



## **Standards of Practice**

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The Canadian Academy of Endodontics is the recognized body representing endodontics in Canada.

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## **PREFACE**

The Canadian Academy of Endodontics (CAE) has assumed responsibility for providing a “Standards of Practice” document for the discipline of endodontics in Canada. This document is designed to assist the dental profession and the public by providing current information about endodontic therapy and expectations of treatment rendered.

The “CAE Standards of Practice” is an authoritative reference which articulates general guidelines for endodontic treatment classification, treatment procedures, and treatment assessment. This document assists the reader in determining risks of treatment and appropriateness of endodontic treatment in various circumstances, and aids the expert in determining if care provided is appropriate or adequate in comparable circumstances. The underlying principle that transcends these guidelines, including their administration and interpretation, is the respect of the rights of all parties involved. The guidelines are not meant to provide a grading system nor to direct punitive measures.

The “CAE Standards of Practice” reflects the opinions and views of provincial representatives and their colleagues, and is consistent with the art and science of endodontics as practised nationally. When this project was initiated in 1992, all provinces with practising endodontists were represented on the Standards of Practice Committee. In addition, input was received from educators, general practitioners, and provincial regulatory bodies.

This document will be reviewed annually and is open to revision and expansion.

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## **SECTION I: GENERAL INFORMATION**

### **DEFINITION**

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Endodontics is the branch of dentistry that is concerned with the morphology, physiology and pathology of the human dental pulp and periradicular tissues. Its study and practice encompass the basic clinical sciences including biology of the normal pulp, and etiology, diagnosis, prevention and treatment of diseases and injuries of the pulp and associated periradicular tissues.

The primary objective of endodontic therapy is to preserve a tooth which may otherwise be lost due to pulpal/periradicular pathosis.

### **SCOPE OF PRACTICE**

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The scope of practice for endodontics is defined by the educational requirements for the training of a specialist in this discipline. It includes but is not limited to:

- Diagnosis and treatment of oral pain of pulpal and/or periradicular origin
- Differential diagnosis of facial pain
- Use of antibiotic, anti-inflammatory, and analgesic drugs (to be included in next revision)
- Vital pulp therapies
- Non-surgical root canal therapy
- Selective surgical removal of pathological tissues resulting from pulpal pathosis
- Repair of root defects
- Intentional replantation
- Surgical removal of tooth structure such as apicoectomy, tooth sectioning and root amputation
- Treatment of dento-alveolar injuries
- Bleaching of discolored dentin and enamel of teeth
- Retreatment of teeth previously treated endodontically
- Treatment procedures related to coronal restoration by means of post and/or cores involving the root canal space
- Placement of osseo-integrated implants and guided tissue regeneration where treatment relates to concurrent endodontic treatment

## **PRACTITIONER QUALIFICATIONS**

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### **A. Education**

It is understood that dentists who have graduated from accredited institutions and are licensed to practise in Canada have basic knowledge and experience regarding endodontic philosophy and treatment. Despite similar education, however, variations exist in the levels of knowledge, competency, skill, experience, performance and attitude of dentists. In recognition of the above, treatment is expected to be within an acceptable range and to meet minimum standards as set out in these guidelines.

### **B. Professional Experience**

During the peer review process, a practitioner's professional experience (clinical practice, continuing education, etc.) may be considered to determine patterns of practice and their relevance to the current issue.

## **STANDARD OF CARE**

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These guidelines are designed to describe the clinical quality and professional performance of a procedure without regard to the practitioner being a general dentist or specialist. Dental practitioners are encouraged to provide endodontic treatment consistent with their education, clinical experience and contemporary standards. The standard of care for various services may change with time and it is the responsibility of practitioners to be aware of such changes for those procedures they perform.

The practitioner, when confronted with a case beyond his/her capabilities, has the following options:

- Discuss risks and limitations with patient, making sure that the information is understood before patient is asked to give an informed consent
- Refer patient for consultation and/or treatment
- Upgrade skill to meet the standard of care

Endodontic treatment procedures undertaken should be of such quality that predictable and favorable results will routinely occur. Due consideration must always be given to various treatment modalities used by different practitioners. Patients should be cognizant that any treatment modality, however acceptable, may not achieve an acceptable treatment outcome in each and every case. There are many other factors, extrinsic and intrinsic, biological and psychological, that may preclude a successful result. Some of these factors are as follows:

- Pre-existing state of the patient's medical and dental condition
- Patient cooperation at the time dental care is rendered and in following suggested standards of home care (oral hygiene, prescribed medications, etc.)
- Patient's compliance with appointments needed for maintenance of care rendered
- Complications occurring during the procedure which are recognized risks of the dental care being performed

Any departures from expected outcomes should be recorded on the patient chart at the time of service and patients should be advised of compromised results as soon as the dentist is sure of the facts. In these circumstances, all information presented to the patient must be documented.

## QUALIFYING WORDS AND DEFINITIONS

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<b>Standard:</b>	...“applies to a rule, principle, ideal, pattern or measure generally accepted for use as a basis of comparison in determining quality, value, quantity, social or moral or intellectual level of something; something used to measure or judge a person or thing; of a useable or serviceable grade or quality; not of good or fine quality” ( <i>Gage Canadian Dictionary</i> )  ...“sound and useable but not of top quality; regularly and widely used, a minimum of necessities held essential to maintaining a person or group in customary or proper status or circumstances” ( <i>Webster’s Collegiate Dictionary</i> )  ...“of average but acceptable quality, a degree or level of requirement, excellence or attainment; commonly used and accepted as an authority” ( <i>American Heritage Dictionary</i> )
<b>Standard of Care:</b>	... “that (care) which a reasonable and prudent practitioner would do under the same or similar circumstances” ( <i>Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, &amp; Endodontics</i> . Selbst, Alan. June 1997)
<b>Must/shall:</b>	Indicates imperative need and/or duty; an indispensable item; mandatory
<b>Should:</b>	Indicates the recommended manner to obtain the standard; highly desirable
<b>May/could:</b>	Indicates a suggested alternative is discretionary
<b>Appropriate/pertinent/satisfactory:</b>	Indicates professional judgment is expected

## **SECTION II: TREATMENT CLASSIFICATION (Degrees of Difficulty and Risk)**

There are many factors that influence degrees of difficulty and risk of endodontic treatment. Recognition of these factors prior to the initiation of treatment helps patients and practitioners to understand the complexities that may be involved in individual cases.

Since 1995, Canadian endodontic programs have taught students how to determine degrees of difficulty and risk, using a comprehensive pre-treatment case assessment system. These protocols have proved to be valuable, both for teaching and instilling clinical judgment. They are becoming recognized as user-friendly tools which can help practitioners record data and make a determination of risk assessment quickly and easily. Several forms for this assessment have been developed (refer to References), including the following which is an example of one of the versions used in Canada.

### **CASE CLASSIFICATION ACCORDING TO DEGREES OF DIFFICULTY AND RISK**

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*Note: This form is shown on the next page. Full-size copies of the form for practice use are included in both English and French at the end of the document.*

- A. Contributing factors are classified into three groups: patient considerations, tooth considerations, and additional factors.
- B. Subcriteria for each category are defined and divided into three risk levels: average, high and very high.
- C. A relative weight in terms of units is assigned for each level of risk: average (1 unit/item), high (2 units/item), and very high (5 units/item).
- D. The sum of the units is used to classify the overall case on the following scale:

Class 1: Average Risk (15-17 units)

Indicates that the preoperative condition is of average or routine complexity. An experienced practitioner should attain a predictable treatment outcome.

