Safe Parameters for Utilizing Magnetic Growth Rods in Patients with a Vagal Nerve Stimulator

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Disclosures

- Michael J. Elliott---None
- Jesua Law---None

Background

- Early onset scoliosis has high risk of progression[1,2]
- Severe curves lead to restrictive lung disease[3–6]
- Surgical treatment is with growing rods which require additional surgery for lengthening[7–9]
- Complications are common with increasing lengthening surgeries[10–13]

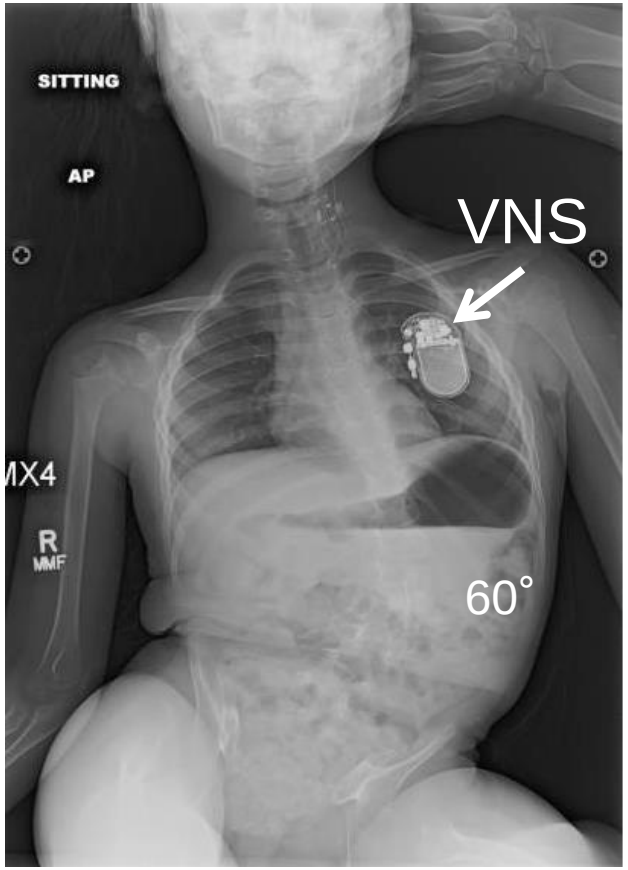
Background

- External magnets are used to control devices that use to require surgery. Examples: vagal nerve stimulator (VNS) and pacemakers[14,15]
- Magnetic controlled growing rods use a similar technology [16–18]
- External Remote Control (ERC) generates an magnetic field to lengthen the device

Purpose

- To determine if the magnetic field from the ERC for Magic rods will inadvertently activate a VNS device.

- Determine if parameters exist for the use of the Magic rod ERC in the presence of a VNS device

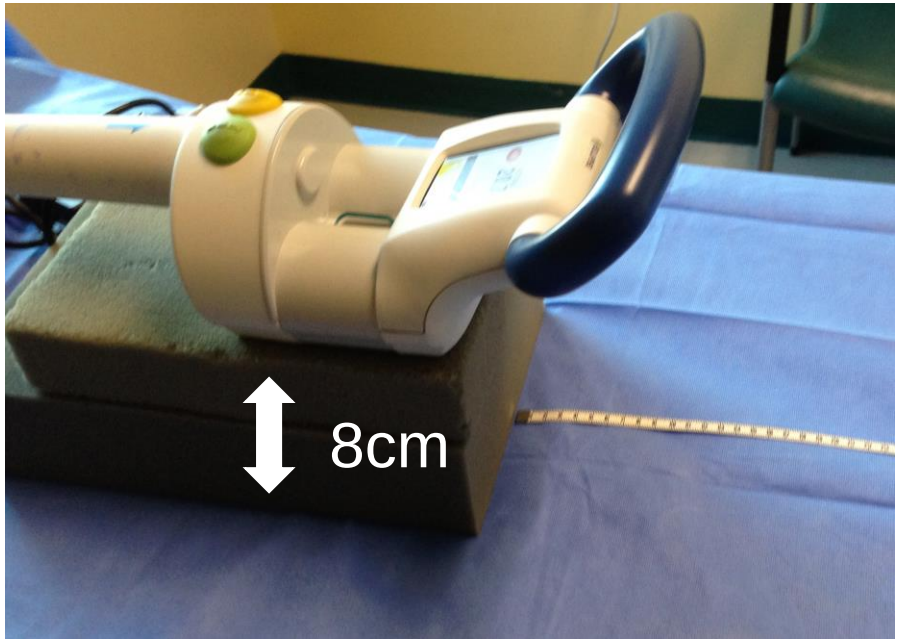


Materials & Methods Simulation 1

- VNS placed adjacent to ERC
- ERC activated for 2-28 sec
- 2 sec activation correlates to .3mm lengthening
- Distance from VNS to ERC increased at 2cm increments (2-12cm)
- VNS interrogated for activation

