

DENTAL ARTICLE

Unusual Unilateral Fracture of the Condylar and Coronoid Processes of the Mandible

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ABSTRACT

The incidence of condylar fracture is very high and most are not caused by direct trauma. On the other hand, fracture of the coronoid process is reported less often than fracture of other parts of the mandible. We report a case of right subcondylar and coronoid fractures without any evidence of direct trauma to the zygomatic area or an indirect trauma to the mandibular corpus or symphyseal region. The possible cause was identified as acute reflex contraction of the temporalis muscles leading to coronoid and condylar stress fractures.

Key words: Condylar process, coronoid process, fracture

INTRODUCTION

Mandible, because of its position and prominence, is the second most commonly fractured part of the maxillofacial skeleton after the nasal bone. The proportion of condylar fractures among all mandibular fractures is between 17.5% and 52%.^[1] Most are not caused by direct trauma, but follow indirect forces transmitted to the condyle from a blow elsewhere. Mandibular and condylar fractures are relatively common injuries, however, fractures of the coronoid process are very uncommon and account for only 1% of all mandible fractures.^[2] Isolated coronoid fractures due to direct trauma are very uncommon because the coronoid

process is anatomically protected by the zygomaticomalar complex and its associated muscles.^[3] Most coronoid fractures are due to indirect blunt or penetrating trauma. There are various reports of iatrogenic fractures of the coronoid process, occurring during the extractions of maxillary and mandibular third molars, sagittal split osteotomy, and cystectomies.^[4] In the literature, reports of unilateral fractures of both condylar and coronoid process without any evidence of trauma to the mandible are very rare.^[5] We report a very rare unilateral fracture of condylar and coronoid processes due to a sudden contraction of the temporalis muscle.

CASE REPORT

A 16-year-old male patient was referred to our institution with the chief complaint of pain in the right temporomandibular joint (TMJ) region and difficulty in mastication and mouth opening. He had sustained a trauma to the right temporal region because of a traffic accident. Patient did not present an initial loss of conscience or anterograde amnesia. Clinical

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examination showed little swelling over the right TMJ region with an inadequate mouth opening. No facial palsy was observed. Intraoral examination showed abnormal occlusion, restricted mouth opening, deviation from the midline to the right side, protrusion, absence of lateral movement to the left side and on palpitation, tenderness and pain over right ascending ramus and right temporal region. A computed tomography (CT) scan showed unilateral fracture of the right coronoid and condylar processes [Figure 1]. There was no evidence of direct trauma or fracture to the zygomatic region or mandibular symphyseal and corpus area. Radiological examination revealed a well-defined radiolucent line at the base of both condylar and coronoid processes [Figure 2]. Under nasal intubation, arch bar was fixed in the maxillary and mandibular dental arches and the inter-maxillary fixation was done with elastic bands. The fractures were corrected using the help of the patients' occlusion as a guide. Pre-accident occlusion was achieved. Local analgesic with epinephrine (adrenaline) was infiltrated into the submandibular incision site. A mini submandibular incision was made 2 cm below the angle and inferior border of the mandible. Sharp dissection was performed down through the platysma, and then blunt dissection was begun to minimize risk to the marginal mandibular branch of the facial nerve. Periosteum and attachments for the masseter were completely stripped off the lateral cortex of the vertical ramus up to the level of the sigmoid notch. The subcondylar and coronoid region was exposed and fracture lines were seen. Because of insufficient vision and inability to fix the screws to the plaque in correct directions, a small incision was made to the skin and a trocar was placed for fixing the screws. A silk suture was used at this stage in the lower part of the plates for positioning of the plates in the

