Analysis of Surgeon Decisions to Discontinue a Lengthening Program in Early Onset Scoliosis

Robert F Murphy, MD

William R Barfield, PhD

Tricia St Hilaire, MPH

John T Smith, MD

John B Emans, MD

Amer Samdani, MD

Sumeet Garg, MD

Joshua M. Pahys, MD

Jeffrey R. Sawyer, MD

CAMPBELL CLINIC ORTHOPAEDICS

Introduction

Options exist at the end of growth-friendly surgery:

PSF

Observation: Implants retained

Observation: Implants removed

Introduction

STOP project:

developed/implemented in 2015

prospectively collect data regarding decision making
at the end of lengthening

difficult to determine retrospectively from op reports

STOP Questionnaire

Subject ID (XXX-XXXX) _____   **Evaluation Date** _____

                                                                                            mm   /   dd   /   yyyy

STOP Questionnaire

Surgeon reasoning for discontinuation of regular expansions

- ☐ Patient Age
- ☐ Bone Age/Skeletal Maturity
- ☐ Pain
- ☐ Functional Status of Patient
- ☐ Pulmonary Status
- ☐ Device Prominence
- ☐ Diminishing Returns With Expansions Etc
- ☐ Parent Request

- ☐ Status of PJK
  - ☐ Presence   ☐ Absence
- ☐ Status of DJK
  - ☐ Presence   ☐ Absence
- ☐ Stability of Coronal Deformity
- ☐ Stability of Sagittal Deformity
- ☐ Other

Surgeon Comments

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Surgeon reasoning for definitive treatment strategy (i.e. fusion, observation)

- ☐ Patient Age
- ☐ Bone Age/Skeletal Maturity
- ☐ Pain
- ☐ Functional Status of Patient
- ☐ Pulmonary Status
- ☐ Device Prominence
- ☐ Diminishing Returns With Expansions Etc
- ☐ Parent Request

- ☐ Status of PJK
  - ☐ Presence   ☐ Absence
- ☐ Status of DJK
  - ☐ Presence   ☐ Absence
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- ☐ Stability of Sagittal Deformity
- ☐ Other

Hypothesis

Surgeon indications for discontinuation of lengthening in EOS patients are varied, and depend on patient and deformity related factors.

Methods

CSSG database reviewed for consecutive STOP surgeon questionnaires.

Patients stratified by CEOS classification

Reason for discontinuation recorded

Descriptive statistics performed

Surgeon Reasoning for Discontinuation

Chronologic/skeletal age

Pain

Functional status

Pulmonary status

Device Prominence

Diminishing returns

PJK Status

DJK Status

Stability of coronal and sagittal plane deformity

Parent request

Other

Comments

Results

231 questionnaires identified (59% female)

37% neuromuscular, 35% congenital, 18% idiopathic, 10% syndromic

Mean age initial surgery: 6.9 $\pm$ 3.1 yrs

Mean age STOP: 12.9 $\pm$ 2.5 years

	Average Coronal Cobb (+/- STD)	Average Kyphosis (+/- STD)	T1-S1 height (cm) (+/- STD)
At presentation	72°± 22°	50°±29°	26±5 cm
At cessation	63°±19°	56°±25°	33±6 cm

Results:

Questionnaire Responses	Number
Skeletal Age	101
Patient Age	70
Diminishing Returns	59
Function Status	30
Stability of coronal deformity	18
Pain	13
Stability of sagittal deformity	12
Device Prominence	11
Parental request	8
Proximal Junctional Kyphosis	6
Pulmonary Status	5
Distal Junctional Kyphosis	5

Results:

Questionnaire Responses	Number
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Patient Age	70
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Function Status	30
Stability of coronal deformity	18
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Distal Junctional Kyphosis	5

Results

79% patients underwent PSF at STOP

21% of patients observation (avg 24 months)

  45/48 (94%) stable w/ obs alone
  3/48 (6%) delayed PSF

Conclusions

Ideal strategy to discontinue growth-friendly treatment unclear.

First prospective study to characterize surgeon decision making at the end of lengthening.

Most common factors are patient age/maturity, diminishing returns and functional status.

Useful as end of lengthening strategies are developed.