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The effects of food consistency on maxillary growth in rats

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ABSTRACT

The effect of food consistency on the bone appositional pattern at the growth site in the palatal region of the maxillary complex in growing rats was examined by quantitative analysis employing bone histomorphometry. Sixty inbred male rats aged 14 days in the weaning period were divided into two groups. One group was fed a conventional solid diet in addition to milk, while the other received the same diet but in liquid form in addition to milk. They were weaned at 21 days of age. Vital staining was employed to enable a longitudinal recording of bone apposition. In rats fed a liquid diet, the amount of bone apposition on the occlusal surface of the palate was reduced in the region between the first molars, but was increased in the region between the third molars, indicating a more anteriorly directed growth rotation of the palate. The width and ossification rate of the synchondrosis of the midpalatal suture was smaller. Furthermore, lateral growth of the maxilla was inhibited considerably in the distal area. In conclusion, this study shows that food consistency affects the bone appositional pattern at the growth site in the palatal region of the maxillary complex. The results also suggest that the difference in the growth pattern in the upper viscerocranium induced by different food consistencies is caused not only by a difference in mechanical force of the masticatory muscles acting on the muscle insertion areas but also by a difference in the growth pattern in the region which receives occlusal loading.

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