



### 31. HISTOLOGICAL ASPECTS OF BONE RECONSTRUCTION IN ORTHODONTICS

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**Introduction.** Understanding the mechanisms of bone growth is crucial for orthodontists. Craniofacial development involves intricate processes of bone formation, sutural growth, and changes in the shape and size of facial structures. Orthodontists must be well-versed in the normal patterns of craniofacial development to diagnose and address abnormalities. There are 2 important process of bone formation: bone modeling and remodeling. The modeling refers to the process of bone formation and adaptation during growth. In orthodontics, it is particularly relevant to the shaping of bones in response to mechanical forces, such as those applied by orthodontic appliances. Also it plays a significant role in achieving desired tooth movements and jaw adjustments. The remodeling is the continuous process of bone resorption and formation throughout life. It is essential for maintaining bone density, responding to functional demands, and repairing micro-damage. Orthodontic treatments can influence bone remodeling, especially in cases where teeth are moved or repositioned.

**Aim of study.** Was to explain the bone structure and its density in performing orthodontic treatment. Understanding of this can lead to more targeted and efficient approaches, potentially reducing treatment times and optimizing outcomes.

**Methods and materials.** We accessed relevant literature from sources such as NihGov, PubMed, NCBI and ScienceDirect from 2018-2023. The information was gathered also from histology and dentistry books. The keywords used for the search included “orthodontics, bone structure, bone remodeling, bone growth and bone density in orthodontics”.

**Results.** After studying the sources and analyzing their reliability, we have determined that orthodontic tooth movement involves the repositioning of teeth within the alveolar bone to achieve proper alignment. The success of orthodontic tooth movement is closely linked to the remodeling of the alveolar bone surrounding the tooth roots. This process includes the resorption of bone tissue on the compressive side and the deposition of new one on the tension side. Both, labial (towards the lips) and lingual (towards the tongue) movement of anterior teeth leads to changes in the alveolar bone. Notably, these changes in alveolar bone height and thickness primarily occur at the cervical level.

**Conclusion.** Ongoing and future research in the field, including histological studies, is crucial for advancing orthodontic care. This research contributes to a deeper understanding of the complex interactions influencing bone histology. Also, this statement emphasizes the dynamic nature of orthodontics, where understanding bone histology is crucial for providing effective and personalized care for patients across different age groups and health conditions. Advances in research, especially in the realm of genetics, hold the potential to further refine and enhance orthodontic treatments on an individual basis.