

CLINICAL STUDY AND METHODS IN CREATING OF ENDODONTIC ACCESS

Summary

The main objective of access cavity preparation is to identify the root canal entrances for subsequent preparation and obturation of the root canal system. Access cavity preparation can be one of the most challenging and frustrating aspects of endodontic treatment, but it is the key to successful treatment. Inadequate access cavity preparation may result in difficulty locating or negotiating the root canals. Good access cavity design and preparation is therefore imperative for quality endodontic treatment, prevention of iatrogenic problems, and prevention of endodontic failure.

Key words: Access, periodontitis, pulpitis.

Rezumat

STUDIU ȘI METODE DE ACCES ÎN CREAREA ACCESULUI ENDO-DONTIC

Obiectivul principal al preparării cavității de acces este de a identifica intrările în canal, pentru pregătirea ulterioară și obturarea sistemului canalelor radiculare. Prepararea cavității de acces este una dintre cele mai dificile și mai frustrante aspecte ale tratamentului endodontic, dar este cheia succesului tratamentului. Prepararea inadecvată a cavității de acces poate duce la dificultăți în localizare a canalelor radiculare. Accesul reușit în cavitate, în cele din urmă, este imperativ pentru tratamentul endodontic de calitate, pentru prevenirea problemelor iratrogene și prevenirea eșecului endodontic.

Cuvinte cheie: Acces, periodontită, pulpită.

Introduction:

The hard tissue surrounding the dental pulp can take a variety of configurations and shapes, a thorough knowledge of tooth morphology, careful interpretation of angled radiographs, and adequate access to and exploration of the tooth's interior are prerequisites for treatment. Magnification and illumination are indispensable aids only after correct completion of this phase of therapy can the clinician perform thorough shaping and cleaning and three-dimensional (3-D) obturation. The optimal endodontic result is difficult to achieve if the access is not properly prepared. The clinician must have an understanding of the complexity of the root canal system to understand the principles and problems of shaping and cleaning, to determine the apical limits and dimensions of preparations, to perform microsurgical procedures successfully and to correct procedural errors. Practitioners must have a thorough understanding of the internal anatomic relationships of teeth and must be able to visualize these relationships before undertaking endodontic therapy. The critical importance of a careful reading of each radiograph before and during root canal therapy is well recognized. As shown in a case report of five canals in a mandibular first molar, the radiographic appearance significantly aided recognition of the complex canal morphology. Access cavities should be cut so the pulpal roof, including all overlying dentin, is removed. The size of the access cavity is primarily influenced by the anatomical position of the orifice(s). Access objectives are confirmed when all the orifices of a furcated tooth can be visualized without moving the mouth mirror. Cleaning and shaping potentials are dramatically improved when instruments conveniently pass through the occlusal opening, effortlessly slide down smooth axial walls, and are easily inserted into a preflared orifice. Spacious access cavities are an opening for canal preparation. 8–10 properly performed, the finished preparation should provide both coronal and radicular straight line access [1].

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A properly prepared access cavity creates a smooth, straight-line path to the canal system and ultimately to the apex, or position of the first curvature. Straight line access provides the best chance of debridement of the entire canal space and reduces the risk of file breakage. When prepared correctly the access cavity allows complete irrigation, shaping and cleaning, and quality obturation. Ideal access results in straight entry into the canal orifice, with the line angles forming a funnel that drops smoothly into the canal(s). [2].

Krasner and Rankow found that the cemento-enamel junction (CEJ) was the most important anatomic landmark for determining the location of pulp chambers and root canal orifices. These authors proposed nine guidelines, or laws, of pulp chamber anatomy to help clinicians determine the number and location of orifices on the chamber floor.

