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Temporomandibular Joint Ankylosis: A Case Report

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ABSTRACT: This report is based on a case of temporomandibular joint ankylosis discovered in a cadaver during routine student dissection in the Department of Anatomy at Tokyo Dental College. Extensive osseous ankylosis in the left temporomandibular joint was evident in this case which exhibited a distinctive bird-like facial deformity caused by a mandibular growth disorder. This resulted in the underdevelopment of the mental area in particular. Furthermore, abnormally enlarged antegonial notching was present along the inferior border of the mandible anterior to the angle. Both these manifestations indicated the likelihood that the ankylosis had contributed to the abnormalities and had commenced at an early stage of skeletal development.

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Various cases of temporomandibular joint ankylosis have been reported.¹⁻⁵ The reports have focused variously on the age at which the ankylosis occurred; serial observations of the symptoms; functional disorder or facial characteristics; and detailed investigations of the intraoral consequences. However, there are no published reports of studies of the morphology of osseous ankylosis in cadavers.

In the course of a routine student dissection in the Department of Anatomy at Tokyo Dental College, a case of extensive osseous temporomandibular joint (TMJ) ankylosis was discovered in a cadaver. Because of the remarkable extent of the ankylosis, it was believed to be a rarity and a detailed anatomical examination was completed.

Unfortunately, the cadaver was unidentified and therefore its gender, age, and relevant medical history were unknown. No information about the etiology of the jaw ankylosis was available, and data such as the age of onset, the period of morbidity, and changes in the degree of mouth opening could not be ascertained. As a further frustration to the investigation, the surrounding tissue as well as the coronoid process had been removed during the student dissections before the joint abnormality was uncovered.

Results of Examination

The external appearance of the cadaver presented as a striking example of a chinless deformity with a bird-like (parrot-like) facial profile. Oral features included a deep overbite, incidence of multiple caries, missing teeth, severe periodontal disease, and abnormal inclination of tooth eruption.

The left temporomandibular joint (affected side) (Figures 1-3) was immobilized by gross osseous ankylosis extending from the condyle to the mandibular angle and the antegonial notch area and had probably spread to the coronoid process as well. However, the previous removal of the coronoid process by student dissection precluded the confirmation of this possibility.

The antegonial notch was unusually large, and the masseter muscle was smaller than normal with a thickness of only 7.3 mm. The styloid process extended to the lower one-third of the posterior border of the mandibular ramus and measured 41.5 mm in length. The distance between the Frankfort plane, and the angle of the mandible was 58.8 mm.

On the right side (Figures 4 and 5), the distance between the Frankfort plane and the mandibular angle was 59.0 mm. Marked antegonial notching was also observed as with the left side. The development of the masseter on this side was also poor with a thickness of 7.6 mm. The length of the styloid process, however, was considerably greater on this side, measuring 49.8 mm.



Figure 2
Magnification of TMJ region.



Figure 1
Lateral view of affected side (left side).

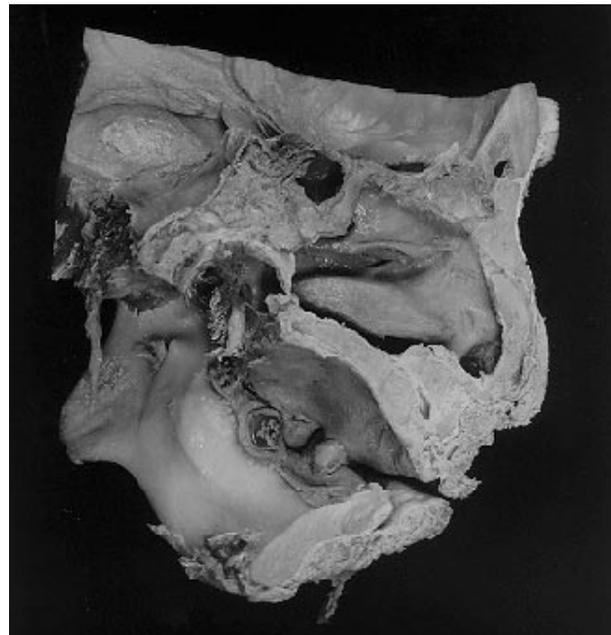


Figure 3
Sagittal plane view (left side)



Figure 4
Lateral view (right side).

Radiographic Examination

Panoramic radiography (**Figure 6**) revealed complete overshadowing of the left condyle and mandibular fossa



Figure 5
Sagittal plane view (right side).

of the temporal bone. The right condyle and fossa were clearer and revealed a constriction of the articular cavity. Also, soft x-ray and computed tomography (**Figures 7 and 8**) examinations showed the same results. There were bilateral morphological changes in the antegonial notches which were more marked on the left side. Both styloid processes extended to the lower one-third area of the posterior border of each ramus.

