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Morphological changes of the TMJ condyles of 100 patients treated with the Herbst appliance in the period of puberty to adulthood: a long-term radiographic study

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One hundred consecutive patients were treated with the Herbst appliance in the period of puberty to adulthood. The orthopaedic effects on the morphology of the condyles were described from orthopantomographic and transpharyngeal radiographs. The orthopaedic treatment effect was, in most cases, visible as a change in morphology of the condyle, a double contour in the distocranial part of the condyle and sometimes also at the distal surface of the ramus. In patients at the peak of puberty, the double contour was distinct for a short time. In patients in late puberty, the double contour could be seen several months after treatment. At adulthood, males showed, in most cases double contours, while females showed in most cases nearly unchanged condyles. When double contours were seen, these persisted for a few months to several years after Herbst treatment. The newly formed bone was stable and no TMJ problems were observed. The change in morphology and the double contour of the condyle can be interpreted as bone modelling. The newly formed bone on the posterior part of the condyle can be explained as a response to hypertrophic chondrocytes, and that on the posterior part of the ramus as a response of resting osteoblasts to mechanically induced changes in the condyle (adaptive bone growth). In two cases, remodelling resorption was found in the anterior part of the condyle after Herbst treatment, again as a sign of adaptation to changed mechanical influence. In most cases, later refilling with bone was registered during the remodelling process. The biomechanical effect of Herbst treatment on the mandible is also analogous with an impeded matrix rotation combined with the relocation of the mandible.

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