- **Law of centrality:** The floor of the pulp chamber is always located in the center of the tooth at the level of the CEJ.
- **Law of concentricity:** The walls of the pulp chamber are always concentric to the external surface of the tooth at the level of the CEJ, that is, the external root surface anatomy reflects the internal pulp chamber anatomy (Fig-2).
- **Law of the CEJ:** The distance from the external surface of the clinical crown to the wall of the pulp chamber is the same throughout the circumference of the tooth at the level of the CEJ, making the CEJ is the most consistent repeatable landmark for locating the position of the pulp chamber.
- **First law of symmetry:** Except for the maxillary molars, canal orifices are equidistant from a line drawn in a mesiodistal direction through the center of the pulp chamber floor.
- **Second law of symmetry:** Except for the maxillary molars, canal orifices lie on a line perpendicular to a line drawn in a mesiodistal direction across the center of the pulp chamber floor. (Fig-1).
- **Law of color change:** The pulp chamber floor is always darker in color than the walls.
- **First law of orifice location:** The orifices of the root canals are always located at the junction of the walls and the floor.
- **Second law of orifice location:** The orifices of the root canals are always located at the angles in the floor-wall junction.
- **Third law of orifice location:** The orifices of the root canals are always located at the terminus of the roots' developmental fusion lines.

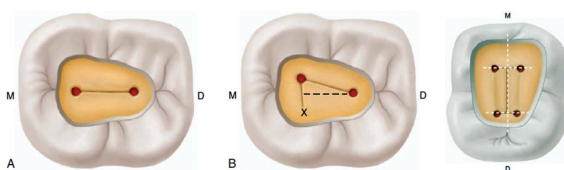


Fig.1 First and second laws of symmetry and first through third laws of orifice location. D, Distal; M, mesial.



Fig.2 Law of concentricity

The goals and objectives:

1. Importance of creation of access cavity in endodontic treatment.
2. Study roles and techniques of correct endodontic access.

Materials and methods:

We got 30 patients in the university's clinic Toma Ciorba 42, with age between 18-50, 20 females and 10 males, 13 of them was with pulpitis and 17 with apical periodontitis, totally was treated 52 teeth, 20 on the upper jaw (5 molars, 5 premolars, 3 canines and 7 incisors) and 32 on the lower jaw (15 molars, 10 premolars, 2 canines and 5 incisors).

Table 1 Groups of patients by the diagnosis:

Pulpitis				Apical periodontitis		
Total	Acute diffuse pulpitis	Chronic gangrenous pulpitis	Chronic fibrous pulpitis	Total	Chronic granulating periodontitis	chronic granulomatous periodontitis
13	5	5	3	17	10	7

Table 2 Method of creation access:

With burs	40 teeth
With ultrasound	12 teeth

Methods of searching and enlargement of the root canal's orifices:

- For enlargement: Proteper IX, and gates glide.
- For searching: Microopener, probe, methylene blue.

Instruments for access creation:

The access armamentarium should be simple, yet sufficiently versatile, to achieve the preparation goals. Every dentist who performs endodontic procedures has a preferred set of burs that are used for any given access procedure. The following will provide a brief description of the Endo Access Kit (Dentsply Tulsa Dental Specialties; Tulsa, Oklahoma) that may be used to initiate, progressively open, and completely finish any access cavity within any tooth in the mouth (Fig-3).

- **Diamond Round Bur:** The #2 and #4 diamond round burs, in conjunction with water, are utilized

to brush-cut away tooth-colored restoratives and to create a window through materials such as porcelain (Fig-4).



Fig.3 The convenient Endo Access Kit

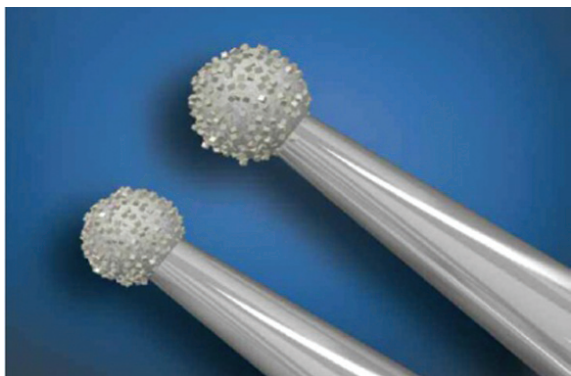


Fig.4 #2 and #4 diamond round burs

- **Transmetal Bur:** The transmetal bur is specifically designed for cutting any type of metal (Fig-5). This bur has a saw-tooth blade configuration, which provides efficiency while reducing unwanted vibration, especially important when entering pulpitic or so-called „hot teeth.“



Fig.5 Transmetal bur

- **Carbide Round Burs:** The #2 and #4 surgical length carbide round burs provide extended reach and improved vision during the entry into the pulp chamber (Fig-6). These burs are used to remove variously encountered restorative materials and dentin.

