

## Case Report

# Decompression of the inferior alveolar nerve to treat the pain of the mandible caused by fibrous dysplasia-case report

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**Abstract:** Fibrous dysplasia is a kind of benign bone lesion characterized by the manifestation of the replacement of the normal substance of bone by fibro-osseous connective tissue. A patient diagnosed fibrous dysplasia had unbearable pain in the left mandibular region only. To treat the patient, an navigation template was designed to guide the decompression of inferior alveolar nerve, and piezosurgery was performed to do the osteotomy. After the surgery, the pain disappeared. The sensation of the lower lip recovered.

**Keywords:** Pain, fibrous dysplasia, decompression of inferior alveolar nerve, digital medical piezosurgery

## Introduction

Fibrous dysplasia is a kind of benign bone lesion that may occur in all kinds of bones [1]. It is mostly characterized by the replacement of the normal substance of bone by fibro-osseous connective tissue [2, 3]. The duration is always long [1]. In maxillofacial region, a slow and painless swelling of the jaw is the most common clinical manifestation [3]. Shaving or bony graft is the surgical choice if deformity or inflammation is severe [1, 4, 5]. Rarely, some patients complained the pain of the affected mandible only without deformity and inflammation. To such patients, treatment was difficulty. In present paper, we reported a case of mandibular fibrous dysplasia with complain of severe pain at the affected mandible, and tried piezosurgery decompression of the inferior alveolar nerve under the guide of digital navigation template.

## Case report

A female patient aged 57, complained a persistent pain in the left mandibular region for about a year. During the process of the disease, there was no history of fever and mandibular trauma.

Systemic disease such as diabetes mellitus, hypertension and so on was not found too. Anti-infection therapy was invalid.

On examination, both side of mandible was symmetric without pain in palpation and fluctuation. The maximal mouth opening was about 35 mm. The teeth of 35 and 36 were extracted before. There were no other abnormal findings.

Oral panorama X-ray and CT (**Figure 1**) showed high density with a 'ground-glass' appearance around the left mandibular canal without clear boundary. The lesion extended from the midline to the angle of the mandible. By measuring on the coronal plane, the left foramina mentale and partial mandibular canal were more constrictive than the right side. The clinical diagnosis was fibrous dysplasia. Current perception threshold (CPT) (Neurometer®, USA) was applied to evaluate the extent of the damage to inferior alveolar nerve (IAN). The result showed that the data of the left and right side was the same with the level of 3.00, which means mild sensory dysfunction.

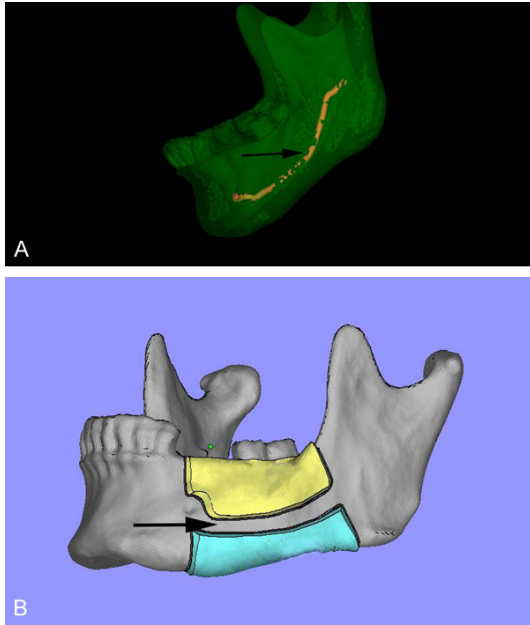
Before the operation, we reconstructed the left IAN (**Figure 2A**). To decompress the left man-



**Figure 1.** CT and Oral panorama X-ray (A) CT scan of the 'ground-glass' lesion (white arrow). (B) The left mandible with strictions (Black arrow).

dibular canal and foramina mentale, two digital navigation templates which showed where and how to do osteotomy was designed by proplan 1.4 (**Figure 2B**). The upper plate was designed to mark the upper margin of the mandibular canal and to be fixed at the gingival margin of the left mandible; the lower plate was designed to mark the lower margin of the mandibular canal and to be fixed at the inferior border of left mandible.

