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Review Article

Endodontics problems: A current and updated review

Pardis Palizban*
Anzali International Faculty of Dentistry, Guilan University of Medical Sciences, Guilan, Iran.

Abstract. It is well known that dentists should be able to make intense contributions regarding the care of patients in addition to the patient complains of tooth pain, swollen gums, sensitivity to hot and cold, tooth discoloration, cracked or chipped teeth. In these conditions dentists should not delay regarding attention to endodontics treatment or other strategies. The purpose of this review was to understand the needs to endodontics treatment for each individual patient attending dental clinics. A review of scientific literature (n= 40) was conducted based on the topic of interest by searching; PUBMED.Gov (https://pubmed.ncbi.nlm.nih.gov/), and Web of Science. Occlusal force is associated with the tooth contact and clenching strength. The greater compressing strength, occlusal power upsurges over the molar area, although it is opposite in the anterior and premolar areas. Research designates that dental refurbishments can decrease occlusal strength over a compensatory response mechanism. Therefore, the sort of renovation used throughout reintegration shows a dynamic character in changing occlusal power and communication zone. The properties of features such as the residual dentition, occlusal connection extent, and dissimilar sorts of therapy on occlusal power require additional examination. To avoid endodontics problems dentists should consider: occlusal contact area, clenching strength, occlusal force, and type of detection—attention to modern clinical techniques to avoid endodontic issues suggested. Access to the cavity should be designated based on a correct design of the dentist as an incorrect attempt may make root canals both challenging to recognize and to the device. Pre-operative study of radiographs should be made wisely. Numerous assistances are obtainable to eliminate cracked tools and unsuccessful root fillings, but the problem must first be properly identified**.** In conclusion, Dentists should be fully aware of the primary diagnosis and plan strategy based on individualized patients for any endodontic procedures.

Keywords: Endodontics, tooth pain**,** occlusal power, molar area, clenching strength.

1. Introduction

Endodontic surgical procedure has a long-standing history regarding dentistry practice. Numerous clinicians presented ideas of apical surgery in the late 19th and early 20th centuries. The purpose was to eliminate necrotic portions of the apex and to delete diseased periapical tissues [1-3]. When a dentist operates endodontic management, many complications may come across. In such conditions, adequate anesthesia allows endodontic treatment to be carried out painlessly. In those with acute inflammation, alternative techniques, and supplementary anesthesia may be required. In preparation and filling of the root canal system, attention to; gaining access to the root canal system, which may involve the removal of natural obstructions, previous restorations, root filling material, and broken instruments should be considered. Complex difficulties such as instrument removal and perforation repair are often better attempted by specialists [4-6]. Endodontic microsurgery is the development of the old-fashioned apicoectomy methods and integrates high intensification, ultrasonic root-end groundwork, and root-end filling with biocompatible filling ingredients. The current endodontic surgical procedure uses the dental operating microscope, incorporates cone-beam computed tomography (CBCT) for preoperative judgment and treatment arrangement, and has assumed piezoelectric attitudes to osteotomy and root management. Crown and root resection techniques have promoted the same technical improvements [7-10]. This review focuses on the current state of endodontic surgery problems by discussing the most recent additions to the clinical protocol and technical improvements to address modern endodontic microsurgery.

2. Materials and Methods

This comprehensive review was focused on the chosen recording objects for methodical evaluation strategies. Consequently, a well-organized assessment based on the precise demand by tentative the automated databanks of periodicals found on Web of Science, and Pubmed from their inception April 14, 2025, was performed. No limitations on object linguistic, year, or status regarding published articles were established in this judgment. We studied all reference lists of qualified articles, former

*Corresponding author: Dr. Pardis Palizban
(pardispalizban@gmail.com).

review objects, and recorded medical studies. Search approaches used by designated topic titles and keywords related to; “Endodontics Problems”, “Oral Microbiome in Endodontics,” and“Root Canal Cleansing.”

3. Results

3.1 Endodontics problems

Endodontic surgery includes several dealings for the management of teeth with a history of failed root canal treatment, such as root-end surgery, crown and root resections, surgical perforation repair, and intentional replantation [5].

Superior support by endodontists and dental associations of their skills to save natural teeth is needed to improve the uptake of endodontic treatments, to help counter the increasing trend towards teeth extraction, and the placement of expensive dental implants [11-15].

For immature permanent teeth with necrotic pulp, the endodontic treatments can vary significantly between endodontic consultants. To continue root maturation regenerative endodontic treatments are growing in popularity and are creating ever more complex treatment protocols, involving revascularization and/or autologous platelet-rich plasma and scaffolds to elicit host stem cell de novo tissue formation to reestablish the vitality of immature teeth [6].

Three-dimensional printing offers possibilities for the development of new models in endodontics. The major concerns with 3D-printed teeth are the resin hardness and printing accuracy of the canal anatomy [16]. The use of cone beam computed tomography (CBCT) in the diagnosis and/or management of endodontic problems is increasing [17]. The vital pulp treatments with indirect and direct pulp capping procedures have been described as a therapy for carious teeth for over a century.

