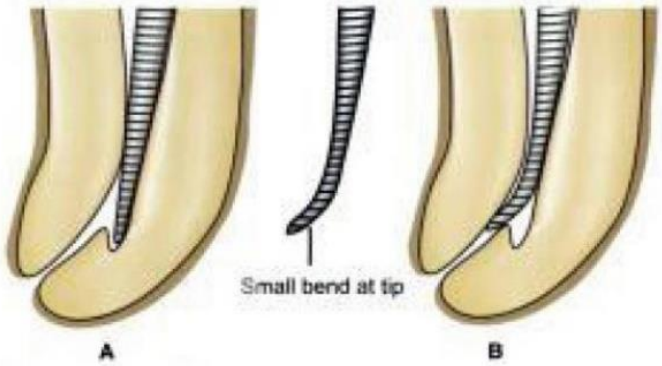
Mustansiriyah University
College of Dentistry
Endodontics lectures
5th year

Endodontic mishaps II



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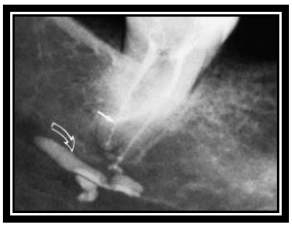
OBTURATION-RELATED MISHAPS

Over- or Under extended Root Canal Fillings:

Although controversy still may exist regarding apical termination of the root canal filling, there is general agreement that the ideal location is at or near the dentinocemental junction. A number of studies have supported the apical termination of the filling material just short of the radiographic apex.



Root canal filling material is sometimes inadvertently extruded beyond the apical limit of the root canal system, ending up in the periradicular bone, sinus, or mandibular canal or even protruding through the cortical plate. Gross overextensions can lead to symptoms and treatment failure. A frequent cause of this mishap is apical perforation with loss of apical constriction against which gutta-percha is compacted.

Under extension of root canal filling material may be caused by failure to fit the master gutta-percha point accurately. It can also result from a poorly prepared canal, particularly in the apical part of the canal.

Recognition of an inaccurately placed root canal filling usually takes place when a post-treatment radiographic examined.

Correction of an under extended filling is accomplished by **re-treatment**: removal of the old filling followed by proper preparation and obturation of the canal. Correction of an **overextended filling** is more difficult. An attempt to remove the overextension is sometimes successful if the entire point can be removed with one tug. Many times, however, the point will break off, leaving a fragment loose in the periradicular tissue. Attempts at removing a laterally condensed overextension, by using chloroform and a Hedstroem file, will usually produce the same results as trying to retrieve an overextended thermoplastic filling material; it may be pushed further into the periradicular tissue. If the overextended filling cannot be removed through the canal, it will be necessary to remove the excess surgically if symptoms or radicular lesions develop or increase in size.

Prevention. As with most mishaps, attention to detail is the best form of prevention. Accurate working lengths and care to maintain them will help prevent overextensions. Modifying the obturation technique may also be preventive. In younger patients with wider root canal systems or in teeth with apical resorption, the apical stop may not be adequate to prevent gutta-percha from being extruded. Techniques that create apical barriers with calcium hydroxide, dentin chips, or MTA may be useful in these cases.

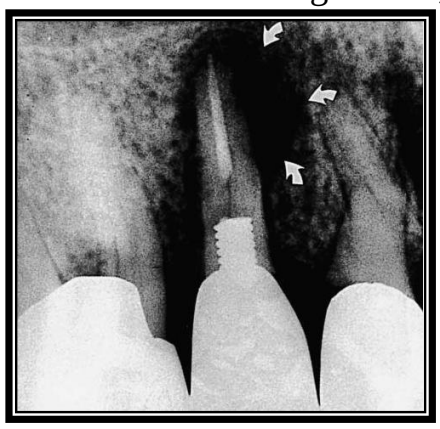
Nerve Paresthesia

There have been both local factors and systemic diseases reported as causative agents for paresthesia. Local factors in dental-related paresthesia are not limited to iatral root canal therapy. Patients presenting with this symptom should routinely be screened for an adjacent tooth with necrotic pulp. Overextensions and/or over instrumentations are the causative factors most often found in paresthesia secondary to orthograde endodontic therapy.

Vertical Root Fractures

Vertical root fractures can occur during different phases of treatment: instrumentation, obturation, and post placement. In both lateral and vertical condensation techniques, the risk of fracture is high if too much force is exerted during compaction. Similarly, during post placement, if the post is **forced** apically during seating or cementation, the risk of fracture is high, particularly if the post is tapered.

Recognition is often unmistakable. The sudden crunching sound, similar to that referred to as crepitus in the diseased temporomandibular joint, accompanied with pain reaction on the part of the patient, is a clear indicator that the root has fractured. A suggestive "teardrop" radiolucency may appear in the radiograph of a long-standing vertical root fracture and may be associated with only minor symptoms of soreness in the tooth.



