

Endodontic Flare ups: The Bacteriological Aspect

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Nothing is more distressing to a dental professional than the patient calling back after the root canal procedure appointment, complaining of pain. This definitely calls for urgent attention by the treating dentist as the situation sometimes is really very alarming. Such like cases are categorized under the term 'Endodontic flare ups'.

The endodontic flare up can be defined as a complication which is characterized by the development of pain, swelling or both, which commences within a few hours or days after the root canal procedures and is of sufficient severity to require an unscheduled visit for emergency treatment [1].

It is a well-established fact that microorganisms have a major role to play in the Endodontic infections. Bacteria and their byproducts are primarily responsible for the infection in the root canal system and it is obvious that their eradication forms one of the most important agenda of Endodontic therapy [2]. The environment of the oral cavity, its microclimate, diverse tissue and numerous microlocalities comprises a very favorable site for the growth of oral microflora. The microlocalities present in the oral cavity are saliva, teeth, dental plaque, gingival sulcus, cheek and tongue mucous membrane. The microorganisms usually present in oral physiological flora are bacteria, fungi, viruses, micoplasmas and protozoa. [3,4]. It has been reported that about 700 bacterial species can be found in the oral cavity, with any person having the potential to harbor 100-200 of these species [5]. The microbes involved in Endodontic infections can be broadly categorized into two: those responsible for Intraradicular infections and the others for Extraradicular infections.

Black pigmented Gram negative anaerobic rods such as Porphyromonas and Prevotella; Tannerella forsythia; Dialister species; Fusobacterium; Spirochaetes like Treponema denticola; Gram positive anaerobic rods such as Actinomycetes spp; Gram positive cocci like Streptococcus spp; other bacteria like Campylobacter etc. are those primarily responsible for Intraradicular infections. Those involved in the Extraradicular infection, dependent or independent of an intraradicular infection are anaerobes such as Actinomyces spp. Propionobacterium, Treponema spp. Fusobacterium Nucleatum etc. It is noteworthy that there are certain bacteria which persist in the root canal system even after its routine disinfection protocol during root canal treatment procedure. Such microbes are highly resistant and pose serious problems in management of Endodontic infections. Of these, the most common Gram negative anaerobic rods are Fusobacterium nucleatum, Prevotella spp and Campylobacter rectus; while the Gram positive bacteria are Enterococcus faecalis, Actinomyces spp, Propionobacterium spp, Staphylococci etc. [6].

It is yet to conclude that whether Bacteria only are responsible for the inter-appointment or post appointment flare ups in Endodontics or other factors such as Mechanical or Chemical factors also have an equal role.

There are three major issues which need attention as far as the endodontic flare ups and bacteria are concerned. First and the foremost is the extrusion of the debris beyond the apical foramen. This extrusion usually happens either due to iatrogenic over-instrumentation or as a result of inherent drawback of utilizing step-back technique for root canal preparation. Whatever may be the cause, the result is acute inflammation due to violation of apical foramen which results in disruption of the balance between aggression and defense in such a way that the host mobilizes an acute inflammation to re-establish the equilibrium which existed between microbial aggression and host defense mechanism prior to the start of endodontic treatment. The severity of flare up relies on both qualitative and quantitative variables of bacterial flora [1].

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Second factor is the change in environmental conditions inside the root canal system as a result of initiation of Endodontic therapy. A mixture of aerobic and anaerobic bacteria grows together in conjunction with each other in a state of equilibrium. However, once the root canal treatment procedure is initiated, the equilibrium gets disturbed, since some bacteria are removed while others stay behind especially if the entire cleaning procedure is not finished in one appointment. In such a case, at times, the more virulent ones are left behind or they become more virulent, thereby leading to flare ups [7].

Third important issue is the occurrence of secondary infection in the root canal system. This can happen during the treatment or even after the completion of endodontic therapy. Secondary infection occurs as a result of entry of microbes from the oral cavity into the root canal system if there is no rubber dam used or there is a leakage; break in the asepsis chain during treatment procedure; leakage from inappropriate temporary filling during inter-appointment interval or leaving the tooth open for the purpose of drainage or otherwise. Once the treatment is complete, the secondary infection can occur because of coronal leakage from temporary restoration if permanent restoration is not done in the same visit or is delayed for longer period of time for one reason or the other [8].

In addition to have said all above, one cannot overlook the importance of host immunity as an important factor regulating the incidence of flare ups in endodontic treatment. Patients with higher immunity levels can better resist the inflammation produced by bacteria and their byproducts as compared to those with poor immune system [9].

Since the origin if endodontic flare ups are polietiological, the management lies in thorough understanding of all the aspects [10]. The best management is to never let a flare up happen, a goal which is ideal but may not be achievable in all clinical situations. What lies in the clinicians' hands is to develop skills which can avoid its occurrence. The precautions include correct determination of working length using advanced apex locators [11], not to push the debris beyond apical foramen for which the use of crown down technique or hybrid technique is recommended [12], use of high quality temporary restoration to avoid coronal leakage [13], use of appropriate antimicrobial irrigants and intra-canal medicament [14] etc. Of all the above issues, it seems very clear the micro-organisms and their byproducts have a

magnanimous role to play as far as the endodontic flare ups are concerned and thus their thorough understanding is a must for successful endodontic therapy with absolute patient comfort.

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