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*Lower alveolar nerve damage in a patient following endodontic
treatment – a case study*

Over recent years, endodontics has shown itself as a rapidly advancing field within dentistry; however, endodontic treatment is still not free of complications and failures. Generally, the worst case scenario following complications such as under-filling of the canal, perforations of the canal or chamber, or breaking of the needle inside the chamber or canal while performing endodontic treatment, require extraction of the tooth. However, certain complications such as overfilling of the physiologic apex of the canal with endodontic material may cause symptoms that are not so readily managed. If overfilling of the physiologic apex of the canal occurs, oft-times the patient's immune system produces an inflammatory response to the foreign endodontic material. This inflammatory response can lead to peri-apical granulomas, which are often treated by apicectomy and resection of the inflamed tissue. If endodontic material is filled past the anatomic apex of the dental root and invades the maxillary sinus or lower alveolar root canal, even more severe complications may arise. This type of complication may produce lower alveolar nerve damage by mechanical compression of the nerve, neurotoxicity, and irritation of the nerve by infective agents from the dental root canal. The clinical symptoms accompanying the lower alveolar nerve injury by overfilled material may be acute, sharp pain, paresthesia, hyperthesia, hypothesia, or anesthesia of tissue innervated by the effected nerve. With severe cases, the patient is unable to eat, drink, or touch the innervated area because of the exacerbation of the pain. Although surgical treatment is often used to remove the irritant, it is often not completely successful in alleviating the symptomatology of the neurological dysfunction.

CASE DESCRIPTION

Having been referred from her primary dental practitioner, a 36-year-old woman presented at the Medical University of Lublin, Department of Periodontology with pain localized on the right side of the mandible to the chin. Stimulation of the right cheek provoked attacks of acute pain that prevented her from touching her face. Occlusion of her teeth during chewing produced an intense pain that prevented the patient from eating. In addition, the patient also lost sense of taste on the right side of her tongue.

The extremely intense nature of the pain made it impossible for the patient to carry out daily functions. Oral exam of the patient revealed temporary fillings in teeth 46, 47, but not the source

of the neurologic dysfunction. The nature of the problem was only made apparent upon radiologic exam, where overfilling of canals in tooth 47 was evident.

One month before her referral to the department of periodontology, she visited her primary dental practitioner to receive treatment of teeth 46, 47. Due to the advanced state of the caries, the teeth were qualified for endodontic treatment. The beginning of the endodontic treatment saw the opening of the chambers of both teeth, and devitalizing paste was administered to destroy the pulp so that endodontic treatment might progress. After the devitalizing paste was applied, the chambers were sealed with a temporary filling. Within the next visit, the pulp was evacuated and the three canals of tooth 46 were filled using endomethasone, and a temporary filling was applied. The same procedure was repeated two days later on tooth 47. Thirty minutes after filling the canals of tooth 47, the patient began to feel paresthesia of the gingiva, lower lip, chin, and tongue. Within one hour, the patient's core body temperature had risen to 38 degrees Celsius, with disgeusia and acute right mandibular pain soon developing. The patient characterized the pain as spontaneous and acute, and aggravated by touch or pressure on the right side of her face and mandible. Due to the overwhelming nature of the pain, the patient was unable to eat or drink as these activities intensified the pain.

Upon return to the primary dental practitioner the following day, the dentist attempted to alleviate the painful symptoms by filing the two teeth in order to minimize contact with the maxillary molars. Upon X-raying the teeth, the dentist observed overfilling of tooth 47 canals with endodontic material, which had extended into the lower alveolar nerve canal. The patient was prescribed the antibiotic Dalacin -C (clindamycin) and Nurofen Forte (ibuprophen), and instructed to return for check-ups twice per week. After the course of antibiotics had finished and no abatement in symptoms was observed, the primary dentist prescribed cocarboxylase and cyanocobalamin (vitamin B12) therapy. This new course of treatment brought the patient's core body temperature to physiologic levels, but did not alleviate the pain symptoms. It was at this time that the primary dentist referred the patient to the Medical University of Lublin's Department of Periodontology.

After initial consultation at the periodontology department, low-level laser therapy (LLT), (also known as cold laser therapy) was conducted with laser type PMC - 018 with a wavelength of 670-904 nm was started. Treatment was performed once per day, for two weeks, intra-orally on the mucous membrane of the gingiva of teeth 46 and 47. For each of the treatments, the dosage was 10 Jules/cm². After two treatments of laser therapy, paresthesia and pain decreased in intensity. Total alleviation of pain was achieved after seven treatments, with symptoms of paresthesia persistent until the 13th treatment. After the 13th treatment provided the patient referred persisting, but minimized paresthesia in the area of tooth 43. Four months after overfilling the canals, the controlled X-ray was repeated. It showed the same dimensions and the same location of the overfilled material as the first X-ray taken after the endodontic treatment.

The patient reported persisting paresthesia in the area of tooth 43 and incidents of a quick, sharp, acute pain on the right side of her mandible once or twice per week. The acute pain is not being provoked by any stimuli. Currently, the patient is still under observation and she is advised to come for check-ups each month.

DISCUSSION

Overfilling of the physiologic apex of the canal is a frequent complication following endodontic treatment. When the canal is overfilled to such a degree as described in the above case, it may readily lead to serious neuropathologic complications such as lower alveolar nerve damage. When lower

alveolar nerve damage occurs following endodontic treatment, treatment strategies often include a combined approach of surgical and pharmacologic intervention. As surgical intervention may pose a risk of greater nerve damage, oft-times dentists propose conservative and less invasive methods to manage and minimize the symptoms produced by lower alveolar nerve damage before resorting to surgery. One of these conservative treatment strategies include low-level-laser therapy (LLT) in conjunction with pharmacotherapy.

Although the size and location of the foreign body (endodontic material) remained the same, in the described case, pharmacotherapy and laser therapy brought the expected results: alleviation of the pain, minimization of the paresthesia, return of the sense of taste. As the patients symptoms have abated, the patient has been recommended to return once per month for check-ups to determine any changes that may occur as the endodontic material may either be resorbed, or develop into a cyst as a chronic inflammatory response to the foreign material.

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SUMMARY

Among the possible complications following endodontic treatment, injury to the lower alveolar nerve may be one of the most severe. In order to alleviate symptoms of lower alveolar nerve damage, treatment strategies tend to take a combined approach of conservative, pharmacological, and many times, surgical intervention. This case study details the efficacy of low-level-laser therapy (LLT) in conjunction with pharmacotherapy in the treatment and outcome of a patient suffering from lower alveolar nerve damage following endodontic treatment.

Uszkodzenie nerwu żębodołowego dolnego w następstwie leczenia kanałowego – opis przypadku

Wśród możliwych komplikacji mogących pojawić się w następstwie leczenia kanałowego uszkodzenie nerwu żębodołowego dolnego jest jedną z najpoważniejszych. Leczenie dotkliwych dla pacjenta objawów jest często złożone i obejmuje terapię zachowawczą, farmakoterapię, niekiedy interwencję chirurgiczną. Opis przypadku dotyczy dolegliwości pacjenta w następstwie uszkodzenia nerwu żębodołowego dolnego, które leczone były za pomocą farmakoterapii i biostymulacji laserowej.