- **Endo Z Bur:** The Endo Z bur is a tapered and safe-ended carbide bur. This bur is popular in that its oncutting end can be safely placed directly on the pulpal floor without a risk of perforation. The Endo Z

bur's lateral cutting edges are used to flare, flatten, and refine the internal axial walls.



Fig. 6 #2 and #4 surgical length carbide round burs

- **X-Gates:** One X-Gates is comprised of four Gates Glidden (GG) drills. Specifically, the heads of the GG 1-4 burs are sequentially stacked on the active portion of a single X-Gates to create a funnel-shaped form .

- **Vision:** Lighting and magnification equal vision. Magnification glasses, headlamps, fiber optic transilluminating devices, and dental operating microscopes (DOM) contribute to better vision.

- **Piezoelectric Ultrasonic Generators:** Piezoelectric ultrasonic energy is a strategic technology and plays an ever-increasing role when performing hygiene, restorative dentistry, and nonsurgical endodontic procedures. (Fig-7).

- **Ultrasonic Instruments:** Ultrasonic instrumentation is playing an increasingly larger role in the field of endodontics. Ultrasonic instruments are available in varying lengths, diameters, tapers, and various abrasive cutting surfaces. (Fig-8).

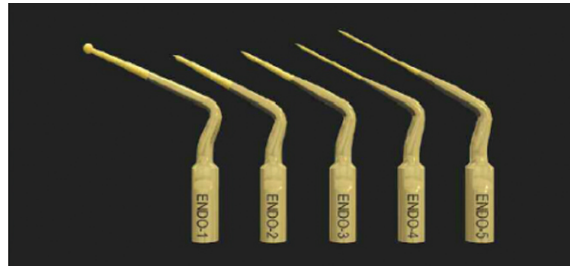


Fig. 7 Piezoelectric Ultrasonic



Fig. 8 The ProUltra ENDO 1-5 ultrasonic instruments

Clinical case:

Passport data:

- Name: Patient B.
- Gender: Male.
- The place of birth: Chisinau
- Date of birth: 26 of June 1990
- Address: Chisinau, Paris 16.
- Profession: Student.

A subjective survey:

- The complains of the patients:

A night pain in the right side of the maxilla with irradiation of the pain to the ear and temporal region.

- Anamnesis Vita:

Patient X was born in Chisinau, Moldova, on 26th of June 1990, the first child in the family.

Grew and developed in a normal condition.

Bad habit: No

Allergological history: No allergic reaction.

Patient brushes his teeth twice a day with tooth brush, with a „Crest“ toothpaste.

- Anamnesis Morbi:

The patient had caries in tooth nr.17, but he doesn't treat it. After several months the patient start to feel hypersensitivity in that tooth, the pain increased gradually until sharp night pain.

Patient's general condition:

Patient's general condition is satisfactory, a clear conscience, active positive, Somatotype: normal. Skin and visible mucosa membrane are pale pink, without pathological changes.

Subcutaneous fat layer is moderately developed.

Submandibular and cervical lymph nodes are not palpable.

Degree of muscle development corresponds to the norm. Bones of the skull/chest/limb- without deformation.

From the cardiovascular, respiratory, nervous and urinary systems revealed no abnormalities.

An objective examination:

• Extraoral examination:

- No pathological changes

• Intraoral examination:

- Vermilion border of normal color, without pathological changes.
- Vestibule of oral cavity is middle, 6mm.
- Oral mucosa pale pink, without pathological changes.
- Profound cavity on tooth nr.17
- Propping on the bottom of tooth nr.17: Provoke a big pain.
- Thermal prop examination of tooth nr.17: Big pain not stops even after remove the stimuli.
- Palpation of the gingival surround tooth nr.17: painless.
- Color of the gingival surround tooth nr.17: pink pale.

