A Note on Endodontic mishaps

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Abstract

Endodontics is currently in the midst of its own revolution. After this discipline is recognized as a specialty, the technological advances were made routinely. The advent of Niellc titanium files, rotary instrumentation, radiovisiography, endoscope and clinical microscope have changed the way in which the endodontics is practiced. This progress has increased both productivity and quality of care. On the other hand, the complexity of the cases being treated by both general dentists and endodontists is increasing with the result those new problems are being created. The purpose of this article is to present a review on these endodontic mishaps.

Key words: Endodontic treatment, Endodontic mishaps, Endodontic accidents.

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Introduction

Root canal treatment (RCT) is usually aimed to maintain or restore the health of the dental pulp and periradicular tissues. The outcome of the therapy depends on the operator’s ability to perform the whole procedure without making any mistakes [1]. Endodontics is the preparatory discipline in which the treatment focuses on conservative or prosthetic restoration of a tooth. Maintaining the integrity of natural dentition is essential for fully functional and esthetic conditions [2]. Root canal irrigation plays an important role in the debridement and disinfection of the root canal system and is an integral part of root canal preparation procedures. The most frequently used irrigants are sodium hypochlorite and hydrogen peroxide, or the combined use of both [3]. Lack of knowledge, its poor application, or a compromise or a break in the chain of proper procedures can lead to a number of accidents which are collectively called ‘endodontic mishaps’ [4]. These accidents can occur during diagnosis, access preparation, cleaning and shaping, obturation and post-space preparation [1].

Classification of endodontic mishaps

The endodontic misadventures classification proposed by Ingle describes instrument related accidents. Part of these are perforations in the cervical section of the canal, and misadventures related to obturation, among which we find overextended or underextended obturation of root canals [5]. According to Ingle and Bakland [6] endodontic mishaps can be access related which are due to treating the wrong tooth, missed canals, damage to existing restoration, access cavity perforations, crown fractures;
Instrumentation related which are due to ledge formation, cervical canal perforations, midroot perforations, apical perforations, separated instruments and foreign objects, canal blockage; Obturation related due to over- or under-extended root canal fillings, nerve paresthesia, vertical root fractures and other forms such as post space perforation and irrigant related.

Endodontic mishaps
One of the major undesired complications of endodontic and restorative treatment procedures is the accidental perforation of the roots or pulp chamber floor. Root perforations are artificial openings in root walls created by boring, piercing, cutting, or resorption that result in a communication between the pulp space and periodontal tissues. The result is a chronic inflammatory reaction of the periodontium (characterized by the formation of granulation tissue) that can lead to irreversible loss of attachment or loss of the tooth. Such perforations are managed surgically or non-surgically depending on the particular characteristics of the case [2]. The separation of an endodontic instrument instantly transforms a case, from whatever level of difficulty it was preoperatively, to a new level of severity [7]. Pathological causes like root resorption and caries can lead to a perforation. Nevertheless, the source is very often iatrogenic, as a result of an excessive use of the dental burr in the pulp chamber [5]. Studies done to evaluate the endodontic recall radiographs have shown that the incidence of the remaining separated instrument fragments in the canal ranges between 2 to 4% [8]. Inadvertent injection of sodium hypochlorite beyond the apical foramen may occur in teeth with wide apical foramina or when the apical constriction has been destroyed during root canal preparation or by resorption. Additionally, extreme pressure during irrigation or binding of the irrigation needle tip in the root canal with no release for the irrigant to leave the root canal coronally may result in contact of large volumes of the irrigant to the apical tissues. If this occurs, the excellent tissue-dissolving capability of sodium hypochlorite will lead to tissue necrosis [3].

Lack of the knowledge and poor understanding of the endodontic principles
Lack of the proper knowledge and poor understanding of the principles is the mainstay in the various endodontic mishaps happening in the practice. Various previous studies have shown the lack of knowledge in the undergraduate students and the endodontic teaching programs. Dummer 1991 compared undergraduate endodontic teaching programs in Britain to those in United States and reported that one of the causes of poor quality endodontic treatment in general practice was lack of expertise and a poor understanding of the principles involved by the graduated students [9]. Similar findings were reported in Arabic countries such as Jordan [10] and Sudan [11]. Barrieshi-Nusair related this to the endodontic teaching at the dental schools in these countries.1

General principles of management [1,2,4,8]
An ideal endodontic repair material should exhibit certain characteristics as follows:
- It should maintain a hermetic seal;
- It should be insoluble in tissue fluids,
- Dimensionally stable,
- Non-resorbable and
- Must exhibit biocompatibility, if not bioactivity.

Mineral trioxide aggregate (MTA) is a biomaterial that has been investigated for endodontic applications since the early 1990s. MTA was first described in the dental literature in 1993 and was given approval for endodontic use by the U.S. Food and Drug Administration in 1998. The unique physical characteristics of MTA allow for superior marginal adaptation [2]. For separated instruments, safe retrieval or bypassing should be carried out. For the meticulous knowledge regarding various instruments, root canal anatomy and methods of performing root canal treatment are very important [8]. Those who perform root canal therapy must have a basic knowledge of etiologic factors and methods of prevention as well as recognition, management and prognosis. This knowledge reduces the rate of endodontic failures and increases our chances of saving more teeth [4].

Conclusion
Endodontic treatment always presents a great challenge to dental practitioners and thus mishaps commonly occur. Thoroughly knowledge of the complications of the endodontic instrumentation, root canal anatomy and excellent training and good technical skills can avoid or decreases the chances of the endodontic mishaps.
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