Under general anesthesia, the left mandible and the mental nerve were exposed via intra-oral approach. Then the digital navigation templates were used to guide the decompression of the mandibular canal and the foramina mentale (**Figure 3A**). By piezosurgery device and surgical chisel, the lateral bone of mandibular canal was carefully removed from foramina mentale to the teeth of 37 to decompress IAN (**Figure 3B** and **3C**). After the operation, the



**Figure 2.** The laboratory design. A. Reconstruction of the mandibular canal; B. Design of two digital navigation templates, the designed operation region was between the two navigation templates (The black arrow).

diagnosis was confirmed by the pathological examination.

After the surgery, the pain of the left mandible disappeared, but numbness occurred in the left lower lip. Oral panorama X-ray and CT showed the compression around inferior alveolar nerve and foramina mentale disappeared (**Figure 4**). CPT was measured three days after the surgery. The result showed the right side was 3.00 and the left side was the level of 9.45, which means severe hypoesthesia. Neurotrophyl medicine was applied for three months. One year after the surgery, no pain and swelling occurred in the left mandible, and the numbness of the lower lip was disappeared. CPT examination was made again and showed the level of 0.00 in left side.

## Discussion

Fibrous dysplasia is a kind of disease that normal bone marrow and cancellous tissue are replaced by fibro-osseous connective tissue and irregular immature bone. The disease processes slowly [2, 3]. Most patients came to the hospital because of deformity or infection. To these patients, local resection of bone is the

most effective treatment. However, a few patients will complain the pain in the affected mandible only, just like our patient. According to the findings in her CT scans, the reason of the pain might be the compression of IAN caused by proliferous irregular immature bone. To this kind of patient, the aim of the treatment was not the removal of the lesion.

We believe that it is a wonderful choice to do decompression of IAN for the patients with complain of pain only. But it is important that there was not serious maxillofacial deformity or infection. The key point of the operation was to locate the mandibular canal and to reduce the damage of IAN. Digital medicine and piezosurgery play an important role in the treatment [5, 6]. They can promote the precision of operation, reduce operation hours, minimizing the surgical injury and improve the predictability of surgery [7, 8]. Especially for this patient, digital navigation template was designed to mark the canal and the osteotomy line, and significantly reduced the possibility of nerve transection. On the other hand, piezosurgery device can improve the accuracy of osteotomy to minimize the mechanical and high temperature damages of nerve which were disadvantages of the electric saw or bur.

