Medial Displacement of Cochlear Implant Magnet Following Trauma

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Objectives
The goals of this case report are to improve knowledge and understanding of the devastating complication of cochlear implant magnet displacement following trauma. Readers will specifically be made aware of the possibility of a very rare medial migration of the magnet. The potential exists for the magnet to be hidden beneath the implant as it occurred in our case and should be kept in mind.

Methods
A five-year-old child sustained minor trauma to the implant site after slipping on the floor. Immediately following the fall her parent observed that the processor magnet would not lock on to the magnet contained in the receiver-stimulator package of her Freedom cochlear implant (Cochlear Corporation). This rendered the device nonfunctional. However integrity testing showed the device to be working within specifications. An X-Ray confirmed that the magnet pocket was empty and the antenna coil was misshaped (Fig. 1). Surgical exploration revealed the magnet pouch to be empty and a systematic search failed to reveal a magnet lateral to and around the implant. After re-reviewing the images, the device was gently elevated out of its bed using a Freer elevator. The magnet was discovered hidden from view between the skull and the receiver-stimulator package, laterally to and medial to the implant. If the magnet is not found lateral to the receiver stimulator package it is important for the surgeon to look for it medial to the implant.

Results
The cochlear implant magnet pocket was successfully repaired using the aforementioned described method, intra-operative impedance measurements and neural response telemetry were normal and the cochlear implant was successfully activated after 6 weeks. Her performance is at pre-trauma levels. Explant and re-implantation of the device was avoided.

Discussion
Cochlear implantation is one of the most common otologic procedures performed today. The complication of magnet migration has been described following Magnetic Resonance Imaging (MRI), and rarely secondary to trauma. In previous reported cases, the magnet migrated anterior or laterally to the implant/ stimulator-receiver; medial migration has not been reported. In our case, minor trauma to the head without a break in soft tissues resulted in medial magnet displacement which was obstructed from view by the implant. Cochlear implant magnet displacement is a rare but potential major complication that renders the individual with a nonfunctional implant. In newer cochlear implants, magnets are designed to be removable temporarily if MRI is needed. They are therefore placed in a small round silicone envelope. With the introduction of removable magnet devices the possibility of magnet displacement or extrusion must be considered after trauma associate with a rapid sudden drop in performance.

Conclusion
It is important for the surgeon to be aware of this complication and methods to repair the silicone magnet pocket to avoid the replacement of the cochlear implant. If the magnet is not found lateral to the receiver stimulator package it is important for the surgeon to look for it medial to the implant.

Table 1: Search of Cochlear database covering the one year period from November 2014-October 2015 yields 49 cases of magnet dislodgement reported to Cochlear for all cochlear implant models

<table>
<thead>
<tr>
<th>Reported Cause</th>
<th>Number of Cases</th>
</tr>
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<tbody>
<tr>
<td>MRI</td>
<td>21</td>
</tr>
<tr>
<td>Impact</td>
<td>15</td>
</tr>
<tr>
<td>Unknown</td>
<td>13</td>
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References: