Integration of dental implant-supported prosthesis and bone grafting: A review of current literature

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Abstract

The integration of dental implant-supported restorations is a complex process involving dynamic biological and mechanical interactions between the implant, bone, peri-implant mucosa, and the final prosthesis. The success of dental implants is significantly influenced by various factors, including the quality of bone grafting, implant design, and surgical techniques. In this review, we aim to summarize the current knowledge on the integration of dental implants and bone grafting, highlighting the importance of bone quality and quantity in achieving successful outcomes. We will also discuss the role of peri-implant mucosa and its impact on the success of the final prosthesis. Furthermore, we will explore the different approaches to bone grafting and the selection criteria for various bone graft materials.

Keywords

Dental implants, Bone grafting, Integration, Prosthesis, Peri-implant mucosa, Biomaterials.

Introduction

Dental implants have become an essential tool in modern dentistry, providing patients with a stable and functional prosthesis. The success of dental implants relies on their ability to integrate into the surrounding bone tissue, a process known as osseointegration. Bone grafting is a critical step in the treatment planning for patients with deficient bone quality or quantity, as it provides a platform for implant osseointegration. The purpose of this review is to provide an overview of the current knowledge on the integration of dental implants and bone grafting, focusing on the importance of bone quality and quantity, the role of peri-implant mucosa, and the selection criteria for bone graft materials.

Bone Quality and Quantity

Bone density and quality are crucial factors in the success of dental implants. Bone density refers to the mineral content of the bone, which is influenced by factors such as age, gender, and systemic health conditions. Bone quality refers to the microstructural properties of the bone, such as porosity, vascularity, and cellularity. Both bone density and quality are important for the success of dental implants, as they influence the rate of osseointegration and the long-term stability of the implant.

Bone Grafting

Bone grafting is a surgical procedure used to increase the volume and quality of bone in the treatment of patients with deficient bone tissue. Bone grafting can be autogenous, allogeneic, or alloplastic, depending on the source of the bone graft material. Autogenous bone grafts are harvested from the patient, while allogeneic bone grafts are harvested from donors, and alloplastic bone grafts are synthetic materials.

Peri-Implant Mucosa

The peri-implant mucosa plays a crucial role in the success of dental implants. The peri-implant mucosa is responsible for the nutrition and maintenance of the implant, and its health and function are influenced by factors such as smoking, diabetes, and poor oral hygiene. The peri-implant mucosa is also influenced by the design of the implant-abutment connection, as well as the type of prosthesis.

Conclusion

In conclusion, the integration of dental implants and bone grafting is a complex process that requires a multidisciplinary approach. The success of dental implants is significantly influenced by various factors, including bone quality and quantity, peri-implant mucosa health, and the selection of bone graft materials. Further research is needed to improve our understanding of the factors that influence the success of dental implants and to develop new strategies for optimizing their clinical outcomes.