Class 2: High Risk (between 18-25 units)

Indicates that the preoperative condition is complicated. Achieving a predictable treatment outcome will be difficult for an experienced practitioner.

Class 3: Very High Risk (above 25 units)

Indicates that the preoperative condition is exceptionally complicated. Achieving a predictable outcome will be challenging for even the most highly skilled practitioner.

If all the ratings fall in the average risk category, the practitioner should feel confident treating the tooth if he/she has experience with the procedure. It is expected that a person graduating from dental school would feel comfortable at this level. A combination of one or more ratings in the high risk category, or a single rating in the very high risk category may be the basis for consultation with a specialist, depending on the practitioner's level of experience with the particular risk(s).



## SECTION III: TREATMENT PROCEDURES

The profusion of information regarding techniques, materials and treatment philosophies is a challenge to dental practitioners, patients, governing bodies and other interested parties making decisions about the appropriateness and/or quality of endodontic care. This section provides current information regarding endodontic procedures and expectations of treatment rendered. It follows the format of the American Association of Endodontists “Appropriateness of Care and Quality Assurance Guidelines” which address the following:

- Definition or description of treatment
- Appropriateness of treatment
- Objectives of treatment, with objective defined as “the goals that the planned, undertaken, or discussed procedures are intended to achieve”

### CONSIDERATIONS

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- For dental therapeutics, materials, instruments and equipment, the CAE recognizes and follows the policies of Health Canada as stated in the Food and Drugs Act, Medical Devices Regulations.
- Infection control is beyond the scope of this document and it is recommended that practitioners adhere to the guidelines of the Canadian Dental Association and/or respective provincial bodies.
- The principles of compiling, reviewing and respecting the information in a health history must be adhered to.
- All non-surgical endodontic procedures should be performed in an aseptic environment under rubber dam isolation.
- Root canal obturation materials must be proven to be biocompatible. For example, the use of paraformaldehyde containing materials is below the standard of care for endodontic treatment.

### ENDODONTIC EXAMINATION

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Endodontics is a discipline unto itself and yet is part of the whole concept in the provision of dental treatment. Therefore, many tests, diagnostic applications, and treatments specific to endodontics are utilized. A proper medical and dental history with current clinical and radiographic examination provides basic information. The clinical situation and circumstances will dictate if any or all of the following may be indicated during a routine examination.

#### A. Patient’s Chief Complaint

Onset, initiating factors, duration, location, radiation, severity, description of pain and progress of symptoms.

#### B. Vitality Tests

Thermal tests (hot and/or cold), electric pulp tests, anaesthetic tests, cavity tests.

**C. Bacteriological Tests**

Culturing and sensitivity tests.

**D. Periodontal Evaluation**

Percussion and palpation tests, periodontal probing, assessment of tooth mobility, and soft tissue color, contour and texture.

**E. Status of Teeth**

Occlusal discrepancies, transillumination and dyes to detect fractures, use of magnification, pressure applied to individual cusps in apical and/or lateral directions, types of restorations, lack of interproximal contact, abutments, and physical description of tooth and adjacent teeth when appropriate.

**F. Radiographic Examination**

More than one radiograph (several periapical and/or bitewing radiographs) may be required to enhance the understanding of tooth morphology and anatomy, periodontal status, adequacies of previous endodontic treatment, pathologies entities (resorptive defects, etc.). Various forms of radiographic assessment may be required in appropriate situations to develop a radiographic profile. This may include but not be limited to a Full mouth Series, Panorex, Occlusal views.

**G. Recall Examination**

On occasion it may be prudent to recall patients at various time intervals to compare various aspects of the examination data and/or treatment rendered in order to establish an accurate diagnosis or to assess healing.

## **DIAGNOSIS AND TREATMENT PLAN**

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**A. Endodontic Diagnosis**

Based on the patient's history and clinical and radiographic examination information, a diagnosis of the patient's dental condition is rendered. At times clinicians will not be able to make a definitive diagnosis of the pathologic condition and a differential diagnosis would then be appropriate until a definitive diagnosis is made with further testing, biopsy results and/or referral reports. In all cases the terms used to record the diagnosis should attempt to reflect the pathologic conditions as identified by the practitioner. It is appropriate for clinicians to record the etiology of the pathosis when possible.

**B. Endodontic Treatment Plan**

Treatment is based on a thorough understanding and interpretation of all diagnostic information including patient history, clinical and radiographic data. Treatment planning should consider the strategic importance of the tooth/teeth being considered. Other factors to consider are: treatment classification; periodontal status; structural integrity and restorability of the tooth; prognosis; patient factors such as attitude, motivation, anxiety, limited jaw opening, gag reflex; and the administration of antibiotics, analgesics and/or anti-inflammatory agents when appropriate.

## **INFORMED CONSENT**

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Obtaining informed consent is a pre-requisite before initiating endodontic therapy. In general, the patient must be informed about the degree of difficulty of the recommended procedure(s), the likelihood of treatment meeting the standard of care, and the option for referral. The elements of informed consent must be explained in terms that can be understood by the patient and include but are not limited to the following:

- Diagnosis
- Treatment options including no treatment
- Reason for recommended treatment
- Prognosis and prospects for success (with and without recommended therapy)
- Nature of care, treatment and/or procedures
- Materials, special or unusual risks or possible complications associated with the proposed treatment including potential for failure and serious effects which may result from procedures performed
- Recommendations for treatment to be performed by other dental practitioners or other health care professionals i.e. referral
- Estimated cost of treatment and advice on necessary restorative follow-up
- Available alternative treatment options for comprehensive care and their costs

The patient should be aware that alteration to the original treatment plan may be required due to changing clinical conditions. Once informed, the patient has the option of:

- Not accepting treatment
- Requesting referral
- Accepting treatment by the practitioner recognizing the limitations

There may be situations wherein the patient refuses to accept part or all of the recommended treatment plan. There may also be occasions where the patient requests a form of treatment that, in the best judgment of the dentist, would be neglectful or injurious to the patient's dental function and overall dental health. Upon informing the patient of the diagnosis, recommended treatment plan, prognosis and risks, the dentist's responsibility is discharged. A practitioner cannot be forced to perform dental services that the practitioner deems contrary to the patient's overall health. The first principle of health care, "To do no harm", should guide a dentist in these situations. In short, the right of the patient to accept treatment is balanced by the right of the dentist to refuse treatment when both parties understand the rational consequences of their actions.

## **ENDODONTIC TREATMENT RECORDS**

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All information gathered during treatment should be recorded, including pertinent patient commentaries or complaints before, during and after treatment. Preoperative, working and postoperative radiographs should be dated and kept on file. In instances where dentists did not use radiographs, the reasons should be recorded (e.g. utilization of an apex locator, difficulty in obtaining radiographs). Endodontic recalls are a valuable aspect of endodontic care. Patients should be encouraged to return at appropriate recall intervals in order to evaluate the results of clinical procedures.

