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## Case Report

# Vertical Fracture of Mandibular Condyle Treated with Intra-articular Pumping Therapy: A Case Report

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## Abstract

We report a patient with vertical fracture of the mandibular condyle visualized by computed tomography (CT). A 43-year-old woman visited our department the day after the injury occurred. At the initial examination, she experienced pain in the left temporomandibular joint (TMJ) when opening her mouth. Maximum mouth opening distance was 15 mm. Routine radiography showed normal findings, but CT revealed vertical fracture of the left mandibular condyle. Based on clinical findings, conservative therapy consisting of intra-articular pumping therapy and training for mouth opening was initiated. After 10 days, mouth opening distance increased to 36 mm, and pain in the left TMJ disappeared.

Key words: Vertical fracture—Mandibular condyle—  
Intra-articular pumping therapy—Computed tomography

## Introduction

Fracture of the mandibular condyle is very rare among mandibular fractures<sup>6</sup>. Diagnosing not only vertical fracture but also other types of fracture of the mandibular condyle is difficult due to its anatomical characteristics<sup>1,3,5</sup>. We encountered a vertical fracture of the mandibular condyle that could be visualized by computed tomography (CT).

Treatment of fracture of the mandibular condyle aims at recovery of the motor function of the jaw. Therefore, training for mouth opening is indispensable. In this case, intra-

articular pumping therapy was performed to alleviate discharge of viscous synovial fluid mixed with blood and pain. From the first day of this therapy, it was also possible to commence mouth opening training. Mouth opening was achieved early, with favorable results.

## Case

A 43-year-old woman visited our department due to a locked jaw and pain in the left temporomandibular joint (TMJ) on March,

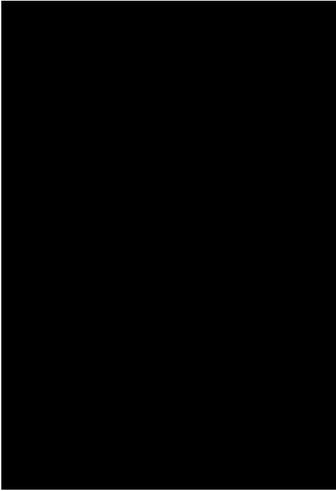


Fig. 1 Facial condition: no deviation of mandibular midline was observed.



Fig. 2 Occlusal condition: intercuspation was possible.

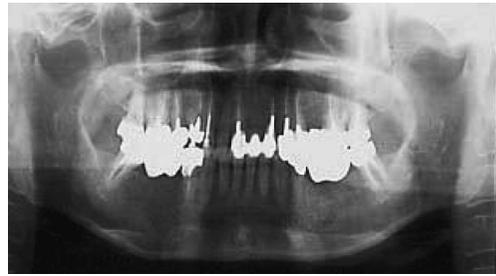


Fig. 3 Orthopantomogram: orthopantomogram showed normal findings.



Fig. 4 Orbit-ramus projection radiogram: orbit-ramus projection radiogram showed normal findings.

200X. In the afternoon on the day before her visit, she became very drunk, fell, and received a heavy blow to her chin. On the day of the injury, she underwent suturing for laceration of the chin skin at a local surgical hospital. At the first examination at our hospital, she experienced pain in the left TMJ when opening her mouth, and maximum mouth opening distance was 15 mm. There was no deviation of the mandibular midline (Fig. 1), and intercuspation was possible (Fig. 2).

Routine radiography (orthopantomogram and orbito-ramus projection radiogram) on first examination day showed normal findings (Figs. 3 and 4). However, CT performed 5

days after injury revealed vertical fracture of the left mandibular condyle (Fig. 5).

There was no deviation of the mandibular midline, and intercuspation was possible. Therefore, conservative therapy was planned.

On the day after CT, intra-articular pumping therapy was performed (Fig. 6), and training for mouth opening was initiated on the same day. Ten days after the initiation of this therapy, mouth opening distance increased to 36 mm, and the pain in the left TMJ disappeared. Follow-up observation was continued for about 1 month. Since no recurrence of symptoms was observed during this period, medical consultation was discontinued.



