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# Article Summary

## Publication

International Magazine of Orthodontology (Dental Tribune Intl)

## Title

Vibration Therapy in Orthodontics: Realizing the Benefits

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### Key Conclusions:

- Vibration therapy has many potential benefits including applications for:
  - Aligner seating
  - Orthodontic pain relief
  - Accelerated tooth movement
  - Enhanced orthodontic retention
  - Applications for implant dentistry and prosthodontics
- A device operating in the high frequency range would likely be most effective in creating tooth movement as well as offering shorter wear times.
- AcceleDent operates in the low frequency range explaining why recent study results have shown no significant impact on OTM. It also requires a long, 20 minutes daily wear time impacting compliance.
- HFV therapy could revolutionize the concept of orthodontic retention.
- HFV therapy may be useful in implant dentistry and prosthodontic treatment.



## Vibration therapy in orthodontics: Realizing the benefits

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### Introduction to vibration therapy—multiple potential benefits

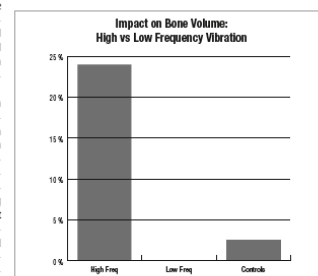
Accelerated orthodontics and vibration therapy to fast track orthodontic tooth movement (OTM) have been hotly debated topics in the orthodontic industry in recent years. Periodontally Accelerated Osteogenic Orthodontics (PAOO) techniques such as osteotomy, open flap corticotomy, and piezosurgery have been shown to decrease treatment time! Unfortunately, these classical approaches have had limited patient acceptance because of their invasiveness and side effects.<sup>1</sup> In the last several years, micro-osteoperforation, which takes advantage of the same biological regional acceleratory phenomenon as these classical techniques, has been gaining rapid clinical adoption because of the simplicity of its chairside microinvasive nature.<sup>2</sup>

There is also growing evidence that the application of mechanical energy-based therapies such as vibration can stimulate and accelerate bone formation and possibly bone remodelling.<sup>4-7</sup> Orthodontic tooth movement, caused by the application of light continuous forces that induce bone formation and remodelling, could logically be accelerated by the application of vibrational force, with the benefit of reducing the overall treatment time. Since 2008, AcceleDent (OrthoAccel Technologies) has offered a daily use vibration device, offering the promise of accelerated orthodontic treatment based on delivering mechanical stimulation to the dentition. At this point, research on the efficacy of this device in accelerating OTM has been mixed, and clinicians debate its value.

The debate on vibration therapy as it applies to accelerated orthodontics in general, and the effectiveness of the AcceleDent device specifically, should consider other factors in evaluating efficacy. First, there is a distinct possibility that frequency optimization of the devices concerning bone formation/remodelling has

not been established. AcceleDent operates in a low frequency range, however, research points towards the benefit of high frequency in bone modulation. Secondly, current research indicates that high frequency low magnitude (HFLM) vibration therapy as applied to orthodontic treatment may have multiple potential benefits, including, but not limited to, accelerated OTM.

This article will discuss these additional benefits, including faster more efficient aligner therapy when used as a nightly seating tool, relief of normal



orthodontic discomfort from new tight fitting aligners and routine adjustments to fixed appliances, and enhancement of orthodontic retention. Additionally, it will touch upon evidence that HFLM vibration is useful in increasing bone density and trabecular bone thickness suggesting applications in implant dentistry and prosthodontics.

**Graphic 1: Relative impact of frequency on bone morphology**  
Increases in bone volume for high frequency subjects was 25% higher than controls; low frequency subjects were not statistically different than controls.

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