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Aplasia of the mandibular condyle

Olaf Krogstad
Department of Orthodontics, Faculty of Dentistry, University of Oslo, Norway

SUMMARY Aplasia of the mandibular condyle is extremely rare when not seen as a part of a syndrome. A case, apparently with no soft tissue aberrations, is described and a possible connection with the hemifacial microsomia syndrome is discussed.

Introduction

Aplasia of the mandibular condyles is one of several facial manifestations of syndromes such as hemifacial microsomia, Goldenhaar's syndrome and Treacher Collins syndrome, especially the first two. The incidence is estimated to be 1 in 5,600 births, with Treacher Collins syndrome even more rarely seen (Gorlin *et al.*, 1990). Aplasia of the mandibular condyle without any other facial malformations is extremely rare, but has been reported previously (Prowler and Glassman, 1954). In the present report, a patient with a unilateral missing mandibular condyle will be presented and the treatment outlined and discussed.

Case report

A boy, 9 years 10 months of age, was referred to the Department of Orthodontics, Faculty of Dentistry, University of Oslo, because of an obvious asymmetry of the lower jaw (Figure 1). The occlusion showed a deflection to the right of the mandibular midline of approximately the width of one lower incisor. At maximum opening, i.e. an interincisal distance of approximately 40 mm, the mandible deviated even more to the right (Figure 2), indicating mainly a rotational movement on the right side. The occlusion on the left side was close to normal, but on the right side it was postnormal and somewhat unstable (Figure 3).

The lateral cephalogram did not show any abnormalities, but the postero-anterior (P-A) head plate clearly demonstrated asymmetry (Figure 4). A panoramic radiograph (OPG) of the right ascending ramus showed the reason for the asymmetry, in that the right condyle was missing (Figure 5). The left condyle also showed a more rounded appearance than is usually seen.

The parents could not remember any accident or trauma to the head or to the mandible, nor was there any history of infection to the ear or the surrounding tissue. This was not surprising because the radiographic outline of the ramus did not resemble an injured condyle. However, in a photograph of the boy when he was approximately 2 years of age, provided by the parents (Figure 6), the asymmetry could easily be detected, indicating a possibility for the condition to be of congenital origin.

Treatment

If the condylar cartilage was destroyed or not present, the condition would be progressive and result in a severe asymmetry. The treatment could then be a costochondral graft transplant, preferably before the growth spurt, orthognathic surgery at the end of the growth period, or both (Vargervik and Kaban, 1992). However, because the movement of the mandible was so good, and the patient rather young, it was decided to try orthopaedic treatment in the form of an activator appliance.

The working bite was taken with the right side of the mandible as far forward as possible, i.e. 2–3 mm, whereas the left side was maintained in a neutral position. The acrylic was trimmed on the right side to promote eruption, while the acrylic was kept intact on the other side. The mandibular wings were made as deep as the patient could tolerate. This was undertaken in order to swing the mandible over to the left and

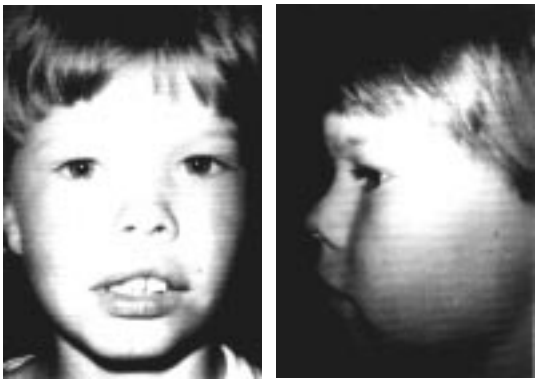

Figure 1 Profile (A) and frontal (B) photographs at 9 years, 10 months showing asymmetry of the mandible.

