



MANAGEMENT OF CALCIFIED CANALS

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ABSTRACT

The future of teeth with calcified canals appears much brighter today than ever before due to the advancements in diagnostic aids and instrumentation techniques. Use of liquid EDTA may aid in locating the orifice. Always advance instruments slowly in calcified canals. When a fine instrument has reached the approximate canal length, do not remove it; rather, obtain a radiograph to ascertain the position of the file. Use ultrasonic instruments in the pulp chamber to loosen debris in the canal orifices. The use of newer nickel titanium rotary orifice – penetrating instruments should be considered.

KEYWORDS: Calcifications, EDTA, Sclerosis, Reparative Dentin, Calcific metamorphosis, Atrophy.

INTRODUCTION

Uncontrolled mineralization due to failure of enzyme, pyrophosphatase, reduced capillary permeability and reduced blood supply leads to calcifications. Root canal in teeth in which calcific deposits have blocked access to the canal (s), treatment efforts are often thwarted.^[1] An effort to locate the residual canal may remove large amounts of dentin and there is a risk of perforating or fracturing the root.^[1]

MANAGEMENT

NONSURGICAL MANAGEMENT

ORIFICE RECOGNITION

An important fact to remember is that the canal space in normal root canal anatomy is always in the cross-sectional center of the root. Similarly the pulp chamber is (or was, before calcification) located in the cross sectional center of the crown. In a tooth with a calcified pulp chamber, the distance from the occlusal surface to the projected pulp chamber is measured from the preoperative periradicular film, or preferably from a bite-wing film, which maximizes accuracy. They applied the buccal object rule for the determination of calcified root canals as follows.

After the initial access opening, the bur is left in place and three radiographs are taken.

1. Straight – on to the bucco- lingual dimension to determine the position of the head of the bur in the root canal in the mesio- distal dimension.

2. Radiograph taken with a 20° horizontal angulation with the cone shifted distally.
3. Radiograph taken with a 20° horizontal angulation with the cone directed mesially.

The last two radiographs give information regarding the relation of the bur to the canal lumen in the bucco-lingual dimension.

Krasner and Rankow have given certain laws which are particularly useful in locating calcified canal orifices. These are.

1. Law of symmetry 1: Except for maxillary molars, the orifices of the canal are equidistant from a line drawn in a mesiodistal direction through the pulp-chamber floor.
2. Law of symmetry 2: Except for maxillary molars, the orifices of the canals lie on a line perpendicular to a line drawn in a mesiodistal direction across the center of the floor of the pulp chamber.
3. Law of color change: The color of the pulp chamber is always darker than the walls.
4. Law of orifices location 1: The orifices of the root canals are always located at the junction of the walls and the floor.
5. Law of orifices location 2: The orifices of the root canals are always located at the angles in the floor-wall junction.
6. Law of orifices location 3: The orifices of the root canals are located at the terminus of the root development fusion lines.

The LN bur (Caulk/ Denstply, Tulsa, OK, USA), the Mueller bur (Brasseler, Savannah, GA, USA) and thin ultrasonic tips are especially useful for locating calcified canals. Another important instrument for orifice location is the DG-16 explorer. At this point a fine instrument, usually a No. 8 or No. 10 K –file is placed into the orifice, and an attempt is made to negotiate the canal. An alternative option is to use instruments with reduced flute, such as a Canal Pathfinder (JS Dental, Ridgefield, Conn.) or instruments with greater shaft strength such as the Pathfinder CS (Kerr Manufacturing Co.), which are more likely to penetrate even highly calcified canals. Remove the cervical ledge or bulge. If the orifice still cannot be negotiated with a fine instrument, drill 1-2 mm into the center of the orifice with a No.2 round bur on slow speed and use the explorer to re-establish the canal orifice. When counter- sinking or troughing in an area where an orifice is located, be sure the pulp chamber is dry.

The bur rotating at a slow speed will remove whitish chips that then accumulate in the orifice. After a light stream of air is blown into the chamber, these chips appear as white spots on the dark floor of the chamber and serve as markers for exploration or further countersinking. This approach can be used if the fourth canal of the maxillary molar or a separation of the mesio-buccal and mesiolingual canals is anticipated in mandibular second molars. Recently a combination of access refinement ultrasonic tips and magnification has revolutionized the basic concept of access cavity preparation. The uncovering of the floor of the pulp chamber can be accomplished with the help of the CPR 2D or BUC 1 tips. The pulp stones sometimes can be vibrated or teased out by the CPR 2D or BUC 1 tips; at other times, they can be planed with the help of a BUC 2 tip- a process similar to planning the root surface. Grind the floor until the dark- colored dentine becomes visible. is of critical importance because it dictates and guides the extension of access cavity.¹³ Locating canals and initial penetration under the microscope is also aided by fine instruments like the Micro- Orifice Opener(Denstply Maillefer, Ballaigues, Switzerland.).

BIOMECHANICAL PREPARATION

Coronal flaring in a crown- down fashion is preferred. Incremental instrumentation is achieved by creating new increments between the established widths by cutting off a portion of the file tip, thus making it slightly wider in diameter. For example, if a 1 mm segment is clipped from a size 10 file, the instrument becomes a size 12, by trimming sizes 15, 20 and 25, instruments of sizes 17, 22 and 27 respectively can be created. In extremely sclerotic canals, only 0.5 mm segments are trimmed, increasing the instrument width by 0.01mm and making a size 10 into a size 11, etc. because cutting the shaft imparts a flat tip, a metal nail file is used to smooth the end and reestablish a bevel after the removal of any segment.^[6]

CHELATING AGENTS-IS THERE ANY ROLE

Chelator preparations have been advocated frequently as adjuncts for root canal preparation, especially in narrow and calcified root canals. Apical dentin is more frequently sclerosed, and is more mineralized. The authors recommend liquid EDTA solution be introduced into the calcified canals.^[14]

TIME TO STOP LOOKING FOR CANAL

In the treatment of calcified canals it is common to find a total occlusion of the canal space at any level.^[11] Smith reviewed the literature concerned with calcific metamorphosis and collected the following data.

- Calcified teeth that were not treated endodontically developed radiographic or clinical symptoms in upto 16% of the cases.
- Studies of the success and failure of conventional endodontic therapy reported failure rates of 10% to 19%.

When these failure rates are compared, it appears that a calcified tooth treated endodontically would have no better chance of success than if it were left alone.^[8]

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