• Percussion: Sensitive.

• Survey of the teeth: orthognatical bite.

- **Diagnosis:** Acute diffuse pulpitis of tooth nr.1.7, placed on the base of: claims, history of present illness and on objective examination of additional research method.

- **Treatment:** Vital extirpation for teeth nr.1.7.

• The plan of treatment:

1. Injection of anesthesia tuberal anesthesia.
2. Isolation of teeth 1.7
3. Preparation of teeth 1.7
4. Access to the pulp with rounded bur nr.2.
5. Enlargement of the root entrance with gates glidin.
6. Extraction of the pulp.
7. Measuring the working length.
8. Instrumental and medicament treatment of the root canal.
9. Obturation of the root canal by cold lateral condensation with Ah+ and gutta-percha. X-ray control of the investigation.
10. Etching, bonding.
11. Imposition of permanent filling by composite material (Gradia Direct Posterior).

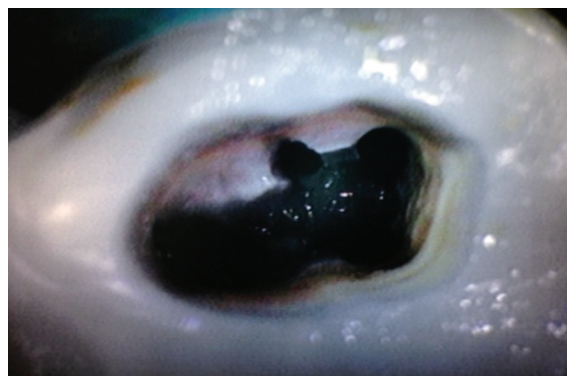


Fig.9 Access of the root canals

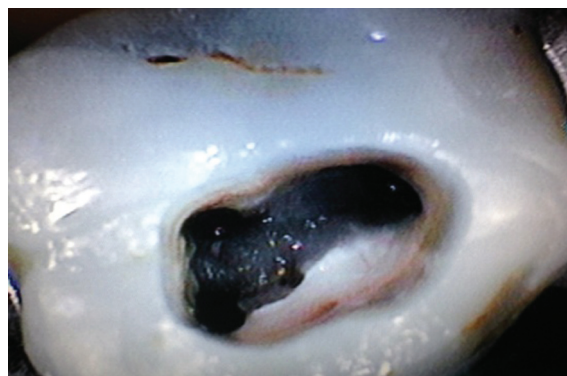


Fig.10 Enlargement of the root canal orifices

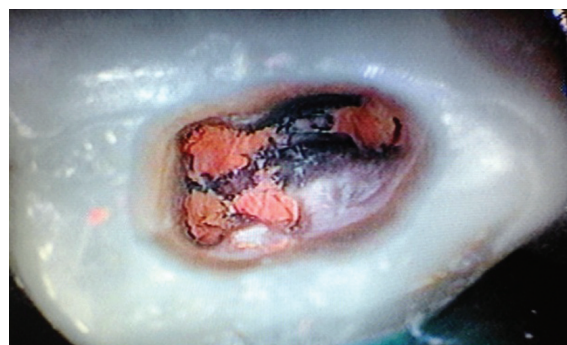


Fig.11 Filling the root canals

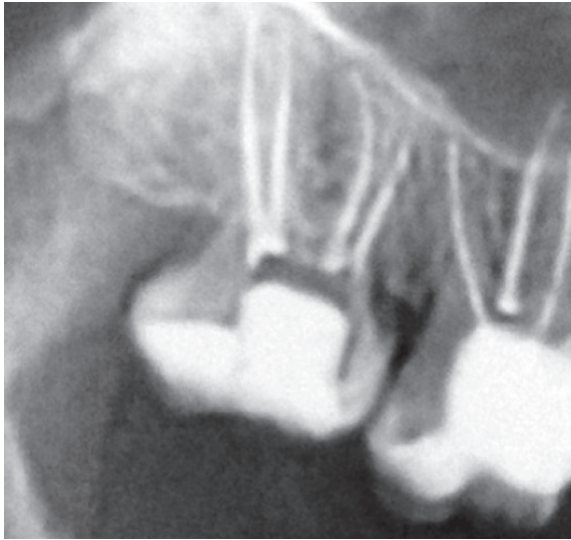


Fig.12 X-ray after filling of root canals

Conclusion:

