Microvibration and Acceledent: What’s the Buzz? (Peter Miles)

Do patients want faster treatment?
- Patient’s, parent’s, and orthodontist’s perceptions of the need for and costs of additional procedures to reduce treatment time.
- Parent’s want Tx done in 12-18 mths
- Adult patients want Tx done in 6-12 mths
- Adolescents was Tx done in 6 mths or less

How much are we/they willing to pay for faster treatment?
- Most orthodontists are only willing to pay up to 20% of their treatment fee to companies for technology to reduce treatment times.
- Most patients/parents willing up to 20%
- Almost 2/3 of orthodontists felt that reducing treatment time would become a problem for fee collection

Patient/parent willingness to have a procedure?

<table>
<thead>
<tr>
<th>Technique</th>
<th>Willing</th>
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<tbody>
<tr>
<td>Customised appliances</td>
<td>54 – 81%</td>
</tr>
<tr>
<td>Intraoral vibrating appliances</td>
<td>51 – 62%</td>
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<tr>
<td>Intraoral injected drugs</td>
<td>25 – 34%</td>
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<tr>
<td>Piezocision &amp; Corticotomies</td>
<td>11 – 20%</td>
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Bone remodelling
- The process for bone remodelling has two main theories that have been proposed:
  - 1) pressure-tension within the PDL
  - 2) piezoelectricity generated in the alveolar bone

Piezoelectric charges
- When bone is deformed, this generates piezoelectric charges and microcurrents to flow through bone and may enhance tooth movement by stimulating osteoblastic and osteoclastic activity.
- The microcurrents flow only during the application or release of stress and are not observed where continuous orthodontic forces are used.
Frequency effects on bone

- Conventional mechanics involves static or intermittent forces (not cyclic/pulsatile).
- Static and intermittent forces have no frequency, and therefore affect cells only when activated.
- Cyclic forces impact cells multiple times (frequency in Hz).

Vibration effects research to be discussed

- Nishimura et al. AJODO 2008;133:572-83
- Kau et al. Orthodontic Practice. US 2010;1(1)
- Acceledent clinical trial (University of Texas Health Science Center - San Antonio)
- Bowman – JCO 2014 and AAO, New Orleans

Miles et al. New blinded RCT of the Acceledent appliance

- Initial alignment – discomfort, irregularity and arch perimeter
- Extraction space closure in mm/mth (future)
- Overall treatment duration (future)
- 40 Class II adolescent upper bicuspud extraction subjects randomly assigned to control or Acceledent
- 36 of 40 recruited, 4 declined – clinician blinded
- Initial alignment and discomfort results of first 30 subjects to be presented