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BIOMECHANICS IN MAXILLOFACIAL SURGERY – A REVIEW

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1. INTRODUCTION

This section presents the anatomy and physiology of human craniofacial bones and tooth. Common terminologies used in maxillofacial surgery and dentistry is also described.

1.1 Human Craniofacial Bones Anatomy

There are twenty-two bones in total consisted in an adult human skull. All of them are joined together by sutures [1], the parts that permit very minimal movement [2]. The neurocranium (braincase) and spalanchnocranium (the bones that support the face) formed by eight and fourteen bones, respectively. There are also cavities exist in the skull such as sinus cavities (sphenoid, ethmoid, maxillary, and frontal sinuses) that lined with the respiratory epithelium and large airways. Whilst, the ethmoid, sphenoid, occipital, temporal, parietal, and frontal are parts of bones that form the cranium [1, 3, 4]. The facial bones, on the other hand, consist of the vomer, two inferior nasal concha, two lacrimal bones, two palatine bones, mandible, two zygomatic bones, two maxillae, and two nasal bones [2, 4]. The upper jaw or also known as maxilla, is a merger of two bones at the hard palate [4]. Some parts of the orbital floor, nasal cavity lateral walls, and hard palate are developed by the maxilla.

The maxilla creates articulation with every bone of the face except the mandible (lower jaw bone). The hard palate is constructed by the palatine processes of the maxilla and the horizontal plates of the palatine bones. The cavity in the maxilla is contained by the large sinus soft tissue and it

is unfilled into the nasal cavity. Also, the maxilla comprises sockets for the placement of teeth which called the alveolar process. The existence of an opening in the maxilla inferior to the orbit, known as infraorbital foramen works as a passage of the infraorbital nerve and blood vessels. Besides, the other foramen that can be found in the maxilla is the incisive foramen and it is located in posterior to the incisor teeth. The cheek bones or technically called as zygomatic bones are categorised as paired bone in the skull. The bone is located at the upper and lateral part of the face and forms the prominence of the cheek, parts of the temporal and infratemporal fossa, and part of the lateral wall and floor of each orbit.

There are four processes represented by the zygomatic bone, which are the temporal, maxillary, orbital, and frontosphenoidal processes. The temporal process of the zygomatic bone articulates with the zygomatic process of the temporal bone to form the zygomatic arch [4]. The zygomatic bone is free from bone resorption or regeneration as compared to the maxilla [5]. It is suitable to be used as support for the placement of implant. The implant may be installed in the zygomatic bone which diverted from the alveolar process together with other conventional dental implants. Figure 4.1 depicts the anatomy of human skull.

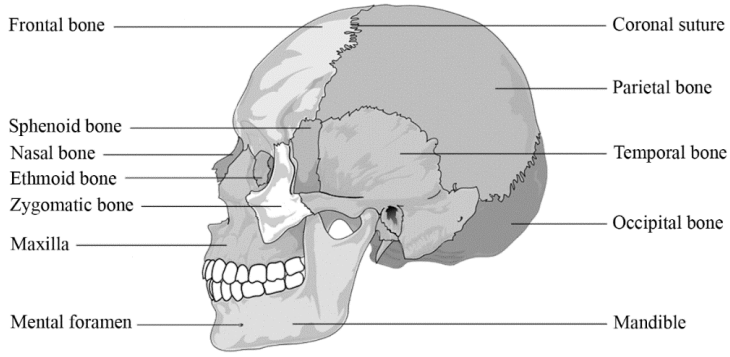

Figure 4.1. Anatomy of Human Skull [6].