The access preparation is an essential element for successful endodontics. Preparing the endodontic access cavity is a critical step in a series of procedures that potentially leads to the three-dimensional obturation of the root canal system

Together with diagnosis and treatment planning, the knowledge of common root canal morphology and its frequent variations is a basic requirement for endodontic success. The significance of canal anatomy has been underscored by studies demonstrating that variations in canal geometry before shaping and cleaning had a greater effect on the changes that occurred during preparation than did the instrumentation techniques

Krasner and Rankow found that the cemento-enamel junction (CEJ) was the most important anatomic landmark for determining the location of pulp chambers and root canal orifices. The study demonstrated the existence of a specific and consistent anatomy of the pulp chamber floor. These authors proposed nine guidelines, or laws, of pulp chamber anatomy to help clinicians determine the number and location of orifices on the chamber floor.

Bibliography

1. Burns RC, Herbranson EJ: Ch. 7: Tooth morphology and cavity preparation. *Pathways of the Pulp*, 7th ed., Cohen and Burns, Mosby, St. Louis, 1998.
2. Nevins M, Mellonig JT (ed.): *Periodontal Therapy, Clinical Approaches and Evidence of Success*, Quintessence Publishing Company, Chicago, 1998.
3. Lenchner NH: Restoring endodontically treated teeth: ferrule effect and biologic width, *Pract Periodont Aesth Dent* 1:19, 1989.
4. Sorensen JA, Engelman MJ: Ferrule design and fracture resistance of endodontically treated teeth, *J Prosthet Dent* 63:529, 1990.
5. Ruddle CJ: Ch. 25, nonsurgical endodontic retreatment. In *Pathways of the Pulp*, 8th ed., Cohen S, Burns RC, eds., St. Louis: Mosby, pp. 875-929, 2002.
6. Levin H: Access cavities. *Dent Clin North Am* 11:701, November, 1967.
7. Ruddle CJ: Ch. 8, Cleaning and shaping root canal systems. In *Pathways of the Pulp*, 8th ed., Cohen S, Burns RC, eds. St. Louis: Mosby, pp. 231-291, 2002.
8. Machtou P: Ch. 8, La cavité d'accès. In *Endodontie — guide clinique*, Pierre Machtou, ed., Paris: Editions CdP, pp. 125-137, 1993. 9. Ruddle CJ: The protaper technique. *Endodontic Topics* 10: 187-190, 2005.
9. Schilder H: Cleaning and shaping the root canal system. *Dent Clin North Am* 18(2):269, 1974.

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PRELUCRAREA MEDICAMENTOASĂ A CANALELOR RADICULARE. IMPORTANȚA ACESTUIA ÎN CURĂȚAREA ȘI STERILIZAREA SPAȚIULUI ENDODONTIC

Rezumat

Studiul clinic s-a efectuat pe un lot de 25 pacienți dintre care 10 de sex masculin și 15 de sex feminin, cu vârste cuprinse între 18-48 ani. Din totalul celor 25 cazuri, 16 au fost dinți pluriradiculari și 9 cazuri dinți monoradiculari. La 13 pacienți s-a efectuat tratament endodontic primar, iar la 12 s-a recurs la retratamentul endodontic. S-a efectuat un protocol separat de irigare a canalelor radiculare pentru pacienții cu tratament endodontic primar și retratament endodontic.

Cuvinte cheie: *Enterococcus faecalis*, *Hipoclorid de Na*, sterilizare, endodontie, protocol.

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