OPEN ACCESS Freely available online

ISSN: 2161-1122
Dentistry

Short Communication

Implant Evolution and Osseointegration Advancements in the Field of Dentistry

Rozel Dreizin*

Department of Clinical Dentistry, Centro Escolar University Graduation School Manila, Manila, Philippines

ABOUT THE STUDY

Depending on the orthopaedic indication, different needs for implants exist from a clinical standpoint. For instance, joint prostheses are intended to replace the joint for the duration of the patient's life, remaining in place indefinitely. Permanent implants are also used for stabilisation in select situations of bony abnormalities, such as those following tumour excision or bony infections requiring significant surgical debridement. However, when osteosynthesis is used to treat a fracture, temporary implants that can be removed following consolidation are used to realign and support the bone [1].

Despite the significant advancements made in prosthetics throughout centuries and decades for many different application areas, we are still faced with issues today. In terms of the variety of applications, long-term durability, and patient outcomes, implants have improved significantly [2]. However, implant failure still happens and puts a heavy burden on the people who are impacted. Failure of osseointegration can result from a variety of factors, such as a mismatch between the strains experienced by bone, implant material, and bone tissue, or a low material fracture toughness; rejection of the implant caused by inflammatory processes; formation of fibrous tissue at the implant-bone interface, which results in fibrous encapsulation; and implant loosening and corrosion effects, which cause material debris to spread throughout the surrounding tissue [3].

Stable osseointegration is one goal of research in this area, which aims to lower the frequencies of necessary revision procedures. Prof. Per-Ingvar Brnemark (1930-2005) coined the term "osseointegration" to describe how bone tissue grows around implants to provide direct anchorage in the bone. This ensures that no connective or fibrous tissue accumulates between the bone and the implant. Within the first 12 weeks of this situation, the interface strength grows [4].

Numerous mechanisms are needed for proper osseointegration. The osteogenic capabilities and unabated osteogenesis, or the differentiation of progenitor cells into osteoblast and then osteocytes implanted in the mineralized matrix, are prerequisites with regard to the bone. As a result, a process known as osteoconduction allows for the growth of vasculature, osteoprogenitor cells, and osteoblasts on the implant's surface [5].

Numerous signalling molecules and growth factors can be added into coatings to promote cell migration and osteogenic differentiation. The most thoroughly studied of them has been the Bone Morphogenetic Protein (BMP)-2, which has also been applied in therapeutic settings.

Osseointegration: Surface roughening developments and important aspects

The primary goal of surface optimization is to stop the growth of fibrotic tissue. It is important to stop multipotent stem cells from differentiating into fibroblastic lineage (accessible at the implant site and capable of differentiating into diverse tissue specific cells). Since pro-osteogenic cells prefer rougher surfaces and non-osteogenic cells prefer smooth surfaces, it has been discovered that a roughened surface is appropriate for this. The mechanical anchoring in the bone tissue is improved by roughness on the surface at the macro-microscale. Overall roughness increases hydrophilicity and expands the implant surface area, displaying a larger area for pro-osteogenic cells to adhere to. The ideal surface roughness required for Osseointegration has not yet been found, but it is suggested that a moderate roughness is recommended for achieving an appropriate surface energy for cell attachment.

CONCLUSION

Additionally, the design, composition, and surface properties of the implant all influence osseointegration. The success of the therapy and the unique requirements of the many treatment scenarios are taken into consideration while developing the design of the implants, such as plates or nails. Bekos et al. demonstrate the development of intramedullary cross-sectional nail designs that led to the interlocking nail that is used today by inserting screws through holes in the nail.

Correspondence to: Rozel Dreizin, Department of Clinical Dentistry, Centro Escolar University Graduation School Manila, Manila, Philippines, E-mail: d.rozel@gmail.com

Received: 21-Jun-2022, Manuscript No. DCR-22-17704; **Editor assigned:** 24-Jun-2022, Pre QC No. DCR-22-17704 (PQ); **Reviewed:** 08-Jul-2022, QC No. DCR-22-17704; **Revised:** 18-Jul-2022, Manuscript No. DCR-22-17704 (R); **Published:** 25-Jul-2022, DOI: 10.35248/2161-1122.22.12.591.

Citation: Dreizin R (2022) Implant Evolution and Osseointegration Advancements in the Field of Dentistry. J Dentistry. 12:591.

REFERENCES

1. Dohan DM, Choukroun J, Diss A, Dohan SL, Dohan AJ, Mouhyi J, et al. Platelet-rich fibrin (PRF): A second-generation platelet concentrate. Part I: technological concepts and evolution. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2006;101(3):e37-44.
2. Miron R, Choukroun J, Ghanaati S. Controversies related to scientific report describing G-forces from studies on platelet-rich fibrin: Necessity for standardization of relative centrifugal force values. Int J Growth Factors Stem Cells Dent. 2018;1(3):80.
3. Caymaz MG, Uyanik LO. Comparison of the effect of advanced platelet-rich fibrin and leukocyte-and platelet-rich fibrin on outcomes after removal of impacted mandibular third molar: A randomized split-mouth study. Niger J Clin Pract. 2019;22(4):546-552.
4. Clark D, Rajendran Y, Paydar S, Ho S, Cox D, Ryder M, et al. Advanced platelet-rich fibrin and freeze-dried bone allograft for ridge preservation: a randomized controlled clinical trial. J Periodontol. 2018;89(4):379-87.
5. Temmerman A, Cleeren GJ, Castro AB, Teughels W, Quirynen M. L-PRF for increasing the width of keratinized mucosa around implants: a split-mouth, randomized, controlled pilot clinical trial. Journal of periodontal research. 2018;53(5):793-800.