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Achieving improved and more predictable vertical bone augmentation for dental implant placement by controlling bone graft substitute microstructure

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The long-term success of implants depends upon the degree of osseointegration that can be achieved, which is largely determined by the volume and quality of bone available at the time of surgery. Bone height and volume is often diminished in patients due to the extended time after tooth loss and this is a major limitation impacting long term dental implant treatment success. Some of the commonly used surgical techniques for ridge augmentation are (i) Osteoperiosteal flap (OPF); (ii) Distraction osteogenesis (DO); (iii) Block grafting; (iv) Guided bone regeneration (GBR) using membranes; and (v) Subperiosteal tunneling for minimally invasive approach to GBR. This talk discusses the development of bioceramic graft materials with controlled microstructure and superior biological properties to those currently available. Dicalcium phosphate cements, brushite and monetite, resorb faster than hydroxyapatite (HA). Monetite (unlike brushite) does not re-precipitate as HA *in vivo*, and demonstrates superior osteoconductive properties. We have produced monetite disc grafts by varying processing conditions which alter their physical properties such as porosity, surface area and mechanical strength. Histological observations after 12 weeks of onlay grafting on rabbit calvaria reveal higher bone volume (38%) in autoclaved monetite grafts in comparison with the dry heat prepared monetite grafts (26%). The vertical bone height gained is similar for both the types of monetite grafts (up to 3.2 mm). This talk discusses and provides information regarding two types of monetite onlay grafts prepared with different physical properties that could be used for achieving more predictable vertical bone augmentation.

Biography

Zeeshan Sheikh is trained as a Dental Clinician and a Biomaterial Scientist with clinical and research degrees of BDS, MSc and PhD in Dentistry. After graduating as a Dentist, he worked as a Dental Surgeon for 2 years before proceeding to obtain an MSc degree in Dental and Biomaterials field from Queen Mary, University of London (QMUL) with distinction. During his MSc, he worked upon synthesizing and characterizing novel polymeric guided tissue regeneration (GTR) membranes for periodontal regeneration applications. He then joined Altamash Institute of Dental Medicine (AIDM) as Head of the Department of Dental Materials and Preclinical Dentistry (2007). He also continued to work as an Assistant Professor in the Department of Oral Anatomy. He then proceeded to obtain a PhD from McGill University, Faculty of Dentistry (2014). During his PhD his work was related to bone grafting and augmentation for maxillofacial and orthopaedic applications using alloplastic bone replacement graft materials. He currently works at Faculty of Dentistry (Matrix Dynamics Group), University of Toronto and the Mt. Sinai Hospital (Lunenfeld-Tanenbaum Research Institute) in Toronto, Canada as a Post Doctoral Research Fellow. In addition to several conference talks and presentations both locally in Canada and internationally, he has more than 35 publications in peer-reviewed journals. He has also co-edited two text books on Oral Biology and Dental Biomaterials. He currently holds two research grants from the American Academy of Implant Dentistry Foundation and the Alpha Omega Foundation of Canada. Being trained extensively as a Clinician Scientist in world renowned insititutions like the Queen Mary University of London, McGill Univeristy and University of Toronto, his expertise lie in developing novel biomaterial options for bone grafting and alveolar ridge augmentation applications.

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