Discussion

Dagher, et al.¹ reported that changes in the facial manifestations of temporomandibular joint ankylosis are small in patients who have suffered the onset of this condition after the age of 14 years, when the growth of the jaw is complete. If the process of ankylosis begins before the completion of jaw growth or the calcification of cortical bone of the TMJ, extensive ankylosis of the joint area can occur, and characteristic changes in the morphology of the face due to inadequate growth in the joint area will result.

The bird-like facial deformity in the present case was due to a mandibular growth disorder, particularly the underdevelopment of the mental area, and is therefore consistent with the onset of the ankylosis occurring at an early age.

Considering the mechanism of mandibular function in relation to the process of growth in this case suggests that the ankylosis initially restricted and eventually prevented mandibular movement despite the contraction of the muscles responsible for jaw opening. Such contractions of the suprahyoids applied lingual forces to the mandible limiting its normal anterior growth which produced the facial deformity.

The intraoral status in this case exhibited multiple caries, missing teeth, and periodontal disease consistent with utterly inadequate oral hygiene along with the disturbance of mouth opening ability. The lingual inclination of the anterior teeth indicate that the ankylosis developed during the tooth eruption period.

Significance of Antegonial Notching

In 1974, Ahlgren, et al.⁶ reported that an increase in the extent of antegonial notching was due to hyperergasia of the masseter muscle. However, Sorensen, et al.⁷ proposed that antegonial notching developed to compensate for the decrease in the height of the ramus. In this case the distance between the Frankfort plane and the mandibular angle was 58.8 mm on the right side and 59.0 mm on the left side. Although these distances were slightly larger than the average for normal healthy adults, no

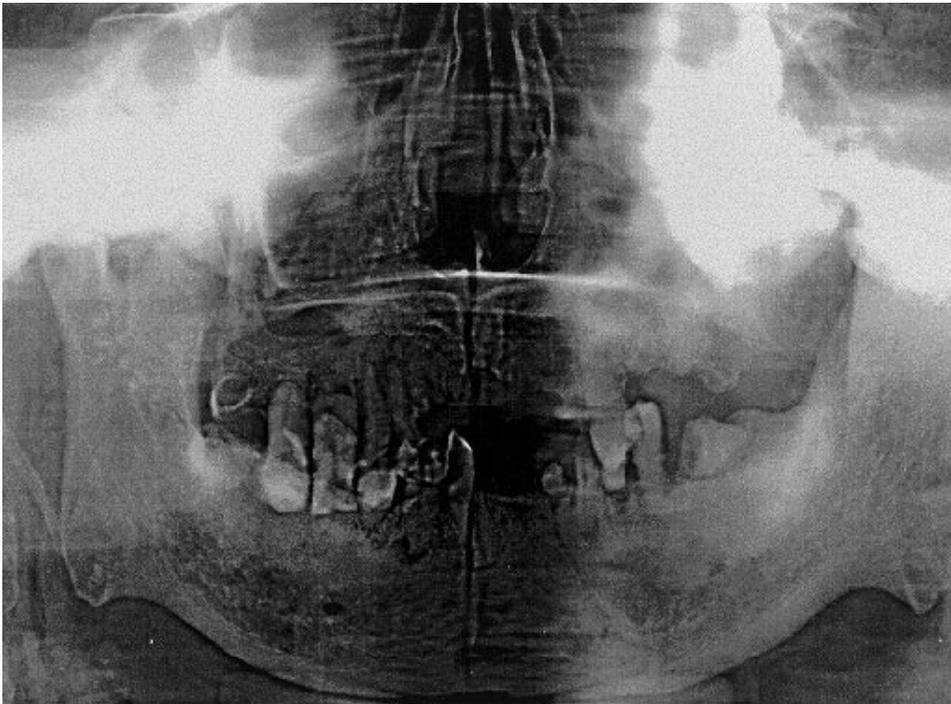


Figure 6
Panoramic radiography.

