ABSTRACT
Inter-appointment flare-up:
The current endodontic treatment can be virtually pain-free during the procedure, but the patient still may experience some pain after the appointment. Although some patients experience mild to moderate pain after endodontic treatment, a few experience what is now commonly referred to as a flare-up or a post-operative problem requiring an unscheduled visit with unplanned treatment to manage the patient's symptoms. This kind of unexpected event can negatively affect the patient's confidence in his/her dentist. This paper reviews the possible causes, the prevention and management of this unexpected problem- 'flare-up'.

Introduction
The inter-appointment flare-up may be defined as the occurrence of severe pain, swelling or both within a few hours or days following endodontic treatment appointment, requiring an unscheduled visit and active treatment.

The incidence of mild postoperative pain is common even when the treatment has followed acceptable standards, and this should be accepted and anticipated by the patients. However, an inter-appointment flare-up is considered to be an unusual occurrence. Studies report a varying incidence of flare-up ranging from 1.4 to 16%.

Causes for flare-up
The causative factor of inter-appointment flare-up encompass mechanical, chemical, and/or microbiological injury to the periapical tissues, which are induced or exacerbated during root canal treatment.

The knowledge on the cause and the mechanism behind the acute exacerbation of the periodontal pathosis after the initiation of the treatment is of utmost importance for the practitioner to properly prevent and manage this undesirable condition.

It has been shown that there is a local tissue adaptation to applied irritants; that is in an asymptomatic periapical lesion associated with infected teeth, there is a balance between microbial aggression and host defense. However, during endodontic therapy, new irritant in the form of microbial cells and/or products, trauma, medicaments, or irritating solutions may be introduced into the chronically inflamed periapical tissue. This alteration of the local adaptation syndrome can result in a violent reaction leading to flare-up (Table 1).

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<th>Table 1: Etiology of flare-up</th>
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<td><strong>Microbial cause</strong></td>
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**Microbial causes:**
Microbial insult is the common cause for inter-appointment flare-up. The development of pain as a result of microorganisms depends on several factors, most of which are likely to be interconnected. These factors include: the presence of pathogenic bacteria, microbial synergism, number of microbial cells, environmental condition and host resistance.

The situations during endodontic treatment in which the microorganisms can cause flare-up are as follows:

- Apical extrusion of microorganisms and their products during chemomechanical preparation.
- Incomplete instrumentation leading to changes in the endodontic microbiota or in environmental condition.
- Secondary intraradicular infection during the treatment, between appointments, or even after the conclusion of the endodontic treatment.

**Non-microbial causes:**
These include chemical and mechanical factors that can inflict damage to the periapical tissues. The non-microbial causes are usually associated with iatrogenic events. Examples of mechanical irritation include over instrumentation and over extended filling materials. The examples for chemical irritation include apical extrusion of irritants, intracanal medicaments or root canal sealers.

**Preventive measures for flare-up**
Clinicians should adopt certain guidelines in an attempt to prevent inter-appointment flare-up, which are as follows:

- Determination of the correct working length to prevent trauma to the periapical tissue and to avoid apical extrusion of debris.
- Selection of an instrumentation technique that extrude less amount of debris apically, which usually
is the crown down technique with rotary action combined with copious and frequent irrigation.
* Chemo-mechanical procedures should be completed in a single appointment.
* Use an antimicrobial intracanal medicament between appointments in infected cases for maximum microbial elimination from the root canal system.
* Do not leave the teeth open for drainage as this can lead to secondary intraradicular infection.
* Endodontic treatment should be preformed under strict aseptic condition.

**Treatment of flare-up**

When a patient comes to the clinic with mid treatment endodontic flare-up it is incumbent upon the dentist to reassure him/her. After this the definitive treatment should be carried out which includes:
> Re-instrumentation: Working length should be re-confirmed, patency of the apical foramen obtained and a thorough debridement with copious irrigation performed.
> Cortical trephination: It is the surgical perforation of the alveolar bone in an attempt to release the accumulated tissue exudate. But the effectiveness of this procedure is controversial.
> Incision and drainage: If pain is present along with swelling and there is no drainage through the root canal, then drainage should be established under soft tissue.
> Intracanal medicaments: The use of intracanal steroids, non-steroidal anti-inflammatory drugs or a corticosteroid-antibiotic compound has been shown to reduce post-treatment pain.
> Occlusal reduction: This may alleviate the post-operative pain.

> Antibiotics: The systemic use of antibiotics should be restricted to patients exhibiting signs of systemic involvement, such as cellulitis, fever, malaise, and toxemia.

**Conclusion**

Even though it has been demonstrated that a flare-up has no significant influence on the outcome of endodontic treatment, its occurrence is extremely undesirable for the patient and the dentist, as this kind of unexpected event can negatively affect the patient's confidence in his/her dentist. The knowledge on the cause and the mechanism behind the inter-appointment flare-up is of utmost importance for the practitioner to properly prevent and manage this undesirable condition.

**References**