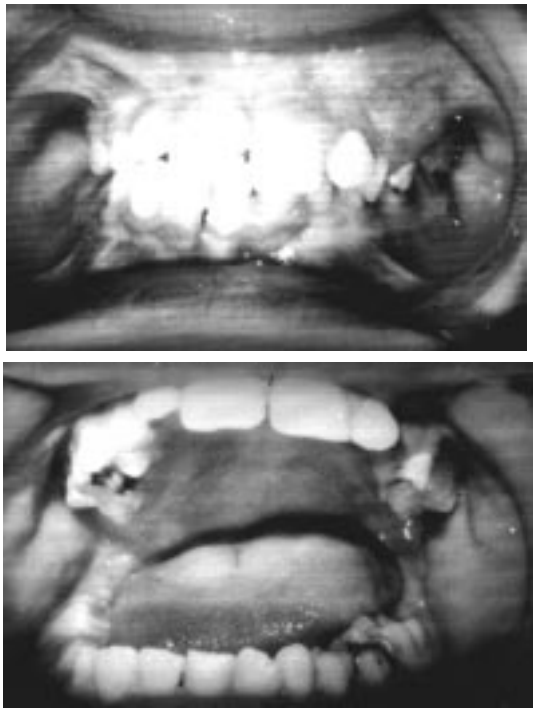

Figure 2 Frontal photographs of the occlusion showing a shift of the midline in closed (A) and maximum open (B) position.

to influence the dentition as little as possible. If a good response was obtained, the plan was to make new activators until the deviation of the midline was corrected.

Two years later, after the use of two activators, there had been a good improvement in the occlusion (Figure 7) although some asymmetry

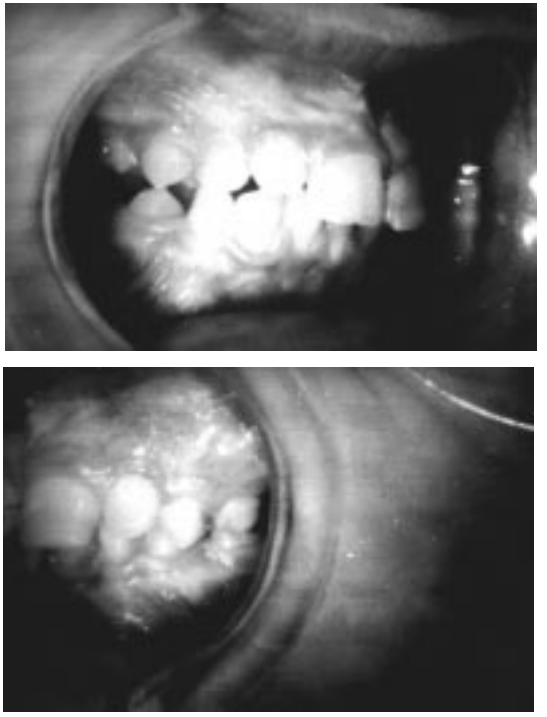

Figure 3 Photographs showing distocclusion on the right (A) and normal relations on the left side (B).

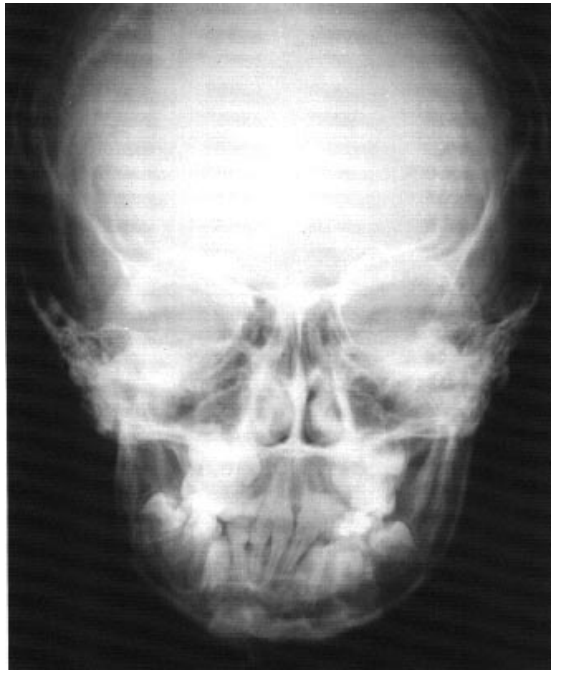

Figure 4 Postero-anterior (P-A) head plate demonstrating the skeletal asymmetry.