A carious injury to the dentine-pulp complex stimulates a wide range of responses and the interaction between infection, inflammation, and repair will eventually impact the outcome of pulpitis, our ability to accurately and objectively diagnose the true inflammatory state of the pulp remains poor [18]. Root canal curvature and calcification present issues that upsurge the danger of technical chances throughout root canal management.

The incapability to attain patency to the apical third, asymmetrical dentine elimination foremost to transport-tation, perforation, and instrument break inside the curved trajectories are some of the procedural difficulties that might threaten the controlling of intraarticular infection and consequence in poor handling results.

Bent and limited canals present such difficulty that entire instrumentation notions and particularly intended instruments have been established to deal with the challenge [19, 20].

Available evidence, suggested the benefit of a single-visit treatment, in terms of time and convenience, for both patient and dentist [21, 22]. The study reported that the tasks of negotiating, cleaning, and shaping canals can frustrate even the most talented clinicians, mainly if the canals are congested by calcifications [23, 24].

3.2 Oral microbiome in endodontics

In 1891, the first oral microbiologist Willoughby D. Miller put onward the philosophy of oral main infections, proposing that oral microbial infection can disturb other parts of the body, connected to an assortment of systemic diseases [25]. The microenvironment at different sites in the oral cavity has different microbial structures and is controlled by multifaceted signaling, hosts, and exterior environmental features [26].

The likely ways for oral microbes to turn on the intestinal tract include oral microbes attacking the intestines, causing inequities in the intestinal microecology, and distressing tissues of the digestive system [27, 28]. Root canal infections are biofilm-mediated. The difficulty and inconsistency of the root canal system, together with the multi-species nature of biofilms, make disinfection of this system extremely challenging [29]. In those with cancer greater bacterial diversity including fusobacterium, dialister, peptostrepto-coccus, filifactor, peptococcus, catonella, and parvimonas was reported [30]. Bacterial infection of the root canal system only occurs when the pulp is necrotic or was removed for previous treatment. In some specific cases, including acute and chronic abscesses, the bacterial infection may reach the periradicular tissues.

Intracanal bacteria are frequently detected as sessile multispecies communities (biofilms) attached to the dentinal root canal walls. Infection in the main root canal lumen can spread to other areas of the root canal system [31]. The study reported that odontogenic infections, including endodontic infections, are polymicrobial, that need broad-spectrum antibiotics even in cases where antibiotics are not indicated, such as symptomatic irreversible pulpitis, necrotic pulps, and localized acute apical abscesses. Phenoxymethyl-penicillin, penicillin V, and penicillin VK combined with metronidazole, and amoxicillin (alone or together with clavulanic acid) is recommended [32, 33]

3.3 Root canal cleansing

Therapeutic strategies focussed on pulp preservation, are important when managing vital teeth with deep caries and an exposed pulp [34]. Under reduced pressure, alternating pressure fields generated microscopic and macroscopic cavitation bubbles. Subsequently, these vapor-filled cavitation bubbles collapsed, creating hydrodynamic turbulence. These two phenomena allowed the irrigant to penetrate the canal system and then be exchanged with a new irrigant [35]. The study indicated that the smaller new machine produced equivalent or better cleanliness results in the root canal system using significantly less irrigant (NaOCl) [36]. Self-adjusting file is a newer file system that facilitates less dentin removal with maximal cleansing of root canals. The self-adjusting file had shown superior cleaning efficacy compared with rotary Protaper Universal and manual K files [37]. Awareness of canal configuration, adequate clinical skills, and the use of specialized techniques of diagnosis, debridement, and obturation will pave the way for successful treatment outcomes [38]. The study suggested that hand ProTaper characterizes an innovative

advancement of endodontic treatment, but an abnormality from recognized procedures of canal root instrumentation can lead to failures of endodontics [39]. For primary teeth pulpectomy, zinc oxide-ozonated olive oil and zinc oxide-olive oil paste had shown good clinical and radiographic success [40].

Conclusion

Root canal treatment, or endodontic treatment, is a common procedure in dentistry. The main indications for root canal treatment are irreversible pulpitis and necrosis of the dental pulp caused by carious procedures, tooth crashes or damages, or dental distress. Effective root canal treatment is characterized by an absence of symptoms and clinical signs such as swelling and sinus tract in teeth without radiographic indication of periodontal involvement. Automated instrumentation with a mixture of sodium hypochlorite & EDTA could result in the best cleansing efficacy. Finally, nonsurgical retreatment leftovers are the first prime to talk in most cases with a history of endodontic failure, current endodontic microsurgery has become an expectable and slightly aggressive substitute for the holding of natural teeth.

Conflict of interest

The author declares no conflict of interest, financial or otherwise.

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