

# Use of Functional Strengthening, Balance Training, and Stretching In The Treatment Of A Patient Following a T11-L5 Spinal Fusion: A Case Report

Anna Sidloski, B.S., DPT student