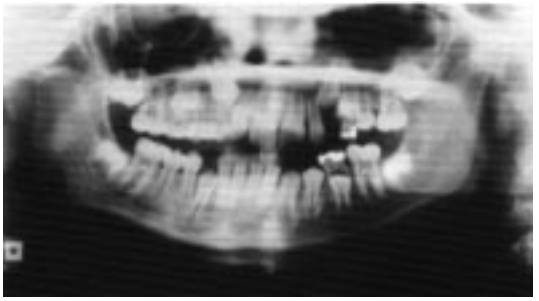

Figure 5 Orthopantomogram showing atypical condyles, especially the right.

of the chin still persisted, probably due to some tilting of the incisors.

A period of 18 months with fixed appliances to correct a crossbite on the right first molars and to upright the lower incisors followed. When the active treatment was finished, a splint was used in the upper arch with a mandibular wing on the left side to stabilize the position of the lower jaw. In addition, a lingual retainer was bonded on the mandibular anterior teeth.

At the last control the patient was nearly 20 years of age and had finished growth. He had two good dental arches and a stable occlusion (Figure 8). Whilst there was a slight deviation of the midline to the right, reflecting a mild asymmetry of the mandible (Figure 9), there was a good opening movement and the previous deviation to the right when opening was, if present, very slight (Figure 10). Furthermore, the degree of opening indicated that there was some translational movement also on the right side.

Comparison of the tracings of the lateral head plates at 9 and 15 years showed a development that could be characterized as normal (Figure 11) and the improvement of the asymmetry of the mandible is evident (Figure 12A and B). The inclination of the occlusal plane had also improved to almost normal. The differences between 16 and 20 years of age were negligible, apparently the patient was an early grower. The reason for the good result is seen on the OPG (Figure 13). On the right side a condyle had formed, although more rounded and cone-shaped than a normal one. On the left side the condyle now resembled that more normally seen. Tracings from the OPG at 9 and 15 years of age

Figure 6 Photograph at 2 years of age, clearly showing the asymmetry of the mandible.

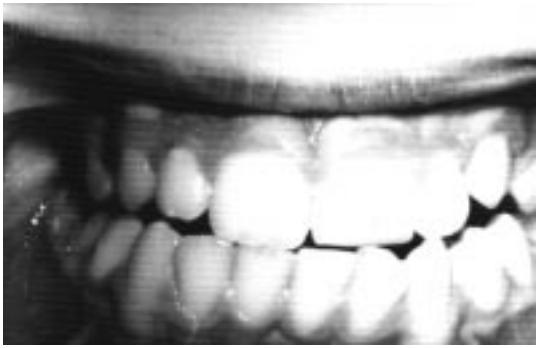

Figure 7 Extra- (A) and intra-oral (B) photographs taken at 11 years, 10 months demonstrating improvement in the asymmetry.

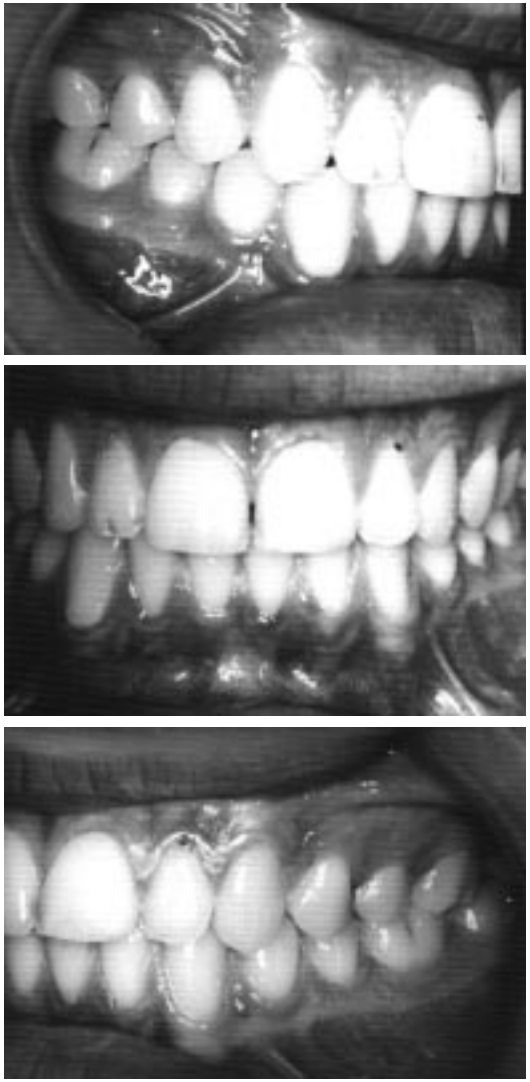

Figure 8 The final occlusion with good relations on both sides (A and C), but a slight deviation of the mandibular midline to the right (B). Note the uprighted lower incisors.

