

Endodontic Surgery/Apicoectomy

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Summary

Resection, or apicoectomy, of the tooth root implies its excision together with the inflamed part of the surrounding tissues. The purpose of this procedure is to stop and eliminate the odontogenic focus of infection, by removing the tumor cells that form it. Apical root end resection is becoming popular procedure as a treatment option in cases of ortho-grade endodontic failure. Apical surgery itself belongs to the field of endodontic surgery, which also includes incision and drainage, closure of perforations, and root or tooth resections. The objective of apical surgery is to surgically maintain a tooth that primarily has an endodontic lesion that cannot be resolved by conventional endodontic (re-) treatment. It is therefore of clinical relevance to perform a thorough clinical and radiographic examination of the tooth before apical surgery (including adjacent and opposing teeth), in order to decide whether surgical or non-surgical endodontics should be considered. Compared with extraction, the procedure of apicoectomy is a more gentle method and allows you to save a problem tooth. But still, do not forget that this is a real surgical operation, as a result of which specific complications may arise, and its success ultimately depends on a properly planned rehabilitation period. In order to avoid relapse and re-inflammation, in order to restore the normal way of life as soon as possible, it is necessary to comply with all the prescriptions of the doctor that will promote the best healing of the wound. Resection of the root is carried out with observation of all sanitary norms and conditions. Procedure lasts from 20 minutes to 1 hour. The duration of the manipulation depends on the location of the tooth. Easiest way to conduct an apicoectomy is on incisors and canines. More difficult is on the molars.

Key Words: *Apical Surgery. Retrograde-Filling. Dental Surgery. Osteotomy. Apicoectomy. Laboratory Examination. Microsurgery.*

Introduction

The procedure that that we are going to discuss, is the intersection of two large directions in dental field, in face of therapeutic and surgical dentistry. Many of you not only know, but also have undergone for a procedure called endodontia, and are well aware that an infectious and inflammatory process in the area of apex of the tooth can cause significant troubles to the patient.

Unfortunately, not all pathological processes can be cured with the help of endodontic treatment. In case when the lesion is large enough, or the root canals are impassable, in order to save the tooth, it is necessary to eliminate the focus of infection, in this case, apicoectomy becomes the method of choice. Apicoectomy or Endodontic Microsurgery - is the removal of the tip of the affected root and the subsequent retrograde filling of the root canal. Carrying out such a surgical intervention can prevent various formations and protect not only tooth, but also surrounding areas from the spread of inflammation. The main condition for the success of such an operation is timely visit of to the dentist, because in neglected cases, when bone damage occupies several centimeters in diameter, these operations are not successful.

Purpose of Article

The objective of this review article is to give the reader an update about apicoectomy, including pre-clinical, clinical and post-clinical processes. The present paper is divided

into several sections: indications, contra-indications, preparation, armamentarium, steps of surgery, complications, recovery period and post-recommendations.

Indications

- ◇ **Presence of formation in form of a cyst and granulo-
loma, dissolved root.** The cyst and necrotic part of the root are removed with minimal resection. Earlier, such a diagnosis was a fatal verdict for the tooth, as it was simply extracted. Now the problem is solved by apicoectomy.
- ◇ **Impassability of root canal.** Cause of this situation may be poor-quality filling, a congenital developmental anomaly, an established pin, a fixation of the cermet crown on the tooth and so on. Clinician has no choice but to perform a surgical procedure to save the tooth.
- ◇ **The Cyst.** Determines a limited area of inflammation, which is present as a pouch with exudative cavity. The cyst can become aggravated and cause serious changes in the patient's condition: headache, enlarged lymph nodes, unpleasant sensations in the tooth area and others. For treatment of a cyst, is provided cystectomy with resection of the tip of the root, by possibility with polishing the root and preserving it.
- ◇ **Perforation (damage) of the root walls during filling**
- ◇ **Fragment of the instrument, remained in the canal**
- ◇ **Intracranial calcification**
- ◇ **Teeth with apical resorption**

Contraindications

Medically compromised patients
Deep periodontal pocket, excessive mobility
Severe chronic diseases of body (diabetes, coronary heart disease, asthma) Crown destruction (above 50 %).

Preparation

Preparation for the operation consists in pre-filling of root canal with special antiseptics, and hermetization. First they are thoroughly cleaned, and filled. If such manipulation is impossible, then retrograde filling is performed. The procedure is performed no later than 2 days before resection, so as not to cause an inflammatory reaction.

Laboratory Test

Laboratory diagnosis is provided by applying both general clinical and complex biochemical and morphological methods. An important role is played by a number of functional methods that make it possible to judge the status of the functions of individual systems, as well as objectively assess the effectiveness of the treatment. The conclusion about the diagnosis should be based on reliable signs.

