Non-invasive Therapeutic Device for Bone Regeneration

May accelerate bone regeneration reducing treatment time and costs.

Background
Pharmacological interventions are the current gold standards for the prevention of bone loss due to osteoporosis, but come with potentially severe side-effects and are not suitable for targeted bone regeneration. Osteoinductive growth factors, used for certain experimental focal bone regeneration therapies, are not effective due to rapid diffusion and excretion from the defect site, inefficient delivery (unstable biological activity, short half-life, and minimal tissue penetration). Non-pharmacologic strategies, perhaps based on bone's sensitivity to mechanical/acoustic signals, may therefore represent the basis for developing safer interventions for bone regeneration.

Technology
Dr. Balaji Sitharaman, Professor at the Biomedical Engineering Department at Stony Brook University has developed a biomedical device and a novel biophysical stimulation technology for use on specific segments of the human skeleton as an anabolic or anti-catabolic non-pharmacological prophylaxis and/or therapeutic intervention to improve bone quantity and quality. As a prophylaxis, our device may reduce healthcare costs by reducing the incidences of fractures related to bone loss in the elderly, and post-menopausal women. As a therapeutic intervention, it may accelerate bone regeneration reducing treatment time and costs. Eventually, additional fields of use will cover osteointegration; accelerate fracture healing and treatment of segmental bone defects using bone tissue engineering strategies.

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Advantages
• Overcomes the limitations of existing pharmacological and non-pharmacological technologies
• No external (e.g., weight bearing) or internal (e.g. muscle) forces required

Applications
• Device, orthopedics, bone health, regenerative medicine, therapeutics

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