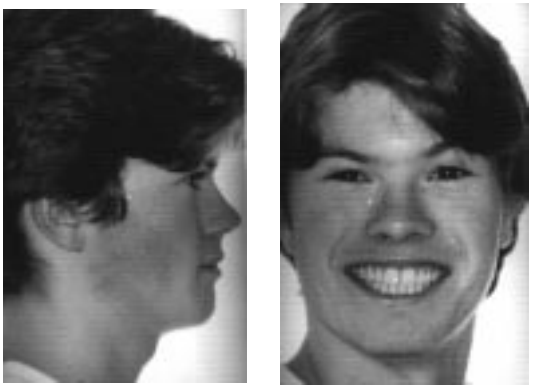

Figure 9 Profile (A) and frontal (B) photographs at 19 years 11 months.

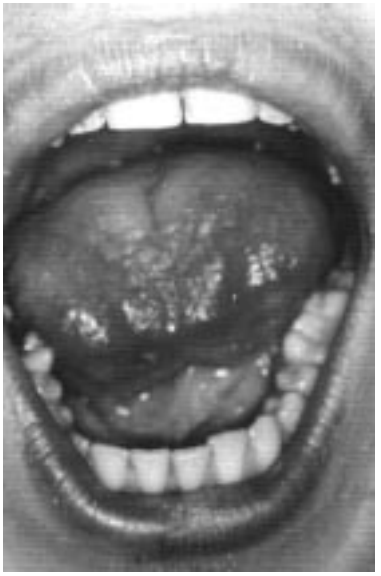

Figure 10 Photograph showing maximum opening amounting to 55 mm illustrating a very slight deviation of the mandible to the right.

superimposed on the mandibular canal, showed an increase of the ramus height (Figure 14).

Discussion

Atypical mandibular condyles in the growth period can be seen in connection with fractures (Lund, 1974) and inflammatory conditions such as juvenile rheumatoid arthritis (JRA) (Larheim *et al.*, 1981). The form and outline of the condylar part of the ramus in this patient does not resemble either of these two conditions. The anamnestic data did not give any information about trauma of any kind. In the case of a fracture, it must have happened before the boy was 2 years old. Mandibular fractures in that age group are rare, only 20 patients (of whom three were subcondylar) have been reported in the literature during the last 50 years (Lustmann and Milhem, 1994). That a fracture of one or both

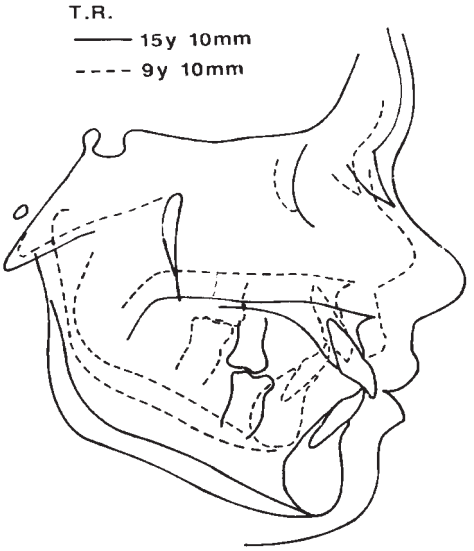

Figure 11 Superimposition of tracings at 9 years, 10 months and 15 years, 10 months showing almost normal sagittal development of the facial skeleton.

condyles could go undetected at that age is unlikely, but cannot completely be ruled out. However, the contour of the ramus does not resemble that of a 7-year-old fracture, especially in the infantile age group, as in most cases healing will occur without complication or treatment.