## **ENDODONTIC ADJUNCTIVE PROCEDURES**

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### **A. Crown Lengthening / Forced Eruption**

#### 1. Procedure

These procedures provide for an adequate biologic width which will enhance restoration of the tooth and result in healthy soft tissues. Considerations which dictate the type of procedure to be utilized are aesthetics, crown/root ratios, and location of tooth in the arch

#### 2. Appropriateness

- a. Inadequate clinical crown length to allow restorative success
- b. Tooth structure lost at or slightly apical to the crestal bone level
- c. Final crown-root ratio will be favorable

#### 3. Objective

- a. Adequate biologic width achieved
- b. Integrity of root maintained
- c. Integrity of adjacent teeth maintained

### **B. Isolation / Cuspal Protection**

#### 1. Procedure

Placement of a restoration or a band (stainless steel/copper) may be necessary to provide support of the coronal structure and isolation of the working environment. Other means of protecting a tooth from fracture prior to endodontic treatment being performed include removal of plunger cusps of opposing teeth and reduction of cuspal interferences.

#### 2. Appropriateness

- a. Teeth with large restorations
- b. Opposing teeth with plunger cusps
- c. Cuspal interferences
- d. Coronal tooth structure weakened by endodontic access opening
- e. Visible or suspected crown fractures
- f. Broken down teeth which would be difficult to isolate with rubber dam

#### 3. Objective

- a. Remaining coronal structure supported and/or isolated
- b. Plunger cusps and/or cuspal interferences removed
- c. Integrity of root maintained
- d. Integrity of adjacent teeth maintained
- e. Rubber dam placement made possible to provide sterile dry field

**C. Post, Post/Core Removal**

1. Procedure

A post or post and core restoration is removed to facilitate endodontic treatment.
2. Appropriateness
  - a. Loss of adequate retention
  - b. Loss of underlying root canal seal and/or loss of coronal seal
  - c. Recurrent caries
  - d. Fracture of the post, core, or both
  - e. Access to root canal system required for retreatment or treatment
3. Objective
  - a. Access to root canal system obtained
  - b. Integrity of root and root canal system maintained
  - c. Integrity of adjacent teeth maintained

**VITAL PULP THERAPY**

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**A. Protective Base**

1. Procedure

A protective filling material is placed at the base of a deep preparation to act as a protective barrier to minimize further injury and promote possible healing and repair of the pulp.
2. Appropriateness
  - a. Deep cavity
  - b. Pulp tests within normal limits
  - c. Asymptomatic or symptoms compatible with reversible pulpitis
  - d. No evidence of periapical pathosis
3. Objective
  - a. Clinical signs and/or symptoms absent or eliminated
  - b. Pulpal vitality maintained
  - c. Integrity of root and root canal system maintained
  - d. Radiographic evidence of normal periradicular tissues present

## **B. Indirect Pulp Capping**

### 1. Procedure

A protective dressing or cement is placed over a layer of remaining carious dentin to act as a protective barrier to minimize further injury and permit possible healing and repair of the pulp in primary and permanent teeth.

### 2. Appropriateness

- a. Carious lesion near a viable pulp
- b. Asymptomatic or symptoms compatible with reversible pulpitis
- c. Removal of the remaining dentin might expose pulp
- d. No evidence of periapical pathosis (in mature teeth)

### 3. Objective

- a. Clinical signs and/or symptoms absent or eliminated
- b. Pulpal vitality maintained
- c. Integrity of root and root canal system maintained
- d. Radiographic evidence of normal periradicular tissues present

## **C. Direct Pulp Capping**

### 1. Procedure

A pulp capping agent is placed directly onto the surface of vital pulp tissue at the site of the pulpal exposure. All of the considerations listed under appropriateness must be evaluated and/or performed for this procedure to be successful. Consideration should also be given to the extensiveness of the immediately planned restoration. Direct pulp capping is not deemed to be a definitive procedure.

### 2. Appropriateness

- a. Exposure of a viable pulp in an asymptomatic tooth or one with symptoms compatible with reversible pulpitis
- b. Bleeding and oozing of serum or plasma controlled at the exposure site
- c. Exposure permits the pulp capping agent to make direct contact with the vital pulp
- d. Vital tissue allows for the effect of the pulp capping agent
- e. Proper peripheral seal can be maintained
- f. No evidence of periapical pathosis

### 3. Objective

- a. Clinical signs and/or symptoms absent or eliminated
- b. Pulpal vitality maintained
- c. Integrity of root and root canal system maintained
- d. Radiographic evidence of normal periradicular tissues present

**D. Pulpotomy / Apexogenesis**

1. Procedure

Pulpotomy is the surgical amputation of the coronal portion of the vital pulp tissue. A protective filling material which includes a pulp capping agent, a base and a suitable filling material is placed in the space created to preserve the vitality and function of the remaining radicular portion of the pulp.

2. Appropriateness

- a. Exposed vital pulps of primary teeth
- b. Emergency procedure until root canal treatment can be accomplished
- c. Interim procedure for permanent teeth with immature root formation (apexogenesis)

3. Objective

- a. Clinical signs and/or symptoms absent or eliminated
- b. Pulp vitality maintained
- c. Tooth and tissues restored to health and function
- d. Radiographic evidence of continued root/root canal development present
- e. Radiographic evidence of normal periradicular tissues present

**NON-SURGICAL ENDODONTICS**

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**A. Primary Teeth**

1. Procedure

Endodontic therapy involves chemical and mechanical treatment of the root canal system to eliminate pulpal and periradicular disease, and to promote healing and repair of the periradicular tissues. When a permanent successor tooth is evident, the debridement and shaping of the root canal system is followed by obturation with a resorbable filling material. When no permanent successor tooth is present, the canals of the primary tooth are obturated with an acceptable non-resorbable endodontic filling material.

All canals are shaped, cleansed, and disinfected using an aseptic technique. Proper access is dictated by the size and shape of the pulp chamber as well as by the tooth position in the arch. In all cases, the entire roof of the pulp chamber must be removed. Debridement, enlargement and disinfection of all canals is accomplished under rubber dam isolation with appropriate canal length

determination. Obturation should fill the root canal system in three dimensions and should be as close to the cemento-dentinal junction as possible.

2. Appropriateness

- a. Irreversible pulpitis
- b. Necrotic pulp with or without evidence of periapical disease

Primary teeth with insufficient root structure, internal resorption, furcal perforation, or extensive periapical pathosis which may jeopardize the permanent successor are not suitable for non-surgical endodontic treatment due to poor prognosis and should be extracted.

3. Objective

- a. Clinical signs and/or symptoms absent or eliminated
- b. Tooth and periradicular tissues restored to health and function
- c. Root filling materials and respective root(s) resorbed where a permanent tooth exists
- d. Injury to permanent successor tooth avoided
- e. Radiographic evidence of root and periradicular tissue integrity achieved

**B. Permanent Teeth**

1. Procedure

Endodontic therapy for permanent teeth involves chemical and mechanical treatment, on a biologic basis, of the root canal system to eliminate pulpal disease and to promote healing and repair of the periradicular tissues. The debridement and shaping of the root canal system is followed by obturation with a biologically acceptable non-resorbable root canal filling material.