Correction. Unfortunately in most cases of vertical fracture, extraction is the only treatment available at this time.

Prevention involves avoidance of over preparing canals and the use of a passive, less forceful obturation technique and seating of posts.

Vertical root fracture can be attributed to over instrumentation ("over flaring") of the canal, resulting in unnecessary removal of dentin along the canal walls, with subsequent weakening.

MISCELLANEOUS

Post Space Perforation

A well-done root canal procedure can be destroyed in a few seconds by a misdirected post space preparation. End-cutting drills such as those used for the Para-post system need careful attention to avoid lateral perforation; round burs can also be dangerous if care is not exercised in watching the direction of the bur.

Recognition is similar to that of instrumentation related lateral root perforations: sudden presence of blood in the canal (post preparation) or radiographic evidence.

Correction consists of sealing the perforation, if possible, as described for other perforations.

Prognosis is least affected if the perforation is totally within bone; if it is closer to the gingival sulcus, the risk of periodontal pocket formation is high, but, in any case, the tooth must be considered weakened.

Prevention is associated with a good knowledge of root canal anatomy and planning the post space preparation based on radiographic information regarding the location of the root and its direction in the alveolus.

Irrigant-Related Mishaps

Various irrigants have been used in the chemomechanical preparation of the root canal system. Saline, hydrogen peroxide, alcohol, and sodium hypochlorite are among those most commonly used. Any irrigant, regardless of toxicity, has the potential to cause problems if extruded into periradicular tissues. The fear of toxicity of sodium hypochlorite as an irritant of periradicular tissue has tended to deter its use.

Recognition of an irrigant-related mishap will be

readily apparent. The patient may immediately complain of severe pain, and swelling can be violent and alarming.

Treatment. Because of the potential for spread of infection related to tissue destruction, it is advisable to prescribe antibiotics in addition to analgesics for pain. Antihistamines can also be helpful. Ice packs applied initially to the area, followed by warm saline soaks the following day, should be initiated to reduce the swelling. The use of intramuscular steroids, and, in more severe cases, hospitalization and surgical intervention with wound débridement, may be necessary. Monitoring the patient's response is essential until the initial phase of the reaction subsides.

Prognosis is favorable, but immediate treatment, proper management, and close observation are important. The long-term effects of irrigant injection into the tissues have included paresthesia, scarring, and muscle weakness.

Prevention of inadvertent extrusion of irrigants past the apex can be attained by using **passive placement** of a modified needle. No attempt should be made to force the needle apically. The needle **must not be wedged** into the canal, and the solution should be delivered slowly and without pressure.

The common etiologic factor is compressed air being forced into the tissue spaces. Two procedures in endodontics, if carried out improperly, have the potential to cause a problem. First, during canal preparation, a blast of air to dry the canal, and second, during apical surgery, air from a high-speed drill can lead to air emphysema. Any time a stream of air is directed toward exposed soft tissues, the potential for a problem exists.

Recognition. The usual sequence of events is rapid swelling, erythema, and crepitus.

Correction. Treatment recommendations vary from palliative care and observation to immediate medical attention if the airway or mediastinum is compromised. Broad-spectrum antibiotic coverage is indicated in all cases to prevent the risk of secondary infection.

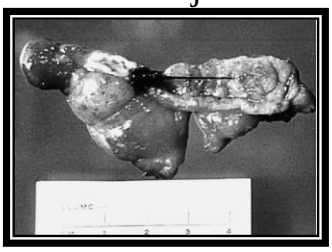
Preventive measures that should be taken to avoid the risk of this occurrence during endodontic procedures include using paper points to dry root canals.

Instrument Aspiration and Ingestion

Aspiration or ingestion of a foreign object is a complication that can occur during any dental procedure. Endodontic instruments, used in the absence of a rubber dam, can easily be aspirated or swallowed if inadvertently dropped in the mouth.

Recognition in these cases is perhaps better termed “suspicion” because sometimes aspiration may not be recognizable. If an instrument aspiration or ingestion is apparent, the patient must be taken immediately to a medical emergency facility for examination, which should include radiographs of the chest and abdomen.

Correction in the dental operator is limited to removal of objects that are readily accessible in the throat. High-volume suction, particularly if fitted with a pharyngeal tip, can be useful in retrieving lost items. Hemostats and cotton pliers can also be used. Once aspiration has taken place, timely transport to a medical emergency facility is essential. The dentist should accompany the patient there.



Prevention can best be accomplished by strict adherence to the use of a rubber dam during all phases of endodontic therapy. If a rubber dam clamp is placed on the tooth to be treated before rubber dam placement, aspiration of a loosened clamp can be avoided by attaching floss to the clamp before placement.