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| **Name:** |
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| 1B-3 |
| **Basic Science Question:** |
| What is osseointegration? |
| **Report:** |
| Osseointegration refers to the direct contact between bone structure and an artificial implant, critical for maintaining the structural integrity of the implant (Lang 2019). Understanding the recovery process, subsequent to the introduction of a dental implant into the patient’s dentition, is critical for successful treatment. The level of osseointegration is greatly dependent on the selected materials used for the implant body. According to Steinemann, “It was demonstrated that only metals of a high resistance to corrosion, such as titanium or zirconium, would have the property of osseointegrating and to heal by direct bone-to-implant contact (1998)”. Once the implant is placed, the osseointegration process follows a set of biological stages for the regeneration of surrounding bone. The first stage involves incorporation of woven bone into the surrounding area of the implant and development of the primary spongiosa (Lang 2019). This early stage of bone formation serves to fill gaps and form the initial links between the alveolar bone and the metal body. This process of woven bone formation is primarily evident four to six weeks after the implant procedure (Lang 2019). The second stage in the process acts to reinforce the primary spongiosa. This involves the growth of lamellar bone and parallel-fibered bone, which typically occurs two months after surgery (Lang 2019). Lamellar bone is composed of collagen fibrils that function to provide strength to the newly forming bone structure surrounding the implant. The last stage of the bone regeneration phase consists of bone remodeling (Lang 2019). This process involves the continuous absorption and deposition of lamellar bone facilitated by osteoclasts and osteoblasts. The absorption and deposition interaction continues for as long as the bone remains healthy. These stages that comprise the osseointegration process are vital to ensure the localized bone surrounding the implant does not become infected and that the surrounding bone is not lost. |
| **References:** |
| Lang, N. P. (2019). Oral Implants: The Paradigm Shift in Restorative Dentistry. Journal of Dental Research, 98(12), 1287–1293. https://doi.org/10.1177/0022034519853574Steinemann SG. Titanium--the material of choice?. Periodontol 2000. 1998;17:7-21. doi:10.1111/j.1600-0757.1998.tb00119.x |