

# Clinical and radiological findings of a bilateral coronoid hyperplasia case

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## ABSTRACT

Coronoid hyperplasia (CH) is an infrequent condition that can be defined as an abnormal bony elongation of histologically normal bone. Progressive and painless difficulty in opening the mouth is the main clinical finding of CH. In this case report, the clinical and radiological findings for a 23-year-old male patient with bilateral CH are presented. When plain radiographies are not sufficient for diagnosis and evaluation of the CH, cone-beam computed tomography can be used.

**Key words:** Cone-beam computed tomography, coronoid enlargement, coronoid hyperplasia

## INTRODUCTION

Coronoid hyperplasia (CH) is a rare condition that can be defined as an abnormal bony elongation of histologically normal bone. The main clinical finding of CH is progressive, painless difficulty in opening the mouth because of the impingement of the hyperplastic coronoid process with the temporal surface of the zygomatic bone or medial surface of the zygomatic arch.<sup>[1,2]</sup>

The etiology of CH is not yet explained, and CH cases are not usually diagnosed easily due to the fact that the condition is often confused with other maladies. Therefore, a differential diagnosis should be made with radiography. Plain radiographies can be used to detect CH, but these can be limited because of the fact that they provide only two-dimensional images. The cone beam systems can produce three-dimensional data with very low radiation doses at a time. At the same time, cone-beam computed tomography (CBCT) allows the realignment of two-dimensional images in coronal, sagittal, oblique, and various incline planes. Hence, CBCT can be a useful imaging method for this patient.<sup>[3,4]</sup>

The aim of this report was to present clinical and radiological findings of a bilateral CH case in the mandible and to show that CBCT can be used to detect mandibular CH.

## CASE REPORT

A 23-year-old male patient was referred to our dental clinic with a history of limitations in mouth opening. His medical anamnesis was not noteworthy. There were no musculoskeletal anomalies, congenital bone dysplasia, or trauma. Clinical examination did not reveal facial asymmetry, deviation, or pain. The interincisal mouth opening was measured as 18 mm. Crepitation and clicking of temporomandibular joint (TMJ) were not seen. Pressure in the zygomatic region on maximal opening was detected. Hyperplasia of the coronoid process could be seen bilaterally on panoramic radiography and TMJ radiography, but that was not clear [Figures 1 and 2]. Therefore, CBCT was utilized for detailed diagnosis. Informed consent was received from the patient for the exposures. The patient had been scanned with CBCT (NewTom FP QR-DVT 9000, 110 kVp, 15 mA, 36 s scan time, 5.4 s typical X-ray emission time, 17 cm diameter-13 cm

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height scan volume, Verona, Italy) with an open and closed mouth to evaluate temporomandibular bone structure, condylar movement, and relationships among condyle, eminence, and zygomatic arch. The patient was placed in a horizontal position so that the Frankfort horizontal plane was perpendicular to the table, with the head within the circular gantry of the X-ray tube in order to obtain a consistent orientation of sagittal images. Raw data obtained from the CBCT generated volumetric and study data, including information on the mandible, using the NNT software program (QR-NNT version 2.21, Quantitative Radiology, Verona, Italy) for analysis. Images obtained from CBCT were examined in a multiplanar reconstruction mode. CH was observed on sagittal slices taken in the closed mouth [Figure 3]. Impingement of the bilateral CH with the medial aspects of the zygomatic arches was observed on the axial and coronal slices taken in the open mouth. There was no fusion between the coronoid processes and zygomatic arches on higher axial slices [Figures 4 and 5]. According to a three-dimensional view, CH was detected bilaterally in the mandible [Figures 6 and 7].

## DISCUSSION

The etiology of CH is not clear, and various causes have been proposed. It could be related to developmental changes, bone pathologies (such as osteochondroma, exocytosis, and osteoma), increased temporal bone activity, genetic inheritance, endocrine stimulus, and trauma.<sup>[5-8]</sup> In the literature, CH was first defined and named as Jacob disease by Jacob in 1899 as joint formation between an osteochondroma of the coronoid process and the zygomatic arches.<sup>[2]</sup> In this present case, no causes were detected. There was no fusion between the coronoid process and the zygomatic arc on CBCT images. It may occur because of developmental changes. CH is thought to be a rare condition, and no epidemiological studies have been conducted, so incidence and prevalence numbers concerning CH are hard to find. The mean age at diagnosis was found to be 23-year-old.<sup>[9]</sup> CH can be seen as unilateral or bilateral with a bilateral: Unilateral ratio of 4.7:1. CH mostly affects males, with a male: Female ratio of 5:1.<sup>[2]</sup> According to a review by Mulder *et al.*,<sup>[9]</sup> CH is mostly seen in males, and the male-to-female ratio is 3.3:1, and bilateral CH is seen 4.1 times more frequently than the unilateral form. Unilateral CH is seen slightly more frequently in women, and bilateral CH is more frequently found in men. No significant association was found between sex and unilateral or bilateral CH.<sup>[9]</sup> Bilateral CH was

