

# MENTAL NERVE PARESTHESIA DUE TO OVEREXTENSION OF ROOT CANAL SEALERS: A CASE REPORT

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## ABSTRACT

*Injury of the mental nerve due to root canal treatment of lower bicuspid or 1st molar is a rare complication. It usually occurs due to overinstrumentation of the canal or overextension of gutta percha or root canal sealers.*

*Mental nerve paresthesia usually manifests as tingling, numbness, burning or itching. Duration of paresthesia depends upon the extent of mental nerve damage or persistence of the etiology.*

*A case report of 33 years old female patient is described who attended our clinic with mental nerve paresthesia since 10 months due to overextension of root canal sealers.*

**Keywords:** *mental nerve, paresthesia, sealer.*

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## INTRODUCTION

Paresthesia is defined as a sensory disturbance with clinical manifestations such as burning, pricking, tingling, numbness, itching or any deviation from normal sensation.<sup>1,2</sup> Paresthesia may be transient or chronic, and may be due to multiple causes. It can occur anywhere in the body and is usually painless, and may be attributed to a systemic etiologic factors such as diabetes mellitus, lymphoma and multiple sclerosis or may be local.<sup>3</sup> Paresthesia of mental or inferior alveolar nerve can occur during different dental procedures like inferior dental nerve or mental block anaesthetic injections, dental implants, lower third molar extraction, orthognathic surgery, flap reflection surgery at mental nerve area, and root canal treatment of lower premolars and molars.<sup>4,5</sup> Pressure of periapical infection and benign or malignant tumors at inferior dental nerve or mental nerve area can affect their sensory functions.<sup>6</sup>

Root canal treatment related mental nerve paresthesia are classified into two categories; mechanical or chemical injury of the nerve. mechanical injury can be caused from root canal over-instrumentation into the mental nerve foramina or pressure exerted by over-extended endodontic gutta percha.<sup>7</sup> Chemical injury

can be caused due to neurotoxicity of the irrigants, intracanal medicaments and root canal sealers which may have over extended the apical foramen.<sup>8,9</sup>

Inferior dental nerve or mental nerve paresthesia could be reversible and vary from days, weeks or several months or in some cases paresthesia might even become irreversible.<sup>10</sup> Irreversible paresthesia can result from massive nerve damage which may cause complete cut of the nerve, prolonged pressure on the nerve or prolonged contact with toxic overextended root canal materials.<sup>11</sup>

The present paper describes a case of mental nerve paresthesia following root canal treatment of lower second premolars.

### Case report

A 33 years old female patient was referred from a routine dental clinic to Periodontics Clinic at Prince Hashim bin AlHussein Military Hospital, with the chief complaint of food impaction and burning sensation at lower right buccal gingiva which extended from lower right second premolar to lower right central incisor accompanied with numbness in the right lower lip and chin since 10 months. The patient reported that weeks after she had received endodontic treatment from a general dentist in her lower right mandibular second premolar.

Patient developed numbness weeks after getting root canal treatment. She contacted her dentist and

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told him about her complaint, who reassured the patient and told her that is temporary. He prescribed B complex injection and multivitamins (centrum) and asked her to take them regularly for one month.

She used the medicine for one month without any recovery of sensation, and visited her dentist who told her that it may take up to six months to recover lip sensation and asked her to continue medication for six months.

Patient used B complex and multivitamins for 10 months without any progress and then came to our clinic for treatment.

On extra and intraoral clinical examination with a dental probe, the area of numbness was found extending from midline of the lower lip right side to lower right second premolar and the buccal gingiva extending from lower right second premolar to lower right central. Vitality test using electric pulp tester was done for teeth from lower right central to lower right second premolar but there was no response.

On radiographic examination, periapical and pan-

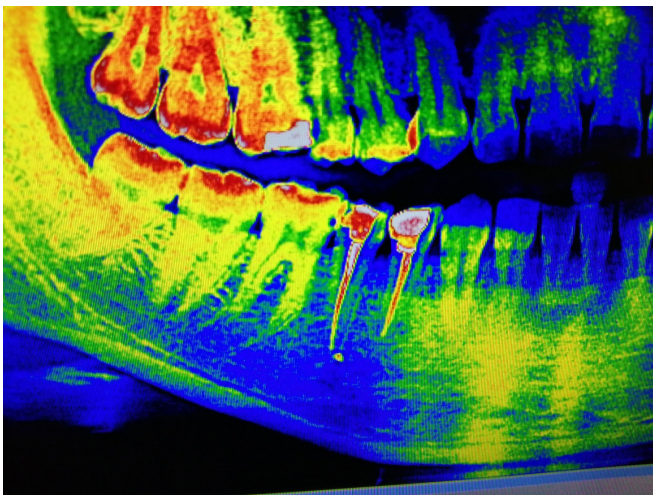


Fig: 1



Fig: 2

oramic x-ray an overextension of root canal sealers reaching to mental foramina was noted (fig 1,2).