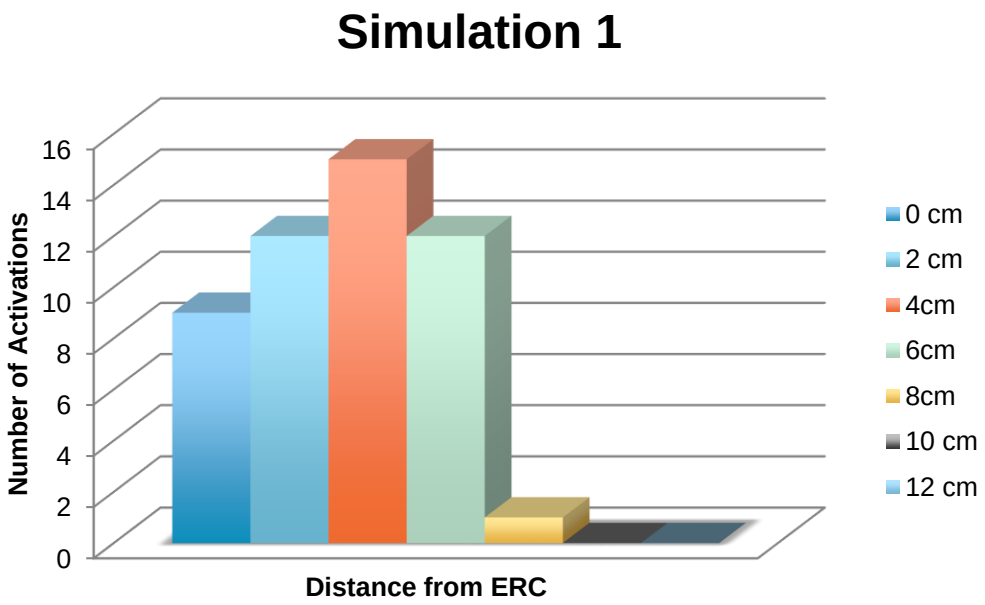
Materials & Methods Simulation 2

- ERC elevated on 8cm foam
- ERC activated for 2-28 sec
- Distance from VNS to ERC increased at 2cm increments (2-12cm)
- VNS interrogated for activation



