Paresthesia case study: diagnosis and management

ABSTRACT

Parasthesia is defined as a sensory disturbance with clinical manifestations such as burning, prickling, tingling, numbness, itching or any deviation from normal sensation [1] . Paresthesia of the inferior alveolar nerve can occur during various dental Procedures like local anesthetic injections, third molar surgery, orthognathic surgery, Ablative surgery, Implants, and endodontics. This case report highlights a commonly occurring and often reported problem of Paresthesia involving the Mental Nerve during endodontic treatment. Most of the previous case reports have used radiographs for the diagnosis and management of these cases. Since the radiographic image is a 2 dimensional image it has its limitation while a 3 dimensional imaging modality like a cone beam computed tomography (CBCT) provides the clinician with additional information which can be critical in the management of cases. The exact 3 dimensional location of the mental foramen in relation to the apex of the concerned tooth can be confirmed using CBCT scans, helping make more informed diagnosis and treatment plans. This case was successfully managed using CBCT images for guidance during the root canal treatment.

INTRODUCTION

Parasthesia is defined as a sensory disturbance with clinical manifestations such as burning, prickling, tingling, numbness, itching or any deviation from normal sensation [1] . Paresthesia of the Inferior Alveolar Nerve and its branches can occur during various dental Procedures like Local Anesthetic

Injections, Third Molar Surgery, Orthognathic Surgery, Ablative Surgery, Implants, and Endodontics [2, 3] .

Damage to vital structures in the head and neck area during dental treatment is always a vexing prospect for the clinician. During Endodontic Treatment precautions have to be taken against this, as there is a possibility of injury to a vital structure with the instruments or chemicals being used and also a chance of depositing infected material with their byproducts from the tooth into these areas causing a subsequent immunological response from the body. Today we are able to use 3 Dimensional imaging to locate and respond to such situations much more precisely than ever before [4, 5] . This case highlights a commonly occurring and often reported problem of Paresthesia involving the Mental Nerve during endodontic treatment [6. 7] which was managed using a CBCT to offer the patient a predictable treatment. Most of the previous case reports have used OPG'S and Intra oral periapical radiographs for the diagnosis and management of these cases. Since these are 2 dimensional imaging techniques they have their limitations. Cone Beam Computed Tomography (CBCT) is 3 dimensional imaging modality which provides the clinician with additional information which can prove to be critical in the management of such cases.

CASE REPORT

A 32 Year old female patient was referred to the Department of Conservative Dentistry with the chief complaint of a dislodged temporary restoration in a tooth undergoing endodontic treatment at a private dental clinic. Patient gave a history of Root canal treatment having been started 2 weeks back.

Clinical Examination revealed an exposed access opening and extreme tenderness to percussion. Radiographic evaluation confirmed the history presented by the patient (Fig 1). A differential diagnosis of Periapical granuloma/ Periapical Abscess was recorded and the patient was advised to complete the Root canal treatment.

In the first appointment the access opening was refined under local anaesthesia and the pulp tissue remnants were extirpated using a barbed broach followed by temporistion. The patient was recalled after 4 days for Root canal instrumentation. In the second appointment local anaesthesia was administered and working length determination was done using an apex locator (Propex 2, Dentsply) followed by confirmation with a radiograph (Fig 1). The working length was kept at 0. 5mm short of the radiographic length of the tooth and the root canal instrumentation was carried out. Saline and Sodium Hypochlorite were used to copiously irrigate the root canal space and instrumentation was carried out with the Protaper Rotary system. The root canal was dried and the tooth was temporized for obturation in the following visit. On the next visit 7 days later the patient complained of Parasthesia of the lower lip from the date of the previous visit. On examination there was Parasthesia of the left half of the lower lip and its distribution was consistent with the supply of the mental nerve (Fig 2). A close examination of the IOPA revealed the presence of the mental foramen directly below the apex of the treated premolar indicating possible deleterious effects of the previous procedure causing and periapical inflammation and subsequent damage to the mental nerve. A CBCT was taken to confirm the exact location of the mental foramen. The CBCT images

confirmed the extreme close nature of the mental foramen to the apex of the treated premolar (Fig 3, 4). The distance between the apex of the premolar to the mental foramen was measured to be 0. 4mm by using the CBCT software. Taking this into account the working length was reset at 1. 5 mm short of the radiographic apex. The tooth was then instrumented to the new working length and the canals were irrigated with saline and sodium hypochlorite followed by drying using paper points.