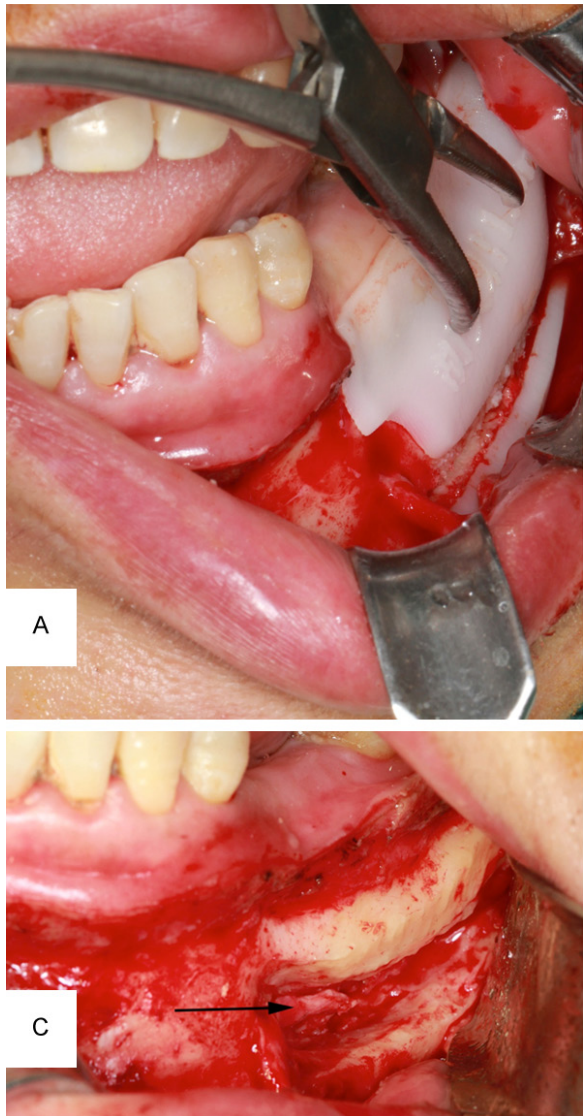
After the decompression, the symptom of pain was disappeared. Although the numbness of lower lip was lasted for 3 months, it was recovered at last. The application of CPT makes it possible to evaluate the function of nerve objectively. Before the operation, the CPT of lower lip was 3.00 which means mild sensory dysfunction; three days after the surgery, it was 9.45 which means severe hypoesthesia; 1 year after the surgery, it recovered to 0.00 which means normal.

So, the fibrous dysplasia in mandible may cause pain only. To treat this kind of patients, decompression of IAN is an invasive and effective method. Digital navigation template and piezosurgery can promote the precision of operation and minimize the injury of IAN.

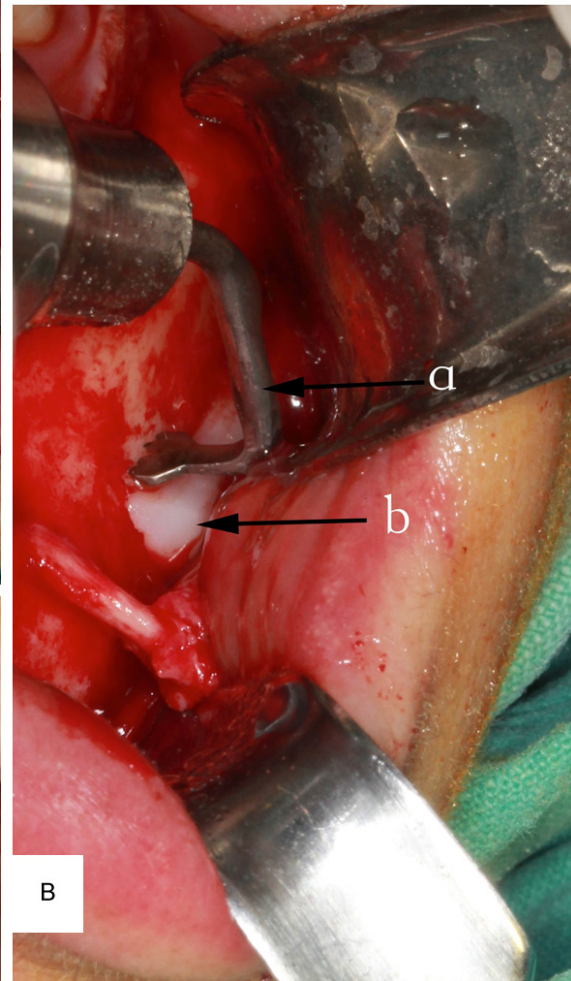
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**Figure 3.** The process of operation. A. Location of mandibular canal by digital plate; B. Osteotomy by piezosurgery (a for the piezosurgery, b for the navigation template); C. Exposure of the inferior alveolar nerve.



**Figure 4.** Postoperative CT with the decompression of the inferior alveolar nerve.

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#### Disclosure of conflict of interest

None.

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