All canals are shaped, cleansed and disinfected using an aseptic technique. Proper access is dictated by the size and shape of the pulp chamber as well as by the tooth position in the arch. Debridement, enlargement, disinfection and obturation of all canals are accomplished under rubber dam isolation, with appropriate canal length determination, and with microbial culture and sensitivity determinations where indicated. A non-resorbable material, which has been demonstrated to be biologically acceptable, is used to obturate the root canal system in three dimensions and as close to the cemento-dentinal junction as possible. Root canal sealers are used in conjunction with the core filling material to establish an adequate seal.

It is recognized that root canal instruments will occasionally fail due to circumstances which may be beyond the control of the practitioner. Attempts should be made to retrieve or bypass the obstruction. If the instrument is not retrievable, the remainder of the canal should be obturated and the practitioner should use discretion to determine the need for further treatment. The patient should be informed of the obstruction and all information should be documented on the patient's chart. Instrument separation does not imply substandard care.

2. Appropriateness

- a. Atrophic (stressed pulps) and teeth where the pulp would be compromised during restorative or periodontal procedures (i.e., overdenture abutments, malposed teeth, or post insertion)
- b. Irreversible pulpitis

- c. Necrotic pulp with or without evidence of radicular pathosis
  - d. Traumatically displaced or avulsed teeth
  - e. Active resorptive defects
  - f. Cracked or fractured teeth with pulpal involvement which can reasonably be expected to have satisfactory periodontal support
3. Objective
- a. Clinical signs and/or symptoms absent or eliminated
  - b. Tooth and periradicular tissues restored to health and function
  - c. Radiographic evidence of root and periradicular tissue integrity present
  - d. Radiographic evidence of a well sealed root canal system present

**C. Apexification and Recalcification Procedures**

1. Procedure

Apexification is a method of inducing apical closure or apical development of the root or roots of an incompletely formed permanent tooth in which the pulp is irreversibly damaged or necrotic. Recalcification procedures are methods of treatment of resorptions, perforations, root fractures, and sequelae of traumatic injuries to induce biologic, calcific root repair. Both procedures may involve several treatments over an extended period of time. Calcium hydroxide compounds are most commonly used for this purpose. However new materials such as SEBA and MTA are also of use. When closure or repair of the root is complete, endodontic therapy must be performed.

2. Appropriateness

Apexification and recalcification procedures performed in conjunction with non-surgical endodontics are appropriate in the following clinical conditions:

- a. Incomplete apical closure
- b. Prevention or arrest of internal or external root resorption
- c. Perforations that do not communicate with the oral cavity
- d. Root fractures that do not communicate with the oral cavity

3. Objective

- a. Clinical signs and/or symptoms absent or eliminated
- b. Tooth and periradicular tissues restored to health and function
- c. Radiographic evidence of apical closure or root repair present
- d. Radiographic evidence of periradicular tissue integrity present

**D. Endodontic Retreatment**

1. Procedure

Non-surgical endodontic retreatment is preferred to surgical retrofilling (root end filling) in teeth where the previous root filling is suspect, and the root canal system is accessible and amenable to

reinstrumentation and obturation. Retreatment procedures involve the removal of the previously placed obturation materials to facilitate procedures normally used in conventional endodontic treatment (i.e., debridement of the canals and reinsertion of an acceptable obturation material). Further efforts may be required to remove posts or correct conditions possibly created during the initial treatment such as radicular defects, ledges, canal blockages, separated instruments, and/or perforations. Retreatment may need to be augmented by other treatment modalities such as apexification or surgical intervention.

Retreatment cases may vary greatly in complexity requiring greater effort, time and skill, and should be undertaken with due regard to the ability and experience of the practitioner.

2. Appropriateness
  - a. Unresolved periradicular pathosis and/or persistent symptoms associated with a previously endodontically treated tooth
  - b. Inadequacy of the previous endodontic treatment
  - c. Anticipated restorative or prosthetic procedures which will adversely compromise any pre-existing root canal treatment and possibly predispose the periradicular tissues to pathosis
  - d. Anticipated restorative or prosthetic procedures on a tooth with root canal treatment of questionable quality
  - e. Loss of coronal seal in the absence of periapical pathosis
3. Objective
  - a. Clinical signs and/or symptoms absent or eliminated
  - b. Tooth and tissues restored to health and function
  - c. Integrity of root and root canal system maintained
  - d. Radiographic evidence of periradicular tissue integrity present

## **SURGICAL ENDODONTICS**

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### **A. Incision and Drainage / Cortical Trephination**

1. Procedure

Incision and drainage of the soft tissue is a surgical procedure that involves lancing an area of fluctuance or penetrating the mucous membrane through to the periosteum. Drainage through hard tissues involves penetration of the cortical plate of bone in the periradicular area. The procedure may include the placement of a small drainage device.
2. Appropriateness
  - a. Pathway for drainage of soft tissue cellulitis or fluctuance
  - b. Relief of pain caused by accumulation of fluid beneath the periosteum and/or within the alveolar bone
  - c. Collection of samples for bacteriologic analysis
3. Objective
  - a. Clinical signs and/or symptoms absent or eliminated

- b. Soft tissues restored to health and function
- c. Integrity of root and root canal system maintained

**B. Periradicular Curettage**

1. Procedure

Periradicular curettage is a surgical procedure which consists of the removal of soft tissue and/or foreign material around the root without the removal of the root end.

2. Appropriateness

Periradicular curettage is appropriate in the following clinical situations, providing orthograde root canal treatment is deemed acceptable:

- a. Persistent sinus tract or periradicular inflammation
- b. Persistent periradicular lesion which has not decreased in size one to two years after the completion of root canal treatment
- c. Periradicular lesion which is enlarging after acceptable root canal treatment, as noted on follow-up radiographs
- d. Biopsy or surgical exploration is deemed necessary
- e. Foreign material is present in the periradicular region and symptoms exist
- f. Patient choice as an alternative to retreatment

3. Objective

- a. Clinical signs and/or symptoms absent or eliminated
- b. Tooth and periradicular tissues restored to health and function
- c. Integrity of root maintained
- d. Radiographic evidence of periradicular tissue integrity present

**C. Apicoectomy and Periradicular Curettage**

1. Procedure

Apicoectomy is a surgical procedure in which a portion of the root apex is removed to evaluate or improve the apical seal of the root canal filling, to facilitate the access for creation of a root end preparation for a retrofilling (root end filling), to allow for curettage behind the root, or to remove a portion of the root which cannot be obturated with a root canal filling material.

2. Appropriateness

An apicoectomy surgical procedure in conjunction with periradicular curettage is appropriate in the following clinical conditions, providing the root canal system is obturated in three dimensions:

- a. Periradicular lesion that is enlarging as noted on follow-up radiographs

- b. Persistent periradicular lesion which has not decreased in size one to two years after the completion of root canal treatment
  - c. Persistent sinus tract
  - d. Persistent symptoms
  - e. Patient choice as an alternative to retreatment
3. Objective
- a. Clinical signs and/or symptoms absent or eliminated
  - b. Tooth and periradicular tissues restored to health and function
  - c. Integrity of root and root canal system maintained
  - d. Radiographic evidence of periradicular tissue integrity present

**D. Apicoectomy, Periradicular Curettage, and Retrofilling (Root End Filling)**

1. Procedure

This procedure includes removal of a segment of the tooth root, debridement of the radicular region, and placement of a filling material in a prepared cavity preparation in the root end.