About a month ago, after reflecting the flap in the area of mental nerve, we removed the extended sealer and did curettage. Multivitamins and B.complex were prescribed. So far no progress has been noted. One maxillofacial surgeon thinks, it is irreversible due to long lasting chemical injury to the mental nerve.

## DISCUSSION

Mental foramen is located on anterior surfaces of mandible;<sup>12</sup> most common location of mental foramen was below the apex of second mandibular 2<sup>nd</sup> premolar at a distance from 1-3 mm from the root apex.<sup>13</sup> The toxicity of root canal treatment materials are reviewed. Accidental overfilling of the root canal may expose the patient by constituents leaching from the unset and set sealer.<sup>14</sup> Most sealers exhibited a cytotoxic response, especially unset and the responses diminished with time after setting. Unset and newly set endodontic material may also have a toxic potential in vivo that may result in a localized inflammation postponing the healing of an apical periodontitis.<sup>15</sup> Paraformaldehyde containing root canal sealers is of biological concern.<sup>16</sup> Intracanal medicaments, endodontics irrigants, and root canal filling materials should fit the canal and should not overextend to apical structure or other surrounding structures. Endodontics filling materials, including gutta percha and root canal sealers, can induce paresthesia via chemical or mechanical mechanisms.<sup>17</sup> Their extension beyond the tooth apex can result in clinical manifestations related to the toxicity of the product, although small amount of material extrusions well tolerated by the perirapical tissues. When the filling materials come into contact with nerve structures, the toxic effects can manifest in the form of anesthesia, hypoesthesia, paresthesia or dysesthesia that may prove irreversible.<sup>16</sup>

Gutta-percha is the most common used endodontic filling material. Gutta-percha points usually composed of 20% gutta-percha, 60%–70% zinc oxide, plasticizing agents (waxes and resins), barium sulfate, colouring agents and trace metals. Gutta-percha features a low level of poisonous quality, which makes it a material of choice in root canal treatment. In this way, the passage of a gutta-percha cone beyond root apex rarely causes paresthesia. In fact, the cone tends to distort without compressing the nerve or blood vessels.

In addition, it is a relatively inert material that causes no lesions of chemical origin if it contacts the neurovascular bundle. Gutta-percha has been assessed in different cell culture frameworks and found to inspire no or low cytotoxicity, in spite of the fact that cytotoxic impacts shifted among brands.<sup>17</sup> However, depending on the gutta-percha product used, in vivo studies in both hard and soft tissues resulted in reactions varying from none to chronic inflammation. The observed inflammation may have been induced

by anti-oxidants and oxides associated with the gutta-percha compound.<sup>18</sup> Systemic response to gutta-percha items has not been reported.<sup>18</sup>

Another important cause of paresthesia is endodontic sealer. Chemical injury to nerve by root canal sealers may lead to paresthesia.<sup>16</sup> Most commonly used Endodontic sealers contains zinc oxide and eugenol-based sealers. eugenol is the most common cause of toxicity, when eugenol in direct contact with the mental or inferior dental nerve neurotoxic effect in paresthesia or anesthesia has been demonstrated. Ozeki reported that a concentration of 200 ppm eugenol can anesthetize crayfish. Trowbridge and colleagues showed that freshly mixed zinc-oxide eugenol inhibits intradental nerve activity.<sup>18</sup>

Calcium hydroxide based sealers also used commonly in root canal treatment. Boiesen and Bodrin claims that they caused nerve damage that may become irreversible in an experimental model, and clinical studies confirmed that.<sup>19</sup>

Ahlgren and colleagues reported a case in which extrusion of a large amount of a calcium hydroxide based sealer beyond the apical area and cause mechanical compression on the inferior dental nerve leading to nerve paresthesia.<sup>20</sup>

Also Blanas and colleagues reported nerve paresthesia due to thermal nerve injury, overextension of gutta-percha and obturation using thermoplastic technique induce thermal injury to nerve leading to nerve paresthesia.<sup>21</sup>

Zeliha and colleagues reported a case of irreversible inferior alveolar nerve damage after the overextension of root canal sealer into the mandibular canal.<sup>22</sup>

Szalma and colleagues reported complete neurosensory function recovery of mental nerve after removal of overextended sealer using piezoelectric technique shortly after parasthesia was noted.<sup>23</sup>

In conclusion root canal treatment of lower premolars and molars should be done with caution, periapical radiographs or CBCT should be done to know accurate anatomy of vital structures in this area.

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All authors contributed substantially