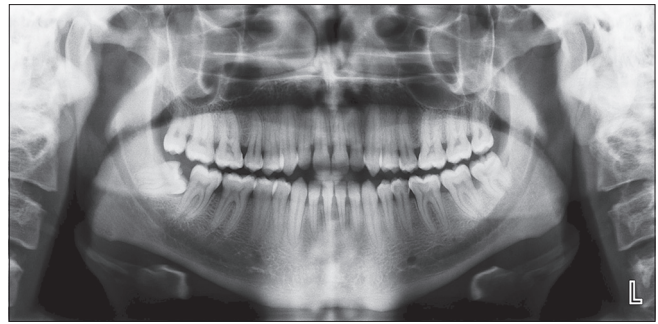


Figure 1: Orthopantomography shows the bilateral coronoid hyperplasia

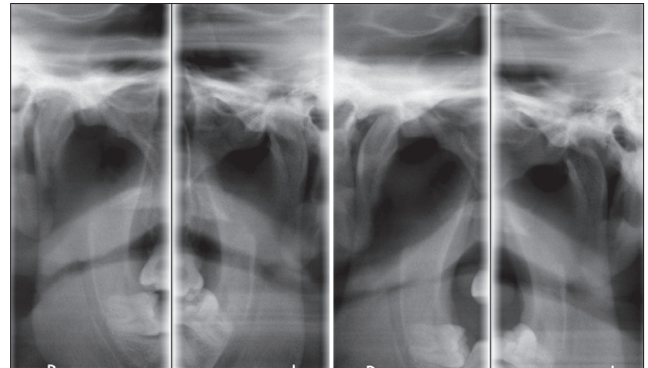


Figure 2: Transcranial radiograph of temporomandibular joint shows the bilateral coronoid hyperplasia

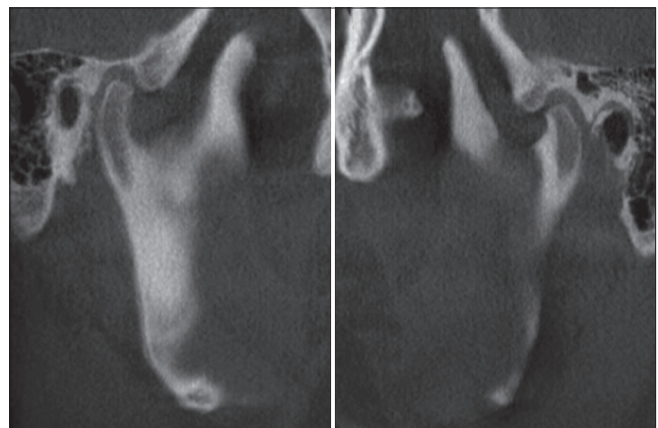
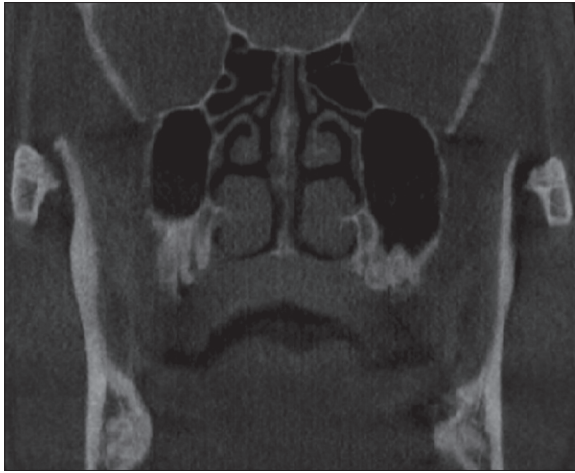


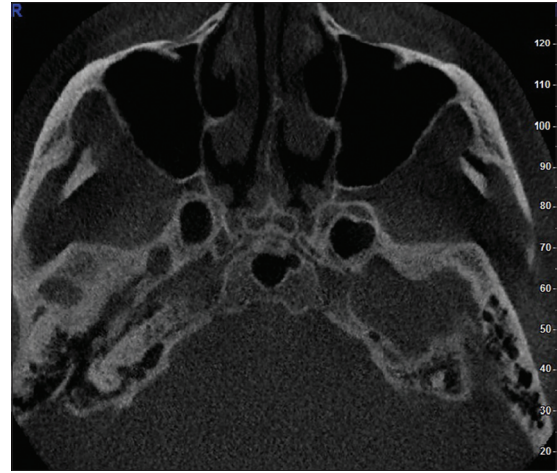
Figure 3: Bilateral coronoid hyperplasia is shown on sagittal slices in a closed mouth

diagnosed for the 23-year-old male patient in this present case.

