

**Committee Breakout 3 - New Technology: Innovation and 3D Technology**

4:00 PM – 5:00 PM

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**THE NOVEL USE OF RARE EARTH MAGNETS FOR THE EXTRACTION OF METALLIC SOFT TISSUE FOREIGN BODIES IN CHILDREN**

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**PURPOSE:** Penetrating metallic foreign body (FB) injuries are common in children. Once embedded in the soft tissue these objects can be challenging and time-consuming to safely remove. Neodymium iron boron magnets (Ndy) are powerful rare earth magnets. The potential use of Ndy for the removal of FB is logical. Our specific aim was to evaluate the efficacy of Ndy for this purpose.

**METHODS:** One 13-year-old child and one 9-year-old child were referred for an embedded foreign body in the plantar surface of the heel and forefoot, respectively. On exam the area was tender but the FB was not palpable in either child. We obtained commercially available Ndy and processed them for operative use according to hospital protocols. We utilized a sterile ultrasound probe cover for intraoperative use.

**RESULTS:** The FB were localized utilizing fluoroscopy and attempts were made to extract the FB to the skin surface using Ndy prior to a skin incision. This was unsuccessful. A small skin incision into the subdermal soft tissues was made overlying the area of the FB. The pins could not be visualized. Using fluoroscopy, the Ndy was then placed into the wound in close proximity to the FB. The FB were immediately magnetized to the Ndy and the FB were removed without any further soft tissue dissection. The total operative time was 2 and 2.5 minutes respectively. The children recovered uneventfully and are without complication.

**CONCLUSIONS:** The use of Ndy to remove metallic soft tissue foreign bodies in children is feasible, safe, and efficient. Ndy may reduce operative time and radiation exposure. The development of magnets of increasing energy density is indicated to further optimize metallic soft tissue foreign body extraction potentially without an incision.