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| **Name:** |
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| **Group:** |
| 10B-2 |
| **Basic Science Question:** |
| What is osseointegration? |
| **Report:** |
| Osseointegration is the direct structural and functional connection between living bone and the surface of a load carrying implant. * It is considered successful when there is no relative movement between the implant and the directly contacted bone.

Osteointegration is the result of a series of stages.* This figure visualizes the progression of osseointegration.
* As these stages occur we move from a compostion consisting mostly of soft tissue and bone debri to a compostion of new bone.
1. The first stage is the formation of a blood clot.
	1. Erythrocytes and immune cells migrate to the area.
	2. These cells are integrated into the structural network.
2. The second stage includes formation of vascular structures.
	1. Mesenchymal stem cells are condensed in the area to form the vascular structures and eventually bone.
	2. Immune cells are still circulating in the area of the implantation and cause some inflammation.
3. The third stage includes proliferation of connective tissue matrix and bone formation.
	1. Woven bone is formed and begins to contact the implant through hard fingerlike projections.
4. The fourth stage includes the formation of lamellar bone.
	1. Lamellar bone is mature, mineralized, and contains marrow spaces.
	2. Vessels, adipocytes, mesenchymal cells, and inflammatory cells are within marrow spaces.
	3. Remodeling also occurs at this stage.

All of these steps are key in osseointegration being successful. Successful osseointegration plays a crucial role in the success and health of the implant site and surrounding structures.  |
| **References:** |
| “Temporal sequence of hard and soft tissue healing around titanium dental implants” Salvi et al, Perio 2000, 2015 Wang, Yulan & Zhang, Yufeng & Miron, Richard. (2015). Health, Maintenance, and Recovery of Soft Tissues around Implants: Soft Tissues around Implants. Clinical implant dentistry and related research. 18. 10.1111/cid.12343. |