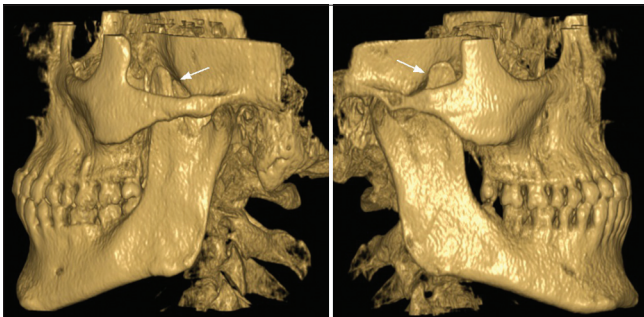
The main complaint of patients with CH is slow, progressive, and painless limitations in mouth opening. Facial asymmetry and deviation are not seen on bilateral CH, but facial asymmetry and deviation toward the affected side can be seen with the unilateral form.<sup>[10,11]</sup> Crepitation and clicking of TMJ and the sensation of pain or pressure in the zygomatic region on maximal opening may be seen as less frequent symptoms.<sup>[7]</sup> The mean interincisal opening was found



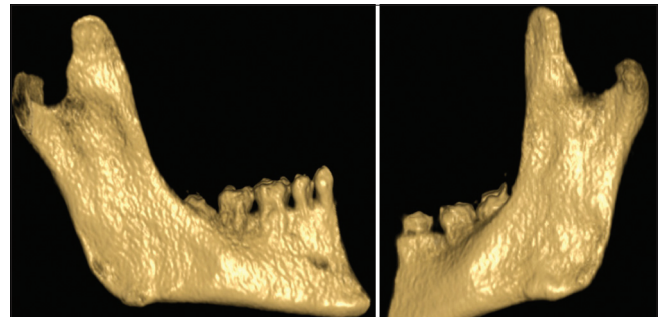
**Figure 4:** There was no fusion between the coronoid processes and zygomatic arches on the coronal slices with an open mouth



**Figure 5:** Bilateral coronoid hyperplasia is seen on higher axial slices in an open mouth



**Figure 6:** Three-dimensional images show bilateral coronoid hyperplasia in a closed mouth



**Figure 7:** Three-dimensional images show bilateral coronoid hyperplasia on extracted mandible

as 15.3 mm in a study conducted by Tavassol *et al.*<sup>[12]</sup> In this present case, facial asymmetry, deviation, crepitation, and clicking of TMJ were not seen in the examination. Maximum interincisal opening was found as 18 mm, and pressure in the zygomatic region was seen on maximal opening.

The diagnosis of CH is confusing, and radiographic examination is essential. Plain radiographs are seen as an initial step for radiographic examination in the diagnosis of CH. Orthopantomograph (OPT), transcranial radiograph of TMJ, occipitontal view, and cephalometric analysis can be used for the diagnosis of CH. While the occipitontal view is useful in displaying the relationship between the coronoid process and zygoma, an OPT can clearly show the CH.<sup>[8,13]</sup> When a coronoid process height exceeds that of the condyle on the OPT, CH is suspected. In this present case, an OPT and transcranial radiograph of TMJ revealed the CH, but not clearly. Additional imaging to confirm CH was needed. CH can be diagnosed by two-dimensional imaging, but this can be inadequate in some cases.

Three-dimensional imaging includes data from all the two-dimensional images. CH has been previously evaluated with magnetic resonance imaging, CT, and CBCT imaging,<sup>[14-16]</sup> and three-dimensional CT can be used to evaluate the bone morphology in more detail.<sup>[3,4,16]</sup> Three-dimensional CT imaging is essential in determining the correct diagnosis of CH and to specifically plan for surgery. CBCT has a low radiation dose, short imaging time, and better image resolution in comparison with CT. In the present case, CH was detected with three-dimensional CBCT imaging, and the relation between the coronoid process and the zygomatic arch was evaluated with axial and coronal slices obtained from CBCT.

## CONCLUSION

Plain radiographies can be used to detect CH, but they can be insufficient in some cases in detecting CH and in evaluating the relation between the coronoid process and the zygomatic arch. When plain radiographies are not sufficient for diagnosis and evaluation of the CH, CBCT can be used.



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