2. Appropriateness

An apicoectomy procedure in conjunction with periradicular curettage and retrofilling is appropriate in the following clinical conditions where there is an inadequate seal:

- a. Marked apical or lateral overextension of the root canal filling accompanied by inflammation and/or infection (overextension implies there is material extruding beyond the confines of the root canal system and there is a lack of an adequate seal)
- b. Apical curettage revealed an inadequate seal of a previously filled root canal
- c. Unfilled apical portion of the root canal system that is not accessible from a coronal approach
- d. Root cannot be retreated non-surgically because of an obstruction such as a post or a separated instrument
- e. Patient choice as an alternative to retreatment

3. Objective

- a. Clinical signs and/or symptoms absent or eliminated
- b. Tooth and periradicular tissues restored to health and function
- c. Integrity of root and root canal system maintained
- d. Retrofilling material confined to the root
- e. Root canal system sealed by retrofilling material
- f. Radiographic evidence of normal periradicular tissues present

**E. Root Repair**

1. Procedure

Root repair involves correcting a defect in the root surface and repairing that defect with a biologically acceptable filling material.

2. Appropriateness

- a. Repair of root perforations
- b. Repair of resorptive defects

3. Objective

- a. Clinical signs and/or symptoms absent or eliminated
- b. Filling material confined to root
- c. Root canal system sealed by filling material
- d. Radiographic evidence of normal periradicular tissues present

**F. Biopsy**

1. Procedure

A biopsy is the surgical removal of a soft and/or hard tissue specimen for histologic examination.

2. Appropriateness

- a. Tissue or foreign material is removed at or near the periradicular surgical site
- b. Unusual tissues are noted on clinical or radiographic examination
- c. Medical history indicates the merits of biopsy

3. Objective

- a. Diagnosis established and/or confirmed by histologic examination of tissues or foreign materials

**G. Tooth Sectioning**

1. Procedure

Tooth sectioning is a surgical procedure that involves separating a portion of the crown and one or more of the attached roots of a multi-rooted tooth. One or more of the separated segments are removed and the retained segments are restored. Sometimes all segments are retained and restored. Tooth sectioning requires root canal treatment on all retained segments. It is preferable to complete the root canal procedure prior to the tooth sectioning procedure.

2. Appropriateness

- a. Class III furcation periodontal defects whereby the maintenance therapy can be enhanced without compromising the critical support of the existing root
- b. Untreatable infrabony defect of one root of a multi-rooted tooth
- c. Fracture of a crown extending into the furcation

- d. Vertical root fracture confined to the root to be separated and removed
  - e. Carious or resorptive root defects that are inoperable or uncorrectable
  - f. Persistent sinus tract, recurrent periradicular pathosis, or periradicular inflammation where non-surgical treatment or periradicular surgery is not possible or has not been successful, and the problem is confined to one root
3. Objective
- a. Clinical signs and/or symptoms absent or eliminated
  - b. Tooth and tissues restored to health and function
  - c. Opening to pulp chamber and root canal spaces sealed

## **H. Root Amputation**

### 1. Procedure

Root amputation is a surgical procedure that involves removal of a root of a multi-rooted tooth without the removal of the corresponding portion of the clinical crown. Root amputation requires root canal treatment on all retained segments. It is preferable to complete the root canal procedure prior to the amputation procedure.

### 2. Appropriateness

- a. Class III furcation periodontal defects whereby the maintenance therapy can be enhanced without compromising the critical support of the existing root
- b. Untreatable infrabony defect of one root of a multi-rooted tooth
- c. Fracture of a root exists which does not involve the crown
- d. Carious or resorptive root defects that are inoperable or uncorrectable
- e. Persistent sinus tract, recurrent periradicular pathosis, or periradicular inflammation where non-surgical treatment or periradicular surgery is not possible or has not been successful, and the problem is confined to one root
- f. If one of the above conditions exists and root amputation will preserve an existing fixed restoration

### 3. Objective

- a. Clinical signs and/or symptoms absent or eliminated
- b. Opening to pulp chamber and root canal spaces sealed
- c. Tooth and tissues restored to health and function
- d. Radiographic evidence of periradicular tissue integrity present

## **I. Intentional Replantation**

### 1. Procedure

Intentional replantation involves the clinical removal of a tooth from its alveolar socket, apicoectomy, and retrofill (root end sealing of the canals or lateral root defect with biologically compatible filling material), and reinsertion of the tooth into its alveolar socket. Stabilization of the replanted tooth may or may not be necessary. These teeth should be periodically re-examined following replantation due to the increased likelihood of resorption specific to this procedure.

2. Appropriateness
  - a. Persistent sinus tract, symptoms, or recurrent periradicular pathosis where non-surgical treatment has been unsuccessful
  - b. Non-surgical treatment is not possible and periapical surgery involves a high degree of risk to adjacent anatomical structures such as the mandibular nerve
  - c. Anatomical configuration of the tooth presents a reasonable opportunity to remove the tooth intact and replant it in the alveolar socket
  - d. Previous surgical treatment has failed
  - e. Preoperative periodontal status is acceptable
3. Objective
  - a. Clinical signs and/or symptoms absent or eliminated
  - b. Tooth and tissues restored to health and function
  - c. Radiographic evidence of periradicular tissue integrity achieved
  - d. Radiographic evidence of a well sealed root canal system present

## **RESTORATION OF ENDODONTICALLY TREATED TEETH**

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### **A. Posts**

1. Procedure

The post is used after placement of an acceptable root canal filling material, which produces a three dimensional seal of the root canal system. A post space is created in the root canal by removal of an adequate amount of the root filling material. Sufficient root filling material must be left in situ to avoid disturbing both lateral canal and apical seals. Posts are either prefabricated or custom made in a variety of materials, may be either actively or passively retained, and are used in conjunction with an accepted cementing medium. The prepared space should then be completely filled by the post and cementing medium.
2. Appropriateness
  - a. Remaining tooth structure is inadequate for retention of the final restoration
  - b. As a direct retainer for a final restoration in certain instances
3. Objective
  - a. Prepared space completely filled by post and cementing medium
  - b. Enhanced retention of an overlying restoration

- c. Integrity of the root and root canal system maintained
- d. Minimal radicular dentin removed

**B. Cores**

1. Procedure

Core restorations are used to provide needed resistance, retention and geometric form to the compromised coronal aspect of a tooth. The core superstructure is constructed with a variety of accepted materials, customarily cast metals, amalgam or composites. Cores may or may not be used in conjunction with posts.

2. Appropriateness

- a. Compromised coronal aspect of a tooth
- b. Change the coronal shape of the tooth to facilitate fixed prosthesis placement

3. Objective

- a. Core adequately retained
- b. Entire pulp chamber occupied by core
- c. Integrity of the pulp chamber floor and radicular preparation walls maintained

**C. Anterior Teeth**

1. Appropriateness

Restoration of an endodontically treated anterior tooth is appropriate based upon the following statements regarding the clinical condition of the tooth.