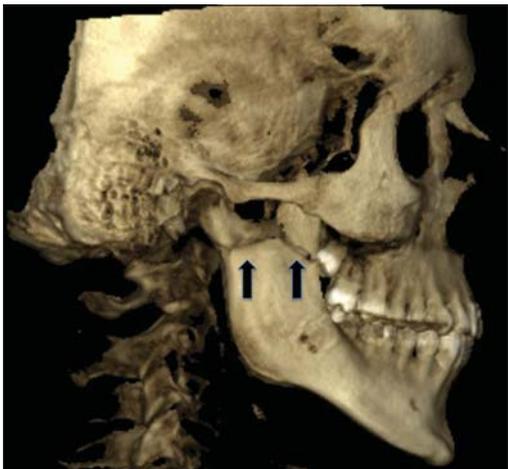


Figure 1: 16-year-old male patient with the chief complaint of pain in the right mandibular region, difficulty in mastication, and mouth opening diagnosed with fracture of the condylar and coronoid processes. CBCT image shows the fractures of both condylar and coronoid processes of the mandible. (black arrows point to the fracture lines).

correct position [Figure 3]. Fractured fragments were fixed with mini plates. To avoid hematoma formation, a small penrose drain was placed in the operation area. The patient was followed-up postoperatively without any esthetic or functional problems [Figure 4].

DISCUSSION

The coronoid process is considered a relatively weak part of the mandible. Coronoid fractures due to direct trauma are very uncommon because of their protected position under the zygomaticomalar complex. On the other hand, incidence of condylar fracture is very high and most are not caused by direct trauma.^[6] The fracture of the coronoid process mostly result from direct, penetrating trauma or if there occurs concomitant sudden and violent contraction of the temporalis muscle at the time of impact.^[7] Coronoid process has no relation with cranial bones so indirect trauma cannot create fractures. In the present case, fractures occurred due to the sudden contraction of the temporalis muscle because there was no evidence of trauma to the facial bones and there were no trauma-related facial skin injuries [Figure 5]. The literature shows that unilateral fracture of both condylar and coronoid processes without any direct or indirect trauma, like in our case, is very rare.^[5]

The coronoid region can be considered as part of the ramus, the angle region encompasses both the ramus and body, and the symphysis is the anterior part of the body. Each of these areas present unique characteristics, and the decision to reconstruct or repair certain areas is dependent on the goals to be achieved. The coronoid process is considered part of the mandible, and its loss can be considered to be critical. As in other parts of the

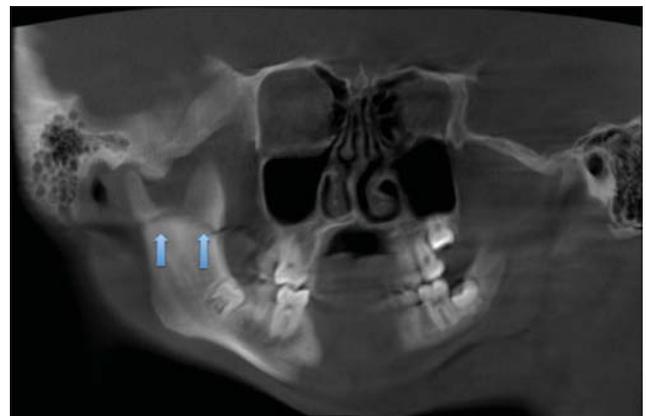


Figure 2: 16-year-old male patient with the chief complaint of pain in the right mandibular region, difficulty in mastication, and mouth opening diagnosed with fracture of the condylar and coronoid processes. Panoramic X-ray image shows the fractures of condylar and coronoid part of the mandible. (blue arrows point to the fracture lines).

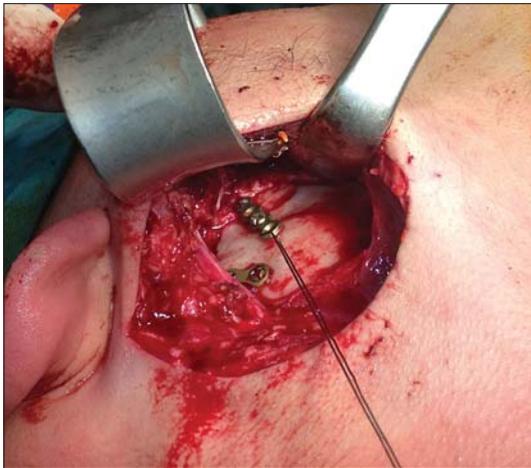


Figure 3: 16-year-old male patient with the chief complaint of pain in the right mandibular ramus region, difficulty in mastication, and mouth opening diagnosed with fracture of the condylar and coronoid processes. Photograph shows surgical intervention being performed. A silk suture is used at this stage for positioning of the plates in the correct directions.