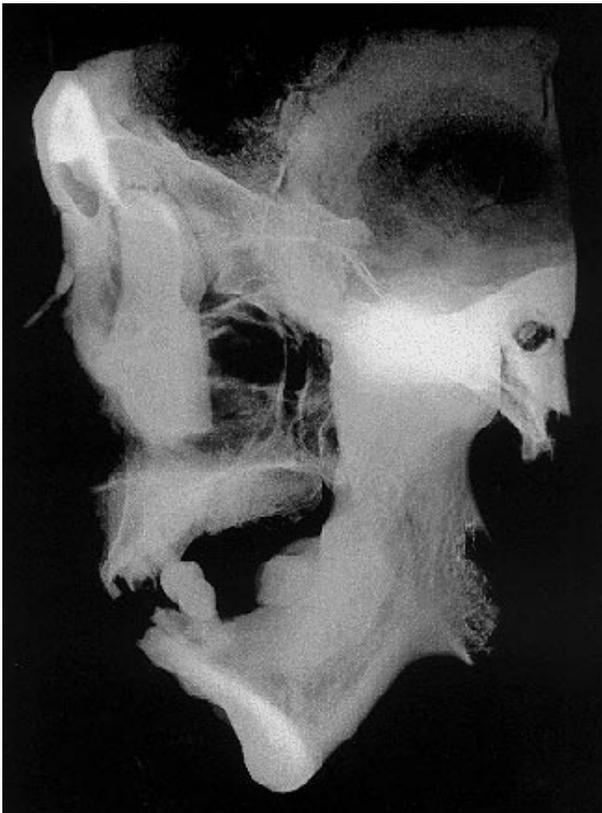


Figure 7
Soft x-ray photograph.

overgrowth of the mandibular angle was noted. However, the thickness of the masseter in this case was only 7.3 mm on the left side and 7.6 mm on the right which is markedly less than the corresponding values obtained by ultrasonography for normal males (17.0 mm) and normal females (14.9 mm),⁸ indicating a significant underdevelopment of both masseter muscles. These findings suggest that the increase in the degree of antegonial notching in this case was not caused by hyperergasia of the masseter muscle but rather was due to the continued downward growth of the mandibular angle combined with a failure of anterior growth. The ankylosis developed after the commencement of anterior development rendering the application of the masticatory force to the mandible impossible and therefore prevented resorption in the areas of muscular attachment. Resorption then took place in the anterior area of the angle outside the area of attachment, producing the abnormal antegonial notch.

Styloid Process

The cause of the excessive length of the styloid process is as yet unknown.⁹⁻¹¹ There have been no reports in the literature of the relationship between the excessive length of the styloid process and temporomandibular joint ankylosis .

In this case, it is suggested that ankylosis of the joint had rendered mouth opening impossible and that the suprahyoid muscles, as mouth openers, developed the

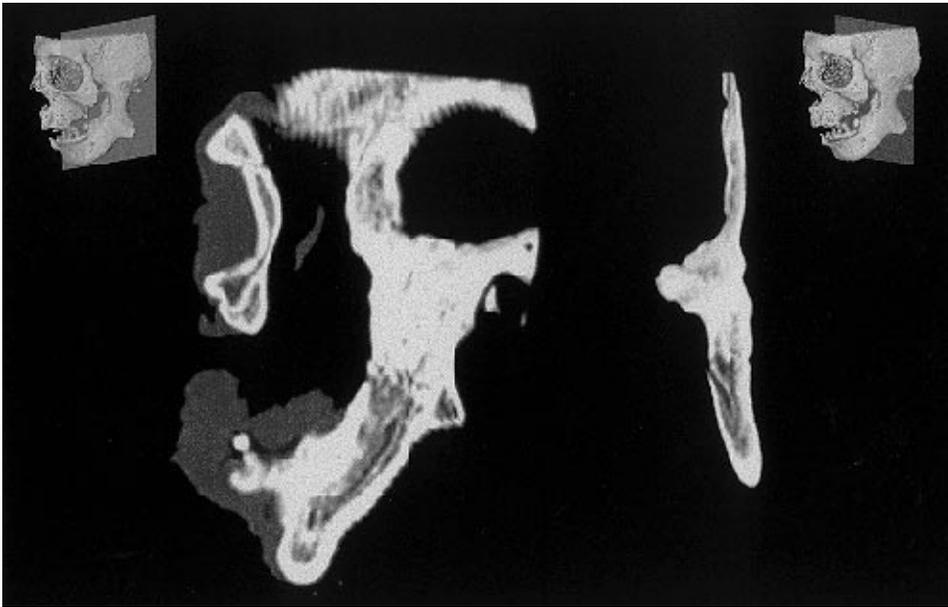


Figure 8
CT image (left: sagittal plane,
right: frontal plane).

styloid processes as the area of origin of the stylohyoid muscles. The stylohyoid muscles are included in the suprahyoid group and were overdeveloped under the tensile forces applied to them during contraction, thereby producing the excessive length.

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