular canal, and maxillary sinus should be considered during treatment. These vital structures may obstruct some surgical procedures. Referral maybe required.

15. ***Existing restorations***: Very often restoration anatomy does not duplicate the original crown anatomy and the pulp chamber and orifices maybe difficult to locate. Other consideration includes the size of the crown and the parallelism between the long axis of the crown and the long axis of the root. These considerations are particularly important in premolars, maxillary lateral incisors, and mandibular incisors which are prone to iatrogenic perforations as these teeth are narrow and there is little room for error. Referral maybe required.

Dentist related contented contra-indications

1. ***Lack of knowledge and/or skills***: Appropriate treatment follows accurate diagnosis and the ability to undertake the different procedures. Many procedures are done inappropriately because of diagnostic errors. The general dentist may be unfamiliar with particular problems. Unless a definitive diagnosis is obtained, no treatment should be rendered and the patient should be referred.

2. ***Lack of devices and technology***: The available armamentarium determines the complexity of the cases that a dentist can successfully manage in the office. When technology is unavailable then referral becomes mandatory.

3. Lack of time.

Medically related contented contra-indications

It is very important before undergoing endodontic treatment that a complete medical history of the patient is taken. There are no absolute contra-indications related to systemic conditions but certain considerations and precautions maybe required. In certain cases referral to the patients physician maybe required.

1. ***Cardiac Disease***:
   a. Congenital heart disease
   b. Heart murmur
   c. Rheumatic fever
   d. Valvular disease or previous valvular surgery
   e. Patients with pacemakers

Some diseases related to the heart may require prophylactic antibiotics and patients with pacemakers can be affected by some of the dental equipment i.e. Pulp testers, apex locaters etc... Referral maybe required.

2. ***Cardiovascular disorders***: Hypertension & patients taking anticoagulant drugs. These patients maybe contraindicated for endodontic surgery or maybe affected by vasoconstrictor drugs present in local anesthetic solutions. Referral maybe required.

3. ***Blood disorders***:
    a. Hemophilia
    b. Leukemia
    c. Thrombocytopenia
    d. Aplastic anemia
    e. Platelet disorders

Patients with these disease may have severe bleeding tendencies, this may contraindicate surgical endodontics, care should be taken while administering local anesthesia and application of the rubber dam clamp. Referral to a physician is mandatory.

4. ***Diabetes Mellitus***: Patients with diabetes should have his blood sugar monitored and controlled during treatment so as not to initiate a diabetic coma or hypoglycemia. These patients should be given anesthetic without epinephrine and should be given non-aspirin containing analgesics because these can raise or reduce blood glucose levels respectively. Furthermore, diabetic patients are more prone to postoperative infection than normal patients. Referral maybe required.

5. ***Liver Disease***: People with liver disease like viral hepatitis have a compromised liver that will not detoxify medicaments properly. So it is necessary to use drugs that don't get processed in the liver. Examples of drugs that can be used safely with liver Aspirin, acetominophen, penicillins and cephalosporins. Referral to physician maybe required.

6. ***Kidney diseases***: Patients with renal failure and other kidney disfunction's may not be able to metabolize certain drugs properly. Exa mples of drugs to be avoided are Aspirins, acetominophen, and penicillins. Erythromycin is the antibiotic of choice in patients with renal failure. Referral maybe required.

7. ***Radiation therapy***: Patients undergoing radiation therapy may required prophylactic antibiotics to reduce the possibility of postoperative infections. Referral maybe required.

8. ***Tuberculosis and other lung infections***: Patients with these diseases have poor oxygenation of the blood and are more susceptible to post operative infections, sometimes prophylactic antibiotics maybe required during treatment or treatment maybe deferred until the disease is brought under control. Referral maybe required.

9. ***Pregnancy***: Pregnant patients are not contra-indicated for endodontic treatment but if possible treatment should be done during the second trimester and the use of drugs should be very limited. Referral maybe required.

10. ***Epilepsy***: Patients with epilepsy should take their medication before treatment to minimize the possibility of an attack on the dental chair. Care

should be taken while administering anesthesia so as not to inject into a vein, this may bring upon an attack of epilepsy.

11. ***Diseases of the Adrenal Cortex***: Addison's disease (Low levels of corticosteroids) and Cushing’s disease (High levels of corticosteroids). In the case of Addison’s disease the patient is unable to handle stressful situations. While in the case of Cushing’s disease the tissue healing is impaired and the patient is susceptible to post operative infections. Referral is required.

12. ***Thyroid Disease***:
    a. Hypothyroidism: Patients have a diminished resistance to infection and an inability to handle stress. Prophylactic antibiotics maybe needed to prevent post operative infections.
    b. Hyperthyroidism: These patients have to be handled with care especially when giving local anesthetic because the epinephrine present in the solutions potentiates the action of the thyroid gland. This may initiate a thyroid crisis during treatment. Using a non-epinephrine containing local anesthetic is preferable. Referral to the physician to correct the thyroid imbalance maybe required.

13. ***Chronic corticosteroid treatment***: Patients who take corticosteroids for chronic systemic conditions i.e. autoimmune disease are prone to infections during treatment so prophylactic antibiotics maybe required during endodontic treatment. Referral maybe required.