Blood Test

The analysis includes the determination of the amount of hemoglobin, the number of red blood cells and leukocytes, the color index, the count of the leukocyte formula. A clinical blood test is an important additional method, and it must be performed in every patient with a disease of the oral mucosa. Absolute indications for the analysis are the presence in the oral cavity of the necrosis of the mucous membrane, long-term healing ulcers, as well as the emergence of suspicion of the disease of the organs of hematopoiesis.

Cytological Test

Based on the study of structural features of cellular elements and their conglomerates. The method is simple, safe for the patient, sufficiently effective and reliable, allows you to quickly get results, and if necessary, you can repeat the study. The cytological method is used to determine the effectiveness of the treatment. In addition, the cytological examination can be conducted independently of the stage and course of the inflammatory process and even in outpatient settings.

Histological Test

Histological examination is the analysis of the biomaterial at the tissue level. This method of investigation is invasive, and it is performed only in cases of already developed disease. When diagnosed, the doctor can determine the exact method of treatment and choose the necessary tactics.

Prophylactic direction is very important for detecting early forms of pathology.

Bacteriological Test

Investigation of the bacterioscopy of the material obtained from the surface of the oral mucosa, ulcers, erosions. This study is carried out in all cases when it is necessary to clarify the cause of the lesion of the mucous membrane, with specific diseases, purulent processes, to determine the bacilli. It is often impossible to establish the cause of infectious damage to the mucous membrane due to the presence of a large number of microorganisms in the oral cavity. The causative agents of a specific infection (syphilis, tuberculosis, gonorrhea, actinomycosis, leprosy, fungal diseases) are also determined by bacteriological studies.

Armamentarium

- ◇ Bard Parker surgical blade #15
- ◇ Bard Parker blade handle #3
- ◇ Molt/Seldin periosteal elevator
- ◇ High-speed handpiece
- ◇ Ultrasonic retrotip device
- ◇ Round bur #6
- ◇ Lucas curettes
- ◇ Needle holders
- ◇ Retractor
- ◇ Microscope

Steps of Surgery:

1. Anesthesia - Anesthesia for resection is always local, but it can be of two types: Local Infiltration (usually for upper jaw) and Nerve Block (usually for mandible). Possible premedication, depending on case.
2. Flap Incision/Elevation - Retraction of the Gingiva or tissue to gain access to the periradicular area is required. A localized flap design should be given to access the periradicular bone region of the tooth. A Vertical incision should be given apical to the junction of horizontal and vertical incision and elevate the flap.
3. Bone Removal - The Root tips are covered by Bone on the buccal surface, removal of bone helps in gaining access to the periradicular area of the tooth. There are certain tips which should be kept before going for removal – Always use a sharp and sterile round bur, only light pressure should be given, shaving or brushing strokes should be given while cutting the bone, making sure that there are no important structures which are being harmed.
4. Root End Resection / Preparation - Root Resection has to be planned depending on the anatomical variations of the Root structure and the pulp chamber as well. There can be many anatomical changes in the pulp structure based on which the length of root to be removed is decided and also the amount of bevel which

should be given. The empty space that remains after removal can be filled with bone-plastic material. If possible, resection is prevented, weakening the root can decrease the life of the tooth.

5. Sewing wound area - Closure of the wound is sometimes carried out with the installation of microdrainage for the outflow of the drained exudate. It remains between the sutures within two days after the operation. Also, on the side of the lesion, an ice pack is applied to prevent swelling and bruising.

Complications

- ◇ Fracture of Maxilla or Mandible
- ◇ Cellulitis/Ludwig's Angina
- ◇ Maxillary Sinus Perforation
- ◇ Nerve/Blood Vessel Injury
- ◇ Perforation of Nasal Passage

Recovery period

Surgical intervention can be performed in an hour, but the recovery period much longer, about three days. Soft tissues are restored within the first week, but the bone heals during 3-4 months. In the first day after surgery, the patient may experience puffiness and moderate pain. They should gradually decrease and disappear during the first week after the operation.

Post Recommendations

- ◇ Refusal of excessive physical exertion during the first week after surgery
- ◇ Food intake is allowed 3 hours after the end of the procedure (food should be chopped, warm)
- ◇ Limitation of chemical stimuli on the oral cavity (acid, spicy, salty, spicy dishes)
- ◇ Reception of antibacterial drugs with a complete course for the prevention of the infectious process
- ◇ The use of antibacterial solutions for rinsing the mouth
- ◇ Perform an x-ray examination to evaluate the results of the operation a few months after resection
- ◇ Abstinence from eating excessively solid foods during the period of bone tissue healing (about 3 months).

Tailpiece

Resection of the root is an extreme high-precision surgical manipulation, which requires a high qualification, and huge experience in performing of surgery. The fact is, that most chronic inflammatory processes are developed without any symptoms, pain and swelling, so it is critical to pay attention on preventive maintenance, which can reveal pathology at its early stages not only in oral cavity, but also in rest of the body system.

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