Intraoperative Laryngeal Electromyography (LEMG) in Children with Vocal Fold Immobility: A Longitudinal Study

LEMG Setup Guide
LEMG Setup Goal

- Capture EMG readings **with audio** from NIM and transfer to digital format that can be read by study neurologist
LEMG Setup

• Basic required equipment
  – Medtronic NIM Response 2.0 w/ VGA and audio output
  – Video Converter (VGA to S-Video or composite video)
  – Audio cable
  – Digital recording device (PC with video recording software and CD/DVD burner)
LEMG Setup
(What you need to buy…)

• Most ORs will need to **buy a video converter**
  – Any unit that will convert VGA output to S-video or composite video will suffice

• The current model of the unit used at MEEI is available from:
  – Focus Enhancements Inc, Campbell, CA
    (http://www.focusinfo.com/solutions/catalog.asp?id=151)
    • TView Micro (part #:444-8600) $89 (requires USB port as power source)
Simplified LEMG Technique - MEEI Method

- **Equipment**
  - **Medtronic NIM Response 2.0**
    - Must have VGA and audio output
  - **Video converter** (TView MicroXGA, Focus Enhancements Inc, Campbell, CA)
    - Convert NIM output from VGA to S-video or RCA to allow connection to digital video recorder
  - **Digital video recorder** (Med X Change DRS2, Med X Change, Inc, Bradenton, FL)
    - Can use any PC with video input card, video recording software and CD/DVD burner
  - **Paired subdermal electrodes** (Medtronic PN#8227410)
Connections

NIM Response 2.0 Unit

VGA Video Converter

Produces CD/DVD

VGA video cable

Audio cable

S-video or composite video cable

White NIM interface cable

NIM interface box (small white box to plug leads into)

Paired subdermal leads

Ground lead

Video Recorder / PC

Produces CD/DVD
NIM interface box connections

Paired subdermal electrodes (to patient’s larynx)

Grounding lead (to patient’s chest or shoulder)

NIM interface cable (to NIM machine)
NIM connections (without wires)

VGA Video Out

RCA Audio Out
NIM Connections (with wires in place)

- VGA video cable (to video converter)
- RCA audio cable (to video recorder)
Video converter connections

VGA video in

S-Video Out
Video converter connections
(top view of the same)

- VGA video in (from NIM)
- AC power in (from wall plug)
- S-Video out (to video recorder)
Video recorder / PC connection

S-Video in (from video converter)

RCA audio in (from NIM)
Preop NIM Setup

- Turn on machine
  - Quick setup screen
- Press “New”
  - This creates a new profile
Preop NIM Setup

- Default screen appears
- Press “Left Vocalis” to assign lead 1 (blue)
Preop NIM Setup

• Press “Right Vocalis” to assign lead 2 (red)
• Press OK
Preop NIM Setup

- Type "LEMG" as setup name
- Press OK
Preop NIM Setup

• Press “Audio” to ensure audio is enabled
Preop NIM Setup

• Under “Tones”
  – ensure that “EMG audio” and “Event Tones” are checked

• Then press “Display” to change amplitude settings
Preop NIM Setup

- Under “EMG Scales”
  - ensure that “Show on main display” is checked
- Set amplitude to “50 µV”
- Set time to “50 mS”
- Then press “Save”
Preop NIM Setup

• Press “LEMG” to get started
Preop NIM Setup

- Press “EMG” in top left corner to view EMG tracings started
Preop NIM Setup

• Ensure that time scale and amplitude are set at 50ms and 50 µV respectively
• Warning box will display until leads are placed
Intraop

- Place child into laryngeal suspension
- Place subcutaneous grounding lead (green) into chest/shoulder
- Place electrodes into vocalis using alligator forceps
  - Into belly of muscle without passing through vocal fold
  - Blue into LEFT, Red into RIGHT
Intraop
Intraop

- EMG tracings are visible on NIM
Intraop

- Video recording on PC starts during emergence from anesthesia
- Electrodes are left in place until child is awake and tracings recorded
  - Gently pulled out at end of procedure
Special consideration

- If size of larynx or exposure precludes placing both leads simultaneously, may proceed with one side at a time.
  - Place lead and record during emergence from anesthesia
  - Deepen anesthesia again and repeat on the opposite side

- Ensure that both recordings are recorded and sent