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| **Name:** |
| Theran Semrad |
| **Group:** |
| 3B-2 |
| **Basic Science Question:** |
| What is the healing process of an extraction socket? |
| **Report:** |
| The process of healing in an extraction socket is highly complex and is characterized by closure of the socket with soft tissue and/or bone. The timeline for complete closure is variable among individuals and there are three main phases that take place throughout the healing process. The inflammatory phase is the first to initiate and can be broken into two parts: formation of a blood clot and migration of inflammatory cells to the socket. After extraction, a blood clot is formed to plug vessels that were severed in the process of removing the tooth. Before new tissue begins to form, the area must be cleaned by immune cells. Migration of inflammatory cells occurs within 2-3 days of extraction. These cells, along with newly forming blood vessels and fibroblasts, form what is called granulation tissue. This tissue is then replaced with a provisional connective tissue matrix.  The second phase of healing is called the proliferative phase. Like the inflammation phase, this can also be broken up into two parts: fibroplasia and woven bone formation. Fibroplasia is a process known as the formation of fibrous tissue. In the context of socket healing, this tissue functions as a matrix that can be penetrated by blood vessels and osteoblasts. Woven bone is then laid down around the new blood vessels. This type of bone is only found during fetal development and sites where bone healing is occurring. It is characterized by an irregular arrangement of collagen fibers and reduced mineral content, therefore this bone must be remodeled to lamellar bone later. The last step in this phase is the formation of primary osteons by mineralization.  The final portion of socket healing is known as the bone modeling and remodeling phase. Bone modeling is the change in shape and architecture of the bone whereas bone remodeling is change without altering these characteristics. This phase has the most variable timeline of the three; studies have shown that it occurs over months to years depending on the individual. During this time, the socket undergoes remodeling, where the woven bone is replaced with more rigid lamellar bone. The socket also undergoes modeling by resorption of bone on its walls; this changes the dimensions of the alveolar ridge. It is worth noting that there are several stimulating factors that initiate the healing process, but given the complexity of their function they are beyond the scope of this presentation.  Lastly, the most common complication associated with the healing process is a dry socket. This occurs when a blood clot is dislodged or dissolved prematurely, exposing the underlying nerves and bones. This causes pain that can be quite severe. |
| **References:** |
| Araújo, Mauricio G., et al. “Alveolar Socket Healing: What Can We Learn?” *Periodontology 2000*, vol. 68, no. 1, 2015, pp. 122–134., doi:10.1111/prd.12082.  Dr. Judy Maloney lecture slides “Bone” |