Oral Health Dent Manag 2015, 14:2
http://dx.doi.org/10.4172/2247-2452.S1.007

OMICS International
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International Conference and Exhibition on
Dentistry

March 18-20, 2015 Dubai, UAE

Bridging the gap

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Bone regeneration is a complex, well-orchestrated physiological process of bone formation, which can be seen during normal fracture healing, and is involved in continuous remodelling throughout adult life. However, there are complex clinical conditions in which bone regeneration is required in large quantity, such as for skeletal reconstruction of large bone defects created by trauma, infection, tumour resection and skeletal abnormalities, or cases in which the regenerative process is compromised, including avascularnecrosis, atrophic non-unions and osteoporosis. Currently, there is a plethora of different strategies to augment the impaired or 'insufficient' bone-regeneration process, including the 'gold standard' autologous bone graft, free fibula vascularised graft, allograft implantation, and use of growth factors, osteoconductive scaffolds, osteoprogenitor cells and distraction osteogenesis. Improved 'local' strategies in terms of tissue engineering and gene therapy, or even 'systemic' enhancement of bone repair, are under intense investigation, in an effort to overcome the limitations of the current methods, to produce bone-graft substitutes with biomechanical properties that are as identical to normal bone as possible, to accelerate the overall regeneration process, or even to address systemic conditions, such as skeletal disorders and osteoporosis. Over the past year we have seen new products approved and released to the market. And the pipeline of therapies on the horizon continues to expand. This paper reviews the various approaches to reconstruct soft and hard tissue defects and its application in implant dentistry and oral surgery.

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