Tips and Tricks: Intraoperative Spine Traction Using Distractor from Ribs to Greater Trochanter

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Disclosure

- No commercial relationships relevant to disclose for this presentation.
Intra-op Halo Femoral Traction

- Advantages
  - Elongates spine and thoracic cage, improves pulmonary function
    - Hamzaoglu 2008
  - Derotates, facilitates exposure, easier screw insertion
    - Jhaveri SN 2009
  - Avoids anterior release
    - Keeler KA 2010
  - Balances the spine over the pelvis
  - Less surgical time
    - Ville R, 2006
  - Less stress on the implants during correction
Disadvantages

- Need to place femoral pins
- Encourages lumbar lordosis in patient who is a sitter.
  - Rinella A 2005.
- Must pull through the neck, increased facial pressure, less correction delivered to deformity.
- Distraction moment, 50% MEP changes
  - Lewis SJ 2011
Case 1: NM Scoliosis, Marked Imbalance

- 14 year male CP GMFCS 5
- DX: 113 degree left thoracolumbar scoliosis
- Marked difficulty sitting and discomfort.
- Seizure disorder on meds
- Osteoporosis with history of fractures
- DXA: Z scores range from -10.6 to -3.7
Advantages of Distractor from Ribs to Greater Trochanter

- Readily available, adapts easily for use.
- Allows hip flexion during surgery for patients who are sitters.
- Placed way out lateral
  - Out of the way during exposure and implants
  - Can be distracted for 1-2 hours while implants placed and IOM monitored
  - Biomechanically delivers bending moment. Safer?
- Can be used in compression or distraction
- Load sharing, less force on the implants
Sitting 113 degrees

40 deg pelvic obliquity
Surgery

Prone on the OR table
Cobb 77 deg

Pelvic obliquity 29 deg
Place right upgoing hooks on midthoracic ribs
Right schanz pin placed into greater trochanter
Shanz pin in proximal right femur

Upgoing hooks under ribs 7,8
Shanz pin into R greater trochanter
Applying the distractor
6 cm of distraction
Distracted 8 cm
Femoral distractor ribs to right greater trochanter. lengthened while screws are being placed and posterior release.

8 cm lengthening 55 degree Cobb Pelvis more level
Intraoperative Distractor

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<th>1 preop</th>
<th>2 supine preop</th>
<th>3 traction preop</th>
<th>4 supine OR</th>
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<td>Cobb</td>
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<td>105</td>
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Case 2: EOS Neuromuscular

- 4 year 3 month old
- Microcephalic cerebral palsy
- Recurrent aspirations and pneumonia
- Progressive curve of $100^\circ$ in lower thoracic spine
- 17 kg
Sitting 100 deg

supine 70 deg

traction 49 deg
Head femoral traction
After anterior apical release 49 deg

femoral distractor
63 deg

after rods placed
18 deg

Shilla caps

Ant post Fused apex
Post op 18 deg
Case 3: Intraoperative compression for SPO in fixed deformity

- 15 year old female
- CP GMFCS 4 progressive neuromuscular scoliosis. Motor WC
- PSFI at age 10 years. Never was happy with post op balance.
- Difficulty sitting. Iliac screw eroding through skin and severe back pain.
Fixed spine deformity
Original surgery Was never Balanced

Now pain and broken implants

72 degree scoliosis
After anterior release T10-L4

Posterior implants removed, new screws placed.

Multiple SPO T7-S1
Gradual 6 cm shortening of femoral compressor

Rods placed.
Preop 72 deg

Postop 23 deg.
No VCR.
Balanced spine over level pelvis.
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The Miracle Spine Distractor

- If it works, it’s a miracle.
  - schwend
What I learned from this meeting:

- Growing rods are not as great advertised.
- Size is important, but is not everything.

Mrs. Elaine Butterworth