- a. An endodontically treated anterior tooth requiring restoration of only the endodontic access opening where the mesial and distal marginal ridges, the incisal edge, and the cingulum are otherwise intact, can be restored with an acceptable restorative material alone
- b. A post may be considered in the anterior tooth
  - i. Where there is insufficient tooth structure to retain a core and a post is advised
  - ii. Where the root canal anatomy has a narrow mesial-distal dimension or an hourglass shape, and a cast post is advised to minimize root perforations

**D. Posterior Teeth**

1. Appropriateness

Due to the necessary loss of tooth structure and the inherent compromised structural integrity following endodontic treatment, and due to the occlusal stresses on posterior teeth, it is recommended that all endodontically treated posterior teeth be considered for full cuspal protection.

*Qualifying Statement:*

An endodontically treated posterior tooth without extensive loss of tooth structure may be restored without full coverage if it is subjected to minimal occlusal force.

## **BLEACHING**

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### **A. Internal Bleaching**

#### 1. Procedure

The internal bleaching process is intended to achieve the reduction of discoloration of a pulpless tooth. The degree of restoration to a normal color shade and return of the coronal translucency is dependent upon the cause, severity and duration of the discoloration. Internal bleaching involves the use of a suitable oxidizing agent placed within the pulp chamber and coronal to the level of the gingival attachment of the involved tooth. Care should be taken to insure the coronal seal of the root canal system is enhanced with a base covering the gutta percha.

#### 2. Appropriateness

- a. Tooth has been previously endodontically treated
- b. Previously completed root canal procedure is adequate and appears to have a well sealed canal space vertically and laterally
- c. Tooth is clinically discolored from an internal or intrinsic source

#### 3. Objective

- a. Degree of discoloration reduced
- b. Degree of translucency improved
- c. Radiographic evidence of root integrity present

### **B. External Bleaching**

#### 1. Procedure

The external bleaching process is intended to reduce the degree of discoloration. External bleaching involves acid conditioning of the enamel surface of the involved tooth along with various externally applied oxidizing agents to reduce the discoloration of the affected tooth.

#### 2. Appropriateness

- a. Tooth has a vital pulp
- b. Tooth is discolored
- c. Tooth has intrinsic stains such as fluorosis or tetracycline staining
- d. As a supplement to previous bleaching of a non-vital tooth

#### 3. Objective

- a. Degree of discoloration reduced
- b. Clinical signs and/or symptoms absent
- c. Integrity of tooth and tissues unaffected by treatment

- d. Radiographic evidence of normal periradicular tissues present

## **TRAUMA**

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Traumatic injuries to the teeth and periodontium dictate that various treatment modalities be understood and that a multidisciplinary approach be considered. The pulps of traumatically injured teeth and/or the cells of the periodontal ligament may undergo adverse changes with time. Teeth which have been affected often require endodontic treatment which is not necessarily routine. Thus it is appropriate to include this section in this document. The format for this section differs from the others and includes a description of the traumatic injury sustained as well as the appropriate treatment modalities.

This document addresses injuries to the permanent dentition and the primary dentition where it is suitable. However, it is important to note the extent of complications to permanent teeth following injury to the primary teeth cannot be fully evaluated until complete eruption of all permanent teeth, a problem which should be considered during the assessment of treatment outcomes.

Treatment planning involves a recognition of a classification of dental injuries, an insight into the principles of healing and an understanding of complications arising from dental injuries. The World Health Organization (WHO) adopted a classification of dental injuries in its “Application of International Classification of Diseases to Dentistry and Stomatology”. Drs. Andreasen and Andreasen defined and modified certain trauma entities not included in the WHO system. The following classification includes injuries to the teeth, supporting structures, gingiva and oral mucosa, and is based on therapeutic and prognostic considerations.

### **A. Injuries Involving the Tooth and Periodontium**

#### **1. Concussion and Subluxation**

##### **a. Description**

Concussion and subluxation describe injuries sustained by the tooth and periodontium in which there is no obvious tissue damage. In concussion injuries the tooth is stable in its socket whereas subluxation implies abnormal loosening. In both instances the tooth is in its socket, the pulp tests are vital, the soft tissues are normal in color, contour and texture, and there is no radiographic evidence of pathosis.

##### **b. Treatment**

Teeth affected by concussion or subluxation injuries require appropriate clinical and radiographic examinations which will serve as baseline data for future comparison. Of importance are vitality tests, mobility and percussion tests, tooth color determination, presence of craze lines (infracture lines), and recording of periodontal status. Recall at regular intervals to determine untoward changes is required. Treatment is aimed at preserving tooth vitality by monitoring any changes to the pulp, root and periodontium. Oftentimes there is no need for the practitioner to perform any active treatment. However, there may be need for semi-rigid stabilization to promote periodontal ligament re-organization.

#### **2. Extrusive, Lateral, and Intrusive Luxation**

##### **a. Description**

Luxation injuries refer to the displacement of teeth from their normal alignment. Teeth suffering luxation injuries can be displaced in various directions depending on the direction of the traumatically applied force.

Intrusive luxation is a central dislocation of the tooth into the alveolar bone which is accompanied by comminution of the alveolar socket. Extrusive luxation is partial displacement of the tooth out of its socket. Lateral luxation refers to displacement in a direction other than axially. This may be accompanied by fracture of the alveolar socket.

b. Treatment

Treatment includes tooth repositioning and stabilization. The teeth are to be aligned as well as possible within the dental arch to restore the dentition to the form present before the traumatic incident. Repositioning of the teeth (tooth) and stabilization should be instituted as soon as possible after the trauma. Stabilization should be performed with flexible (semi-rigid) materials as opposed to fixed techniques so that the function of the periodontal supporting apparatus is not compromised. Appropriate splinting time may be two to eight weeks and is governed by the degree of mobility.

Pulpal therapy should follow as clinical examination dictates. In cases of open apices, apexification or apexogenesis should be performed. With intrusive injuries, teeth with open apices may re-erupt spontaneously without active treatment whereas teeth with closed apices usually require surgical and/or orthodontic repositioning.

Primary tooth luxations can affect the permanent tooth in the way of enamel discoloration, crown/root dilacerations, or odontoma formation. There is controversy regarding if and when to reposition an intruded primary tooth.

c. Objective

- i. Clinical signs and/or symptoms absent or eliminated
- ii. Tooth and tissues repositioned and restored to health and function

3. Avulsion and Replantation

a. Description

Avulsion refers to the injury in which the tooth is totally displaced from its alveolus.

b. Treatment

Treatment includes replantation, stabilization, pulpectomy, placement of calcium hydroxide, and root canal filling.

c. Procedure

An acceptable treatment outcome is related to maintaining the tooth in a moist environment (e.g., milk, saliva, Hank's Balanced Salt Solution) during the extra-oral period, replanting the tooth as soon as possible, minimizing manipulation of the root, and splinting in position with a non-rigid appliance for approximately one week. The pulp should be removed in a mature tooth within two weeks of the trauma and calcium hydroxide should be placed as an interim intracanal medicament. The calcium hydroxide may require replacement periodically and ultimately, if there is no apparent root resorption (as evidenced by radiographic examination), a permanent root filling material should be placed.

Teeth with immature apices may not require immediate pulpal extirpation and the placement of calcium hydroxide. These patients should be monitored weekly to detect early signs of pulpal infection and inflammatory resorption. When assured the pulp has degenerated, apexification procedures should be initiated.

Pretreatment and post-treatment radiographs are necessary. Radiographs should be taken at regular intervals for at least two years to determine if any resorptive changes have occurred which will dictate future treatment.