The patient was advised that the Parasthesia will gradually disappear and that the lip will regain normal sensation and was scheduled weekly recall appointments. The Parasthesia was still present at the one week recall appointment until the 6 th week after which gradual normalization was observed. At end of two months the Parasthesia had completely disappeared and normal sensation had returned.

Endodontic treatment was resumed keeping the new working length. The instrumentation was completed and the tooth was obturated using F3 (Protaper Dentsply) size gutta percha for apical fill and Obtura 2 with System B for back fill using continuous wave of condensation techniqueA one week follow up was done to confirm the absence of any recurrence of the Parasthesia following the obturation. Finally the tooth was restored with a No. 1 size fiber post (Angelus Brazil) and crown was placed (Fig 5).

DISCUSSION

Dental radiographic evaluation is a fundamental tool for endodontic diagnosis. Conventional Intraoral Periapical radiographs are routinely employed during endodontic diagnosis to examine the tooth, identify the

pathology and plan the treatment. However, a conventional radiograph is a two dimensional image of a three dimensional object and consequently has limitations. Numerous prior studies have demonstrated the effective use of CBCT in the assessment of complex endodontic cases . In cases where location of a vital structure such as the mental foramen or the Mandibular canal are concerned the 3 Dimensional imaging capabilities of a CBCT are invaluable. With CBCT and its advanced 3 D reconstruction software, it is possible precisely orient the teeth under treatment with the adjacent anatomic structures across a multitude of planes to get measurable values of distance, which help with the consequent predictable treatment plan.

In situations of close proximity of a nerve to a tooth which is being endodontically treated various possibilities of damage to the nerve exist. Mechanical compression of the nerve, Damage to the nerve due to over instrumentation, Extrusion of necrotic debris and toxic metabolites from the root canal space, overfill or the passage of various endodontic materials (root canal irrigants, sealers, and paraformaldehyde containing pastes) into the vicinity of the nerve or its branches.

In the present case the most probable cause of the Parasthesia could have been an acute exacerbation of the Periapical infection due to Extrusion of the necrotic debris from the root canal space into the mental foramen space and/or inadvertent direct mechanical compression of the nerve because of over instrumentation of the tooth during working length determination

Direct peripheral nerve injury has been previously classified into three basic types: Neurapraxia, Axonotmesis and Neurotmesis [8] . Neurapraxia occurs

due to a slight compression of the nerve trunk resulting in a temporary conduction block. Neurapraxia of the inferior alveolar nerve or mental nerve will usually manifest as a Paresthesia or Dysaesthesia of the lip and chin region [9] . Axonotmesis refers to the actual degeneration of the afferent fibers as a result of internal/external irritation resulting in anesthesia [10] . Neurotmesis is the complete severing of the nerve trunk, resulting in permanent Paresthesia which can only be corrected by microsurgery and has a more guarded prognosis [(8-10)] . The most likely form of injury in the present case seems to be Neurapraxia due to either periapical infection or direct injury by over-instrumentation/inadvertent passage of the root canal irrigant or both. The tooth responded well to conservative treatment, and upon completion of the debridement and disinfection of the root canal, the symptoms of periapical infection subsided and Paresthesia started to diminish.

CONCLUSIONS

The lower mandibular premolars very frequently are in close approximation to the Mental foramen and the Mandibular canal. The pre-operative radiograph does provide us with a 2 dimensional image but better more accurate location can be obtained using the CBCT whenever possible. Finally the best method to prevent any damage to the Mental Nerve is to locate it.