Fig. 5 Computed tomography (CT): CT revealed vertical fracture of left mandibular condyle (arrows).



Fig. 6 Intra-articular pumping therapy: intra-articular pumping therapy was performed to alleviate discharge of viscous synovial fluid mixed with blood and pain.

## Discussion

For the diagnosis of mandibular condyle fracture, radiographic as well as clinical findings are important. However, radiography sometimes does not provide adequate information due to the anatomical characteristics of the fracture area. Vertical fracture of the mandibular condyle is often difficult to diagnose by plain radiography due to its anatomical characteristics. In this case, the deviation of bone fragments was small, and diagnosis was difficult by plain radiography alone.

The widespread use of CT in recent years has allowed detailed observation of the pathologic state of fractures, and some cases of vertical fracture of the mandibular condyle have been reported<sup>1,3,5)</sup>. In this case, CT was also very useful in arriving at a diagnosis. The fracture line and the sites of deviated bone fragments could be observed in detail by CT. Honda *et al.*<sup>5)</sup> reported the usefulness of tomography at two different angles and CT when fracture of the mandibular condyle was suspected. Avrahami *et al.*<sup>1)</sup> performed coronal CT for close examination in a patient who did not show a fracture line by plain radiography at the first consultation, but developed TMJ ankylosis during follow-up. Their study noted, that coronal CT should be performed when TMJ fracture is suspected. Therefore, in

patients with suspected TMJ fracture and clinical symptoms such as locked jaw and pain in the mandibular condyle, CT is indispensable.

Treatment for fracture of the mandibular articular process aims at the recovery of occlusion and improvement of jaw motor function. Occlusal reduction is easier in vertical fracture of the mandibular condyle such as in this case, than in fracture of the neck of the articular process, since the height of the mandibular ramus is maintained. Therefore, the treatment methods selected should place importance on the recovery of jaw motor function<sup>8)</sup>. This case involved a fresh fracture, and conservative therapy was performed with importance being placed on the recovery of jaw motor function. As a result, good jaw motor function was achieved. Cases of vertical fracture of the mandibular condyle that were surgically treated have also been reported. Eguchi *et al.*<sup>2)</sup> performed surgery in a patient with vertical fracture of the mandibular condyle. When small bone fragments were removed, resection of the mandibular condyle was necessary, but they reported that removal of small fragments was the best treatment method. Onizawa *et al.*<sup>9)</sup> removed small bone fragments by inverting the zygomatic arch for an old fracture of the

mandibular condyle. The patient was not able to open their mouth, so osteoplasty of the mandibular condyle, articular disc resection, and scar resection were performed. However, they also stated that this case could have been adequately treated by conservative methods if training for mouth opening had been initiated early after injury. Therefore, for vertical fracture of the mandibular condyle, the surgical approach for small bone fragments is very difficult, resulting in marked surgical invasion, and, therefore, surgery should be limited to cases of old injury showing marked dysfunction. In fresh cases, conservative therapy should be primarily selected because adequate functional recovery can be achieved by training for mouth opening, as in this case.

Conventionally, intra-articular pumping therapy is performed in closed lock of the TMJ<sup>7,10)</sup>. Recently, intra-articular pumping therapy for temporomandibular joint disease (TMD) has been performed as conservative therapy for articular process fracture. Haga *et al.*<sup>3)</sup> performed pumping therapy for high-condylar fracture of the mandibule, and reported its effectiveness for the resolution of TMJ pain. They also performed pumping therapy for low-condylar fracture of the mandibule, and reported a decrease in motor impairment of the mandibular condyle. In this case, intra-articular pumping therapy was performed to alleviate discharge of viscous synovial fluid mixed with blood and pain. From the day this treatment was commenced, training for mouth opening was possible, and mouth opening was achieved early. This indicates that intra-articular pumping therapy is useful for cases of articular process fracture accompanied by TMJ pain.

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