Atypical mandibular condyles can also be seen in connection with different syndromes of the head and neck (Gorlin *et al.*, 1990). In these cases there will, as a rule, also be soft tissue manifestations. In the present case, there were no anomalies either of the ear or the eyelids. Agenesis of the mandibular condyle without affection of the soft tissues has been reported earlier (Prowler and Glassman, 1954). However, in that report the condition obviously started after the age of six and was probably of an acquired nature (Poswillo and Robinson, 1992).

The aetiology of the present case therefore remains unknown, but could be of a congenital nature. In that case it must be a branchial arch anomaly and could be hemifacial microsomia without soft tissue affections, or the soft tissue affection could have been so slight that it was difficult to detect. Looking at the photographs of the tongue at 9 (Figure 2B) and 19 years

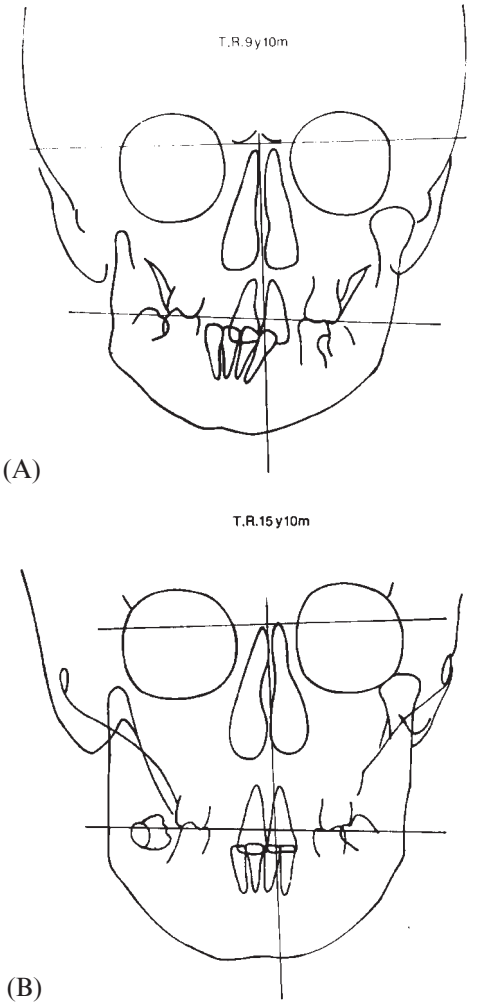

Figure 12 Tracings of P-A head plates at 9 years, 11 months (A) and 19 years, 11 months (B).

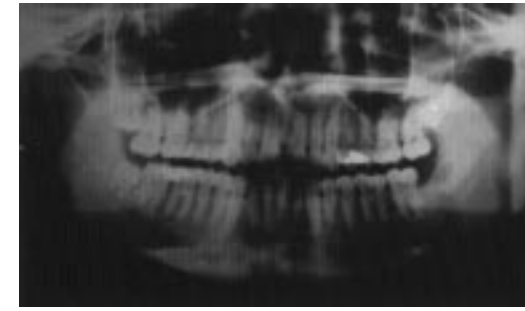

Figure 13 OPG showing the rounded right and the nearly normal left condyle.

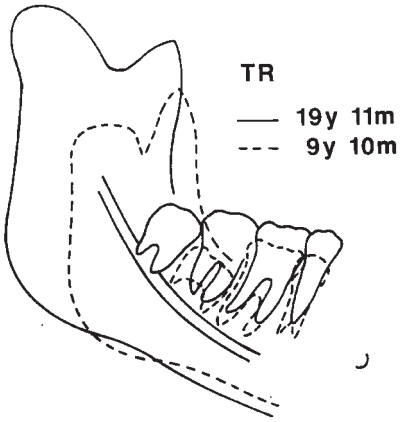

Figure 14 Superimposition from OPG on the mandibular canal of the right ramus at 9 years, 10 months and 19 years, 11 months illustrating the growth and development of an atypical condyle.

(Figure 10), there seemed to be a difference in size of the two sides. If this is the soft tissue aberration of a hemifacial microsomia, it must be characterized as being slight and much smaller than illustrated by Samuels *et al.* (1983), and without any influence on the palate and the dental arches as in that report.