- d. Appropriateness
  - i. Tooth has been traumatically avulsed
  - ii. Root of the tooth is intact or sufficiently intact to allow for reattachment
  - iii. Sufficient alveolar bone remains for reattachment of the root
  - iv. No evidence of extensive or compromising periodontal disease
  - v. Tooth can be replaced in the socket within a reasonable period of time
- e. Objective
  - i. Clinical signs and/or symptoms absent or eliminated
  - ii. Tooth and tissues repositioned and restored to health and function
  - iii. Radiographic evidence of periradicular tissue integrity present
  - iv. Radiographic evidence of root canal therapy present

## **B. Injuries Involving the Crown and Root**

### **1. Crown Fractures: Uncomplicated and Complicated**

#### **a. Description**

Uncomplicated crown fractures are those confined to the calcific structure of the tooth and do not involve the pulp. Complicated crown fractures are those where the pulp is exposed.

#### **b. Appropriateness**

Restoration of these teeth should be instituted when the fractures are noted. Composite is the material of choice for anterior teeth. Enamel fractures may involve only disking of the tooth. Enamel and dentin fractures should include placement of a protective barrier over the dentin prior to restoring the fractured portion. When the pulps are involved, either a pulp cap or pulpotomy should be performed prior to restoring the tooth. In teeth with complicated crown fractures, root maturation, length of exposure time, sealability of the exposure, symptoms, tooth color and aesthetics are factors which will govern selection of appropriate treatment.

#### **c. Objective**

- i. Clinical signs and/or symptoms absent or eliminated
- ii. Pulp protected from external environment and pulpal vitality maintained. In immature permanent teeth, pulp vitality may be maintained to allow root development and apical closure.
- iii. Aesthetics restored
- iv. Function restored
- v. Radiographic evidence of root maturation present

vi. Radiographic evidence of normal periradicular tissues present

2. Crown / Root Fractures: Uncomplicated and Complicated

a. Description

These teeth have the enamel, dentin and cementum involved and the distinction in the two categories is related to pulpal involvement as described in 1(a) above.

b. Treatment

Treatment for these teeth varies depending upon the extent of the injury and is described above. Crown lengthening procedures or forced eruption may be required if the extent of the root fracture lies apical to the crestal bone level. Posts may be used to splint the coronal and apical segments of the tooth (intraradicular splint).

c. Objective

- i. Clinical signs and/or symptoms absent or eliminated
- ii. Pulp protected from external environment and pulpal vitality maintained
- iii. Fractured tooth segments removed where indicated
- iv. Aesthetics restored
- v. Function restored
- vi. Radiographic evidence of root maturation present where indicated
- vii. Radiographic evidence of normal periradicular tissues present
- viii. Root canal treatment performed where indicated

3. Root Fractures: Horizontal, Vertical, Oblique

a. Definition

Root fractures are evidenced radiographically by a radiolucent line which indicates the loss of tooth root integrity.

b. Treatment

Treatment includes reduction, fixation and stabilization. Horizontally or obliquely fractured roots can remain in situ for many years and provide a functioning tooth without pulpal degradation. Pulp tests are necessary to record baseline data. Radiographs are imperative. Two or more radiographs taken from different angles are often required to determine the extent of the fracture.

c. Procedure

Repositioning of root segments, reduction of the displaced fragments and immobilization are the rules which direct treatment. Stabilization should be performed with a rigid splint for at least twelve weeks. Endodontic treatment is only indicated if and when pulpal degeneration occurs. Often the coronal segment alone requires endodontic treatment while the apical segment retains normal functioning pulpal tissue. At times, both segments may require treatment.

Root fracture of primary teeth does not require splinting. If severe dislocation occurs, the coronal segment can be removed and the apical segment should be left in situ as normal physiologic resorption can be expected.

Recall and radiographic follow-up is a required part of the treatment regimen.

d. Objective

- i. Clinical signs and/or symptoms absent or eliminated
- ii. Environment created maintains integrity of tooth and periodontium
- iii. Radiographic evidence of healing present

## **SECTION IV: TREATMENT ASSESSMENT**

### **PURPOSE**

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The assurance of the quality of service rendered by a member of the dental profession is essential to the patient, the profession and the government. On occasion, this may involve an organized system of peer review or an independent assessment of treatment which allows dentists to determine without bias the quality of procedures undertaken.

This section provides information on endodontic treatment assessment including:

- Definitions and/or considerations
- Recommended protocols
- Standardized assessment guidelines

The intent of this section is to ensure that the evaluation process:

- Incorporates the various treatment philosophies of accredited teaching institutions
- Provides required information in a consistent manner
- Identifies problems and finds solutions
- Decreases reliance on personal experience and education of the examiner as the sole factor in assessment procedures
- Respects the rights of both patients and dental practitioners
- Demonstrates the profession's commitment to quality assurance and protection of the public

### **CONSIDERATIONS**

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Assessment of endodontic treatment includes a review of pertinent information gathered during clinical and radiographic examinations to determine if treatment rendered is acceptable, detrimental, reversible or irreversible. Although endodontic therapy involves treatment of a tooth or multiple teeth, evaluation of treatment performed must include assessment of the following:

#### **A. Objective of Treatment**

The overall objective of treatment may vary depending on the situation. If the objective was to treat the tooth with a good prognosis with the anticipation of long term retention, then the mode, method and scope of treatment rendered might differ from the case involving a tooth with a guarded or uncertain prognosis. In general terms, it is understood that the practitioner should do no harm, attempt to retain the tooth so that it serves a useful purpose, attempt to eliminate pathosis, and keep the patient free of symptoms.

## **B. Outcome of Treatment**

Treatment outcome relates to the process of change from the original condition. Outcome of treatment in endodontics involves and is governed by a multiplicity of factors. If treatment rendered follows the regimen provided in these guidelines, the majority of the population can be expected to have a successful result. However, clinical research papers report less than 100% success for endodontic treatment. Therefore it is unrealistic to expect all endodontic treatment will be successful despite a practitioner's best efforts.

It is also important to understand that the dynamics of healing may provide different signs and symptoms as time passes. Even treatment that meets the accepted standard of care can fail with time. Conversely, there are many cases which appear to be technically poor but result in clinical and radiographic success.

If the following conditions are satisfied, the treatment outcome is deemed to be clinically and radiographically successful.

- Patient not compromised as a result of treatment rendered and symptoms improved
- Gingival tissues and periodontium uninflamed and intact
- Tooth, tooth root and tissues restored to health and function
- Osseous tissues within normal limits
- Objectives of treatment satisfied (refer to Treatment Procedures, Section III)
- Radiographic evidence of root, periradicular tissue integrity

When the above are not satisfied, the quality of treatment must be assessed to determine if there is a correlation between the lack of success and the level of quality.

## **C. Quality of Treatment**

Quality of treatment concerns how well the treatment was performed. Assessment of quality involves a systematic review of treatment procedures (refer to Assessment Criteria, Section IV) to determine if they are consistent with the objectives outlined in the guidelines (refer to Treatment Procedures, Section III).

## **D. Patient Attitude / Values / Health**

The patient must be considered in the evaluation process. Attitude, interest, compliance with the dentist's recommendations, medical status, dental awareness, treatment expectations, level and sources of motivation, degree of participation, and financial resources are all relevant.