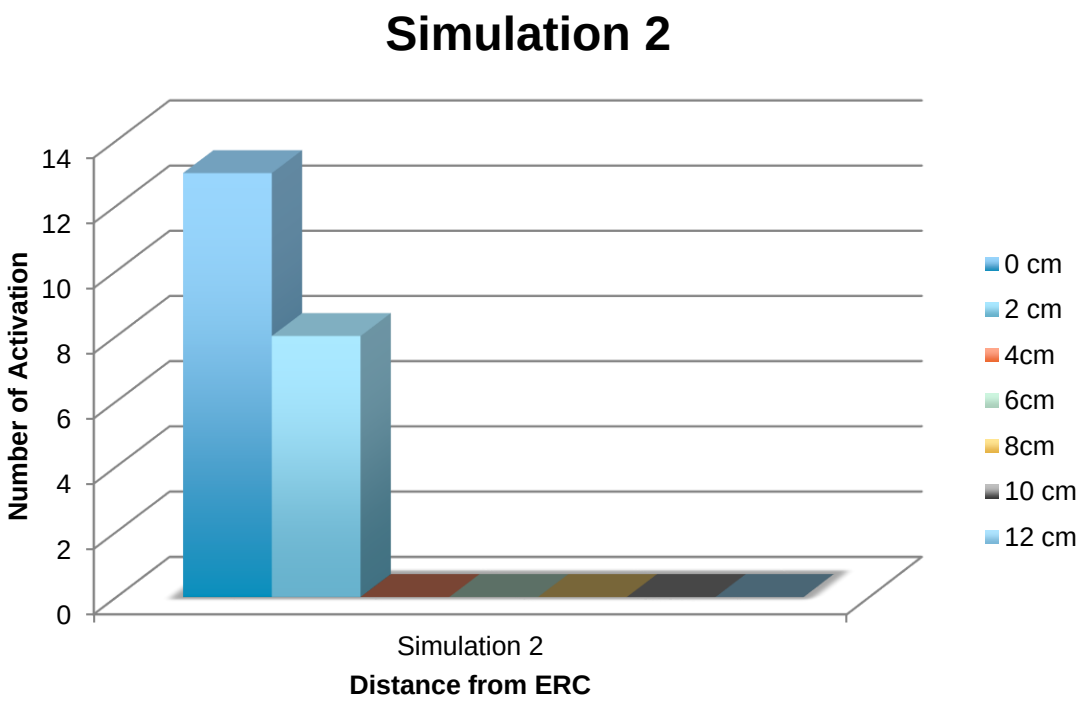
Results
Simulation 1

- 43% activation rate at 0cm
- 71% activation rate at 4cm
- 5% Activation rate at 8cm
- 0% Activation rate at > 10cm



Results
Simulation 2 (ERC on 8cm block)

- 73% activation rate at 0cm
- 38% activation rate at 2cm
- 0% Activation rate at 4cm
- 0% Activation rate at > 4cm

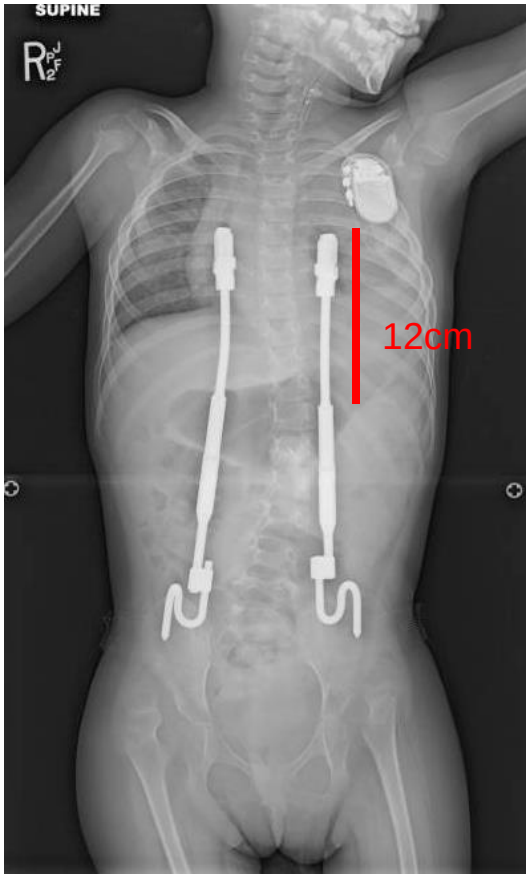


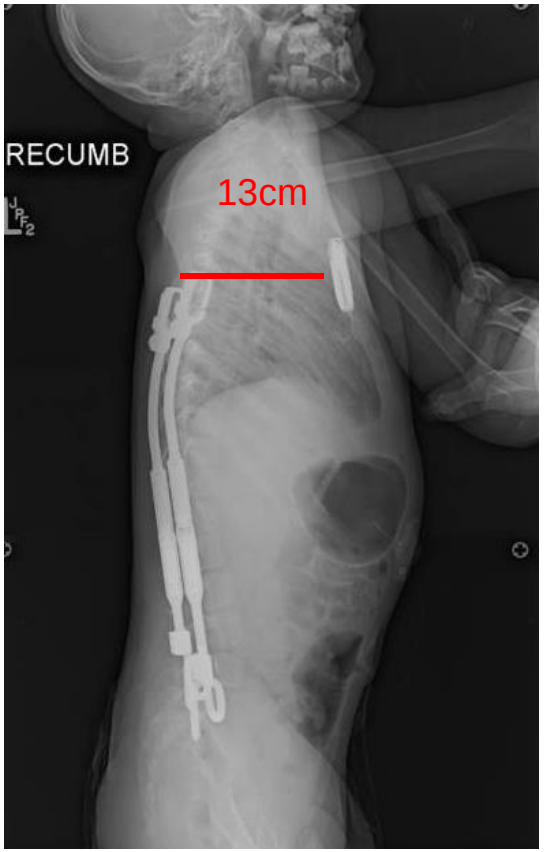
Conclusion

- The ERC can activate a VNS device
- Safe parameters are:
  - Greater 8cm chest thickness
  - Actuator > 4cm from VNS device

Conclusion
Case Example

- No Activations
- Lengthening X3
- VNS > 8 cm anterior
- VNS > 4cm distal





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