According to Harvold (1983), there can be growth in spite of absence of condylar cartilage if there are no functional problems. Such growth has also been shown to occur not only in congenital but also in acquired defects (Melsen *et al.*, 1986; Pedersen *et al.*, 1995). However, left untreated, there will be no advancement of the mandible on the affected side, leading to severe asymmetry.

The unstable occlusion on the right side in the present case made it possible to take a working bite in a slight forward position. Such movement is said to substitute for the effect of the lateral pterygoid muscle, resulting in remodelling and increased size of the condyle (Harvold, 1983). This was apparently what occurred, leading to a stable occlusion also on the right side.

The response to the activator treatment in this case resembles that which can be achieved in a hemifacial microsomia Type I. After the treatment, the condyle was more like Type II which does not respond well to orthopaedic treatment (Vargervik and Kaban, 1992). However, the resemblance with the different types is of minor importance, what is decisive is the presence of bone-forming cells and that there is no firm connection between the ramus and the skull base hindering forward movement of the mandible (Harvold, 1983).

Whether the condition described should be designated agenesis, that means absence of an organ, or aplasia, lack of development of an organ or tissue (Dorland's illustrated medical dictionary, 1974) is a matter for speculation, but as the condylar cartilage is felt more to be a tissue than an organ, aplasia has been chosen for the denomination.

The good result in this case was achieved by a co-operative patient. The timing of the treatment is, however, very important (Melsen *et al.*, 1986) and should start before the pubertal growth spurt. The result obtained with this patient should also be a reminder that conservative treatment, *in casu* activator therapy, should be tried before a more invasive and non-reversible therapy is instituted.

Address for correspondence

Professor Dr Olaf Krogstad
Department of Orthodontics
Faculty of Dentistry
PO Box 1109 Blindern
N-0317 Oslo
Norway

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References

Dorland's illustrated medical dictionary 1974 W B Saunders Company, Philadelphia, pp. 46 and 119

Gorlin R J, Cohen M M Jr, Levin L S 1990 Syndromes of the head and neck. Oxford University Press, New York, p. 641

Harvold E P 1983 The theoretical basis for the treatment of hemifacial microsomia. In: Harvold E P, Vargervik K, Chierci G (eds) Treatment of hemifacial microsomia. Alan R Liss, New York, p. 14

Larheim T A, Dale K, Tveito L 1981 Radiographic abnormalities of the temporomandibular joint in children with juvenile rheumatoid arthritis. Acta Radiologica Diagnosis 22: 277–284

Lund K 1974 Mandibular growth and remodelling process

after condylar fracture. A longitudinal roentgen-cephalometric study. Acta Odontologica Scandinavica 32 Supplementum 64, p. 102

Lustman J, Milhem I 1994 Mandibular fractures in infants: Review of the literature and report of seven cases. Journal of Oral and Maxillofacial Surgery 52: 240–245

Melsen B, Bjerregaard J, Brundgaard M 1986 The effect of treatment with functional appliance on a pathologic growth pattern of the condyle. American Journal of Orthodontics and Dentofacial Orthopedics 90: 503–512

Pedersen T K, Grönhöj J, Melsen B, Herlin T 1995 Condylar condition and mandibular growth during early functional treatment of children with juvenile chronic arthritis. European Journal of Orthodontics 17: 385–394

Poswillo D, Robinson P 1992 Congenital and developmental anomalies. In: Sarnat B G, Laskin D M (eds) The temporomandibular joint: a biological basis for clinical practice.W B Saunders Company, Philadelphia, p. 198

Prowler J R, Glassman S 1954 Agenesis of the mandibular condyles. Oral Surgery 7: 133–139

Samuels L, Lawson I L, Rowe L D 1983 Characteristics of patients with hemifacial microsomia at the Craniofacial Center. In: Harvold E P Vargervik K, Chierici G (eds) Treatment of hemifacial microsomia. Alan R Liss, New York, p. 54

Vargervik K, Kaban L B 1992 Hemifacial microsomia diagnosis and management. In: Bell W H (ed.) Modern practice in orthognathic and reconstructive surgery Vol. 2. W B Saunders Company, Philadelphia, pp. 1533–1560