Take Home

- following SDR, children who use assistive devices have
  - equal likelihood of a good outcome
  - gait (GGI, speed)
  - ambulatory function (FAQ)
  - 32% no longer use devices post-operatively
  - more likely to have poor energy outcome

Complications

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowel and bladder</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Skin related</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Wound healing</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Headache</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Paresthesia</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Weakness</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Miscellaneous related</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Miscellaneous not related</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

All resolved by time of discharge
We know that the current methods provide us with a high rate of good outcomes & a low risk of bad outcomes.

Conclusions

- **SDR outcomes are good & complication rates are low**
  - strict patient selection criteria
  - strict rootlet sectioning criteria

- **Risk associated with deviation from the protocol described has not been assessed**
  - High adherence to defined criteria
  - Other criteria or operative techniques may work as well, better, or worse
IC 14 - A MULTIDISCIPLINARY APPROACH TO IMPROVING GAIT IN CHILDREN WITH CEREBRAL PALSY WITH RHIZOTOMY: PATIENT SELECTION, AND OUTCOMES

Comprehensive Long-Term Outcomes Following Selective Dorsal Rhizotomy

Tom F. Novacheck, MD1, Meghan E. Munger, MPH1, Nanette Aldahondo, MD1, Linda Krach, MD2, Michael H. Schwartz, PhD1

1 Gillette Children's Specialty Healthcare, St. Paul, MN, USA
2 Courage Kenny Rehabilitation Institute, Minneapolis, MN, USA

Goals

- Evaluate comprehensive outcomes 10-17 years after SDR
  - Spasticity
  - Gait
  - Function
  - Pain
  - Quality of Life
  - Subsequent Treatment

- Test benefit of SDR comp

ICF DOMAINS

• Activity
• Participation
• Body Function and Structure
HYPOTHESIS

SDR will lead to better outcomes and fewer subsequent treatments compared to a control group.

Inclusion Criteria

SDR group
- spastic diplegic CP
- SDR between 1995 and 2005
- pre-SDR three-dimensional (3-D) computerized gait analysis
- follow-up ≥ 8 years
- 16-25 years old at follow-up
Strength: Retrospectively Identified Control Group

- Propensity Model (Random Forest Algorithm):
  - age
  - gait
  - stature
  - function
  - CP subtype
  - treatment history
  - plantarflexor spasticity

95% ACCURATE

- Sensitivity: 80%
- Specificity: 98%
- Pos. Pred. Value: 89%
- Neg. Pred. Value: 97%

Timeline

SDR
Control

Baseline
Gait Analysis & Physical Exam
n=24
n=13

Follow-Up
Surveys & Subsequent Treatments
n=24
n=13

Gait Analysis
Physical Exam
Admit

≥8 year follow-up

September 2017 AACPDM 71st Annual Meeting, Montreal, Quebec, Canada
Survey Measures

- Surveys at follow-up
  - Diener Satisfaction with Life Scale
  - World Health Organization's Quality of Life-BREF
  - Modified Brief Pain Inventory
  - Frequency of Participation Questionnaire
  - Functional Assessment Questionnaire
  - Functional Mobility Scale

RESULTS
Reduced Spasticity: SDR>>Control

<table>
<thead>
<tr>
<th>SDR (17+8 yoa) n = 13</th>
<th>Control (19+7 yoa) n = 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adductors (3.1* → 1.1²)</td>
<td>Adductors (2.1* → 1.8²)</td>
</tr>
<tr>
<td>Hip Flexors (1.9 → 1.0³)</td>
<td>Hip Flexors (1.4 → 1.3³)</td>
</tr>
<tr>
<td>Hamstrings (1.9 → 1.0³)</td>
<td>Hamstrings (1.6 → 1.6³)</td>
</tr>
<tr>
<td>Rectus Femoris (2.9* → 1.2)</td>
<td>Rectus Femoris (1.8* → 1.8)</td>
</tr>
<tr>
<td>Plantarflexors (3.2 → 1.0³)</td>
<td>Plantarflexors (2.7 → 2.2³)</td>
</tr>
</tbody>
</table>

Improved Gait

Initial v. Follow-Up: SDR
GDI 61→69

Initial v. Follow-up: CONTROL
GDI 67→79

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Surveys and Energy

- Surveys: no difference
  - Low pain interference  SDR: 0.9 ± 1.1  Control: 1.7 ± 2.3  p = .27
  - High QOL  SDR: 78.1 ± 9.5  Control: 79.5 ± 9.8  p > .46
  - Similar FAQ  SDR: 9.0  Control: 8.0  p = .82

- Energy
  - Δ SDR  312 → 242%  p = .01
  - Δ Control  267 → 206%  p = .31

Subsequent Treatment: Big Difference
(Control >> SDR)

<table>
<thead>
<tr>
<th>SDR Group (n=24) mean bones/muscles</th>
<th>Treatment</th>
<th>Control Group (n=11) mean bones/muscles</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5</td>
<td>Soft Tissue Surgery</td>
<td>6.4</td>
</tr>
<tr>
<td>5.2</td>
<td>Bony Surgery</td>
<td>7.2</td>
</tr>
<tr>
<td>7.5</td>
<td>Botulinum Toxin A</td>
<td>19.0</td>
</tr>
<tr>
<td>0.4</td>
<td>Phenol</td>
<td>2.7</td>
</tr>
</tbody>
</table>

All differences significant
Change in GMFCS

Control (N=6)

Green is Better

1 of 6

Baseline

Follow-up

Red is Worse

1 of 6

SDR (N=9)

5 of 9

Baseline

Follow-up

4 of 6 maintained

0 of 9

4 of 9 maintained

DISCUSSION
Discussion

- Unique study design – with control group
- Similar good outcomes
- Better GDI (control) vs. Better ΔGMFCS/spasticity (SDR)
- Control group received more treatment

Remember...

SDR only addresses part of the problem (tone)

Orthopaedic problems typically need to be assessed and corrected at a later time