Guided Exercise for the Treatment of Scoliosis

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Methods of treatment for adolescent idiopathic scoliosis

- Bracing
- Spinal Fusion
- Exercise

A Consistent Finding in Adolescent Scoliosis Patients

- All adolescent scoliosis patients present with one common finding: the strength of trunk rotation is weaker to one side when compared to the other.
- Normal adolescents of the same age have equal torso rotation strength.
- Inhibition of paraspinal musculature prior to training.
PURPOSE OF THIS STUDY

- To document the efficacy of exercise as a form of treatment for adolescent idiopathic scoliosis.
- To show that muscle imbalance and inhibition can be corrected with specific exercises isolating the appropriate musculature.
Subjects

- N=20 (F=18, M=2)
- Age=13.6±1.6 yrs

Inclusion Criteria:
- X-rays documenting a spinal curvature of over 10 degrees (Cobb’s).
- Available to participate in strength training 2x/wk at US Spine & Sport.
MATERIALS & METHODS

- Participants trained on the MedX Torso Rotation Unit & the Backstrong (VARC) Machine.
- Training Sessions were 2x/wk (each lasting approximately 15 minutes).
- Participants trained for at least 3 months before reassessment (x-rays).
MedX Torso Rotation Unit

- Torso rotational strength training
- Alternating sides participants performed one set of 20 repetitions
MedX Torso Rotation Unit cont...

- Intensity was increased when subjects reported a RPL (Rate of Perceived Load) rating of 7 or less
- ROM was progressed as tolerated
Backstrong (VARC) Machine

- Lumbar extension PRE
- One set of 20 repetitions
- ↑ resistance by varying angle & arm position
Sample Exercise Card

<table>
<thead>
<tr>
<th>Torso Rotation</th>
<th>Hole Placement</th>
<th>Starting Side (R or L)</th>
<th>Weight on Right Side</th>
<th>Reps. On Right Side</th>
<th>RPL on Right Side</th>
<th>LEFT SIDE</th>
<th>Weight on Left Side</th>
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US Spine & Sport
Data Analysis

- Strength (% change pre to post)
  - Mooney (n = 12): Isometric Strength
  - New study (n = 8): Dynamic Load

- Scoliotic Curvature
  - Repeated measures ANOVA ($p \leq 0.05$)
  - Training (Pre vs. Post)
  - Study (Mooney vs. new study)
  - Training x Study Interaction
RESULTS

- Scoliotic curvature
  - No Training x Study interaction ($p = 0.40$)
  - 16/20 participants demonstrated curve reduction
    - Pre-training: $28.2 \pm 13.2^\circ$
    - Post-training: $23.0 \pm 14.1^\circ$
    - % Change: $20.1 \pm 23.3\%$ ($p = 0.003$)

- Strength
  - Mooney: $26.6 \pm 11.6\% \uparrow$ Isometric strength
  - New Study: $132.5 \pm 61.4\% \uparrow$ Dynamic load
Pre

34° curvature

Post

25° curvature
EMG Results (Mooney, 2000)

Figure 1: Beginning of the Study

Figure 2: Conclusion of the Study
DISCUSSION

- Why has the effectiveness of exercise as a treatment for adolescent idiopathic scoliosis not previously been shown?
- Why were the Backstrong (VARC) & MedX Torso Rotation machines chosen for this study?
CONCLUSION

- Study documented the efficacy of exercise as a form of treatment for adolescent idiopathic scoliosis.
- Study demonstrated muscle imbalance and inhibition can be corrected with specific exercises isolating the appropriate musculature.
Limitations of the Study

- Limited Number of Participants
- Participants not yet followed to skeletal maturity
- Duration of Study
- No Control Group
IN THE FUTURE...

- Study is ongoing at U.S. Spine & Sport, San Diego, California.
- If you know of anyone that would benefit from this study please contact Vert Mooney, M.D. medical director of U.S. Spine & Sport.
- Special thanks to Dr. Mooney, Patrick Jones and all others who helped to make this study possible.