Advances in Lasers and Powered Instrumentation for Transcanal Endoscopic Ear Surgery: Safety overview

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Ultrasonic Bone Drilling Devices (UBD)
Safety of device?
Literature Review

Piezosurgery in otologic surgery: Four years of experience

Effects of Piezosurgery on the cochlear outer hair cells

• Stapedotomy, other middle ear surgeries
• No inner ear changes
Piezoelectric round window osteoplasty for Vibrant Soundbridge implant.


Cuda et. al.

- High frequency HL, postop vertigo
Hypotheses?

• ? BC
• ? Shock wave
• ? Heat
• ? Electromechanical
Malleus
Incus
Stapes
I-S joint

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June 13-15, 2019
Functional Results

Auditory Brainstem Response (ABR)

<table>
<thead>
<tr>
<th>Frequency (kHz)</th>
<th>2kHz</th>
<th>4kHz</th>
<th>8kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piezosurgery PreABR n=14</td>
<td>16.07143</td>
<td>16.07143</td>
<td>16.42857</td>
</tr>
<tr>
<td>Piezosurgery PostABR n=10</td>
<td>85</td>
<td>87</td>
<td>93</td>
</tr>
</tbody>
</table>

Signal-to-noise-ratio (SNR)

<table>
<thead>
<tr>
<th>Frequency (kHz)</th>
<th>1kHz</th>
<th>2kHz</th>
<th>4kHz</th>
<th>8kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNRPreop PiezoSurgery (n=14)</td>
<td>10.43846</td>
<td>24.77143</td>
<td>28.38571</td>
<td>38.32143</td>
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<tr>
<td>PostopSNR Piezo n=13</td>
<td>-1.438462</td>
<td>3.115385</td>
<td>-1.346154</td>
<td>-2.892307</td>
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</tbody>
</table>

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Anatomic Results

Control

Ultrasonic Bone Drill

Control

Ultrasonic Bone Drill

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Literature Review

Effects of cochlear drilling with Piezosurgery Medical device in rats

Pawlowski et. al.

Standard Drill

Piezosurgery

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Conclusions

• Useful device
  • Precise, delicate, versatile
• Caution for use in close proximity to cochlea