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| **Name:** |
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| **Group:** |
| 1A-1 |
| **Basic Science Question:** |
| How does bone differ throughout the mandible and maxilla? |
| **Report:** |
| To introduce differences in bone across the maxilla and mandible, it is important to review relevant topics in growth and development. Within the embryo, Arch 1 is associated with a bar of Meckel’s cartilage & CN V. It splits into 2 processes; the maxillary process and mandibular process. Relevant derivatives for this presentation include the bones of the maxilla and mandible, or jawbones. Some pre-natal developmental landmarks include the following: The first site of osteogenesis at the end of week 6 presents at the future location of the mandible, lateral to Meckel’s cartilage. During week 7, more centers of ossification develop around the craniofacial region, including the future maxilla. Intramembranous bone ossification occurs in week 12 to begin formation of the jaw. And both the maxilla & mandible exhibit intramembranous ossification with the only exception being the condyle of the mandible, which grows via endochondral ossification.  The woven bone formed during fetal development remodels to lamellar bone which is found in adults and is generally split into two categories: Compact/cortical bone and trabecular/spongy bone. Lamellae are organized differently in these categories of bone, impacting form and function. Furthermore, the proportion of cortical bone to trabecular bone varies within bones in the body. So, not only do we observe stark contrasts in lamellar organization within the jaw bones, but also varying levels of how trabeculated the bone is. This is known as bone density. Bone density is classified into 4 categories, D1 through D4. Mandibles generally are more densely corticated than maxillae and both jaws tend to decrease in their cortical thickness and increase in their trabecular porosity as they move posteriorly. And variable bone density across both jaws impacts resorption in certain areas, leading to varying prognoses for dental implants. |
| **References:** |
| 1. Frisdal A., Trainor P. A. (2014). Development and evolution of the pharyngeal apparatus. Wiley Interdiscip. Rev. Dev. Biol. 3 403–418. 10.1002/wdev.147 2. Lekholm U, Zarb GA, Albrektsson T. Patient selection and preparation. Tissue   integrated prostheses. Chicago: Quintessence Publishing Co. Inc., 1985;199-209 |