

Study Summary

Publication

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Title

Osteogenic Effect of High-frequency Acceleration on Alveolar Bone

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Key Objective:

- To investigate whether high-frequency acceleration (vibration) can significantly increase bone alveolar bone formation

Design

- Subjects were divided among control, sham, and experimental groups

Overview:

- The experimental group underwent localized accelerations at different frequencies for 5 min/day
- The impact on alveolar bone morphology was measured using a range of microscopy, imaging, and histological techniques

Key Findings:

- High frequency acceleration (vibration) caused nearly twice as much bone remodeling as low frequency vibration (5 min/day application)
- The experimental group had significant increases in bone quality over the same period of time compared to sham and control groups
- Increased bone remodeling activity resulted in thicker and denser bone trabecula
- Localized high frequency force of low magnitude is able to induce osteogenic activity within the surrounding bone

Conclusion:

The application of high-frequency acceleration (vibration) was shown to increase alveolar bone formation

High frequency is significantly more effective than low frequency in inducing remodeling

Figure 1 – Amount of Bone Remodeling at Varying Frequencies. The difference in results between high and low frequency were statistically significant

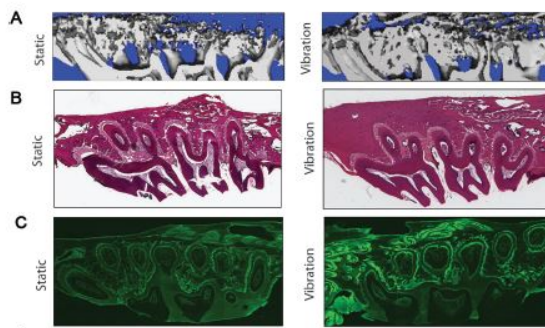
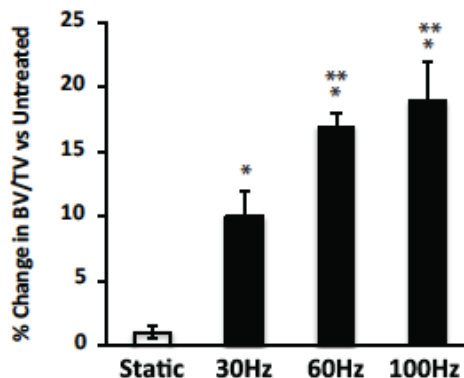


Figure 2 - (A) micro-CT (B) SEM and (C) Fluorescent Microscopy. Images show changes in bone spacing and thickness and other evidence of significant remodeling.

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