# **PROTOCOL**

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## **A. Qualifications of Examiners**

Dentists serving as examiners must have:

1. Clinical practice experience in endodontics which includes an understanding of current concepts in endodontic treatment, inflammation, healing modes, and causes of endodontic failures
2. Training in the use of these guidelines to achieve consistency in the assessment process and uniform interpretation of information
3. Ability to be objective and have no conflict of interest

4. Empathy for both the complainant and the dentist

**B. Assessment Process**

1. Requests for assessment of endodontic treatment must be in writing. During the peer review process, at least two independent assessments are recommended. In other situations (e.g., request from a lawyer), one may be sufficient. Only dentists meeting the above qualifications should be asked to provide evaluations of specific endodontic treatment.
2. All available data, records, radiographs, notes, and charts are provided to the examiners along with information about the practitioner's education, skills, competency, attitude and knowledge (where and when possible).
3. Examiners perform independent assessments, using the standardized assessment criteria. Appropriate notes and comments should be recorded under the various headings as required. Often it will be necessary to make more than one set of notes to record preoperative and postoperative conditions for comparative purposes.
4. The findings are reviewed to determine if there is a problem, and if there appears to be a correlation between the problem and the quality of treatment rendered.
5. When there is more than one examiner, the findings of the independent examiners are compared. If there are disagreements between examiners, the dentists must re-examine the treatment under consultation and try to arrive at a joint decision. If this is not possible, the reasons should be included in the report.

**C. Summary and Recommendations**

When reviewing the findings of the assessment and making recommendations, consideration should be given to the following:

- Is there an absence, elimination or improvement of clinical signs and/or symptoms?
- Is the tooth restored to health and function?
- Is there radiographic evidence of root and periradicular tissue integrity?
- Have the objectives outlined in these guidelines been satisfied?
- What correlation exists between treatment rendered and reason for review?

**Position #1**

A patient continues to have symptoms and there appears to be no correlation to treatment rendered.

***Recommendation:***

- Suggest patient seek further evaluation from other dental/medical disciplines

**Position #2**

A case appears to be clinically successful but the quality of treatment is suspect.

***Recommendation:***

- Identify the potential problems based on the questionable quality of treatment and how it differs from contemporary standards
- Inform the practitioner of the potential problems
- Make recommendations to the practitioner as to how clinical abilities could be updated

**Position #3**

A patient has symptoms and there is a reasonable relationship between quality of treatment and symptoms.

*Recommendations:*

- Identify problem and render a differential diagnosis
- Determine length of time treatment has been successful
- Determine if the treatment can be corrected or not
- Make recommendations as to corrective measures
- Make recommendations for accountability
- Inform complainant and practitioner

**ASSESSMENT CRITERIA**

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In assessing endodontic treatment rendered, a number of factors must be considered. The first step is a review of the patient’s chart(s) and records. This provides an understanding of the dentist’s evaluation of the patient’s problem(s), the information provided to the patient regarding the problem(s), and the treatment rendered. The second step, which may or may not be required, is a clinical assessment of the endodontic treatment rendered. Finally, other contributing factors such as the dentist’s level of expertise, patient’s attitude, geographic location, and financial considerations must be taken into account.

The following outline serves as a guide for dentists responsible for assessing treatment rendered. It ensures a thorough review of pertinent details so that facts will support conclusions.

**A. Chart Review**

**1. Medical/Dental History**

- Was practitioner aware of any medical/dental problems which could complicate treatment?
- Was the ASA Physical Status Classification recorded?  
Class I\_\_ Class II \_\_ Class III \_\_ Class IV \_\_\_\_
- Was the health history significant?

**2. Clinical Examination and Tests**

- What was patient’s chief complaint?
- Were subjective signs and symptoms recorded?

- Were clinical tests performed? - If yes, which ones?
- Were clinical tests appropriate considering chief complaint?
- Did dentist attempt to duplicate chief complaint?

**3. Radiographic Examination**

- Periapicals / bitewings
- Straight on / off angle views
- Quality of radiographic technique / processing
- Findings recorded?
- Interpretation of findings: \_\_\_ correct \_\_\_ incorrect \_\_\_ other

**4. Diagnosis**

- Was treatment classification recorded? Class 1 \_\_\_ Class 2 \_\_\_ Class 3 \_\_\_
- Was a diagnosis recorded?
- Was diagnosis correct based on subjective and objective findings above?
- Did degree of difficulty change during treatment?

**5. Treatment Plan**

- Was treatment plan appropriate for diagnosis rendered?

**6. Informed Consent**

- Were elements of informed consent explained?
- Did the patient sign an informed consent?

**7. Record of Services Rendered**

- Were procedures performed recorded?
- Were there any complications and/or unexpected results?
- If yes, were these discussed with the patient?
- Recommendations for follow-up?

**B. Clinical Assessment**

**1. Patient's General Health**

\_\_\_ normal \_\_\_ general malaise \_\_\_ facial distortion \_\_\_ other

**2. Subjective Symptoms (Patient Report)**

- a. Pain: \_\_\_ none \_\_\_ dull ache \_\_\_ sharp \_\_\_ throbbing  
 \_\_\_ intermittent \_\_\_ constant  
 \_\_\_ spontaneous \_\_\_ yes \_\_\_ no

\_\_ analgesics \_\_ yes \_\_ no frequency \_\_ type \_\_\_\_

- b. Swelling:
- c. Drainage:
- d. Paraesthesia / hyperalgesia: Location:
- e. Medication:

### 3. Clinical Signs and Symptoms (Dentist Findings)

- a. Tooth Restored to Form and Function
  - \_\_ yes \_\_ no \_\_ caries \_\_ acceptable contours \_\_ unacceptable contours
  - \_\_ type of restoration \_\_ material : \_\_ coronal \_\_ root surface
- b. Gingival Tissues (soft tissue exam)
  - i. Color: \_\_ normal \_\_ erythematous \_\_ other
  - ii. Contour: \_\_ normal \_\_ edematous \_\_ other
  - iii. Texture: \_\_ normal \_\_ loss of integrity
  - iv. Drainage: \_\_ sinus tract: \_\_ yes \_\_ no
  - v. Scars: \_\_ signs of previous surgical access/ location/ flap design
  - vi. Closure of surgical site:
- c. Tests
  - i. Percussion: -ve + ++ +++
  - ii. Palpation: -ve + ++ +++
  - iii. Probing: \_\_ no pockets \_\_ mm. pockets \_\_ broad/narrow based
  - iv. Thermal: Heat: +ve / -ve Cold: +ve / -ve  
Duration of pain
  - v. Mobility: Class I \_\_ Class II \_\_ Class III \_\_
- d. Hard Tissues
  - i. Tooth fractures: \_\_ coronal \_\_ root  
\_\_ vertical \_\_ horizontal \_\_ oblique
  - ii. Osseous fractures: \_\_ mandible \_\_ maxilla

### 4. Radiographic Signs

- a. Crown: \_\_ decay \_\_ marginal deficiencies \_\_ fractures \_\_ resorption  
\_\_ gouging \_\_ perforation \_\_ loss of integrity
- b. Root: \_\_ restorations \_\_ non-surgical (orthograde)



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