Figure 4: 16-year-old male patient with the chief complaint of pain in the right mandibular ramus region, difficulty in mastication, and mouth opening diagnosed with fracture of the condylar and coronoid processes. Panoramic X-ray image of the patient's jaw after the operation, shows coronoid and condylar process of the mandible fixed with two miniplates (arrows).

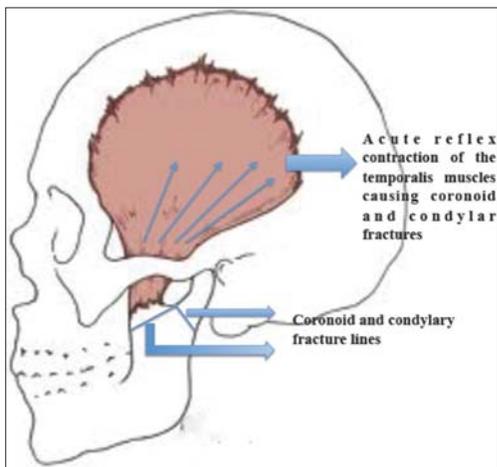


Figure 5: 16-year-old male patient with the chief complaint of pain in the right mandibular ramus region, difficulty in mastication, and mouth opening diagnosed with fracture of the condylar and coronoid processes. Line diagram explains the probable mechanism. Arrows show the possible cause of the fractures.

mandible, the relationship of the coronoid process to the surrounding bones is critical.

Malpositioning of the coronoid process can impede opening of the jaw owing to interferences with the zygoma and zygomatic arch. Also, trismus may also occur secondary to fibrous or fibro-osseous ankylosis of the coronoid to the zygomatic arch. On the other hand, significantly displaced coronoid process can be pulled in a cephalad direction, occasionally into the infratemporal fossa, by the temporalis muscle.^[8] Coronoid fracture may manifest as a swelling below the zygomatic arch and soft tissue swelling and ecchymosis in the retromolar trigone region.

Treatment depends on the degree of the displacement of the fractured coronoid and condylar process and the severity of the symptoms. Fractures with minimal displacement can be managed with a soft diet and mouth opening exercises to avoid osseous adhesions to the surrounding tissues. Fractures with significant displacement that limits mandibular movements can be treated with internal fixation and surgery. If the coronoid fracture edges are properly reduced like in the present case, mini plaques are good treatment choices for fixing the fragments and restoring unrestricted motion of the mandible. Although coronoid fractures are traditionally managed conservatively, surgery may be indicated like in the present case, where the patient was not a good candidate for prolonged intermaxillary fixation. A variety of surgical approaches to treat the fractured condyle have been suggested, including intraoral, submandibular, retromandibular, preauricular, and, more recently, endoscopic. The most important factor in determining the approach used is the level at which the fracture has occurred. Modifying factors such as the degree of displacement or dislocation and the planned method of fixation may also have a bearing on the approach selected. Because of the well-arranged fracture edges and the need to avoid any facial nerve damage, submandibular incision was selected for our case. Submandibular incision is enough for exposing both coronoid and condylar processes. On the other hand, for fixing the screws to the plates, this incision is not enough. We encountered this difficulty in our case, so a small incision was made into the skin for trocar placement. With trocar fixation, screws were easily fixed to the plates. In this step, facial nerve must be protected to avoid any facial nerve damage. Complications of trauma to the TMJ are far-reaching in their effects and not always immediately apparent. Ankylosis, however, is infrequent and has been estimated to occur in only 0.2-0.4% of condylar fractures.^[9] Therefore, one should apply early mobilization treatment at the expense of a stable occlusion.

CONCLUSION

In conclusion, both coronoid and condyle fractures may occur due to reflex contractions of the muscles, and surgical

treatment, we present in this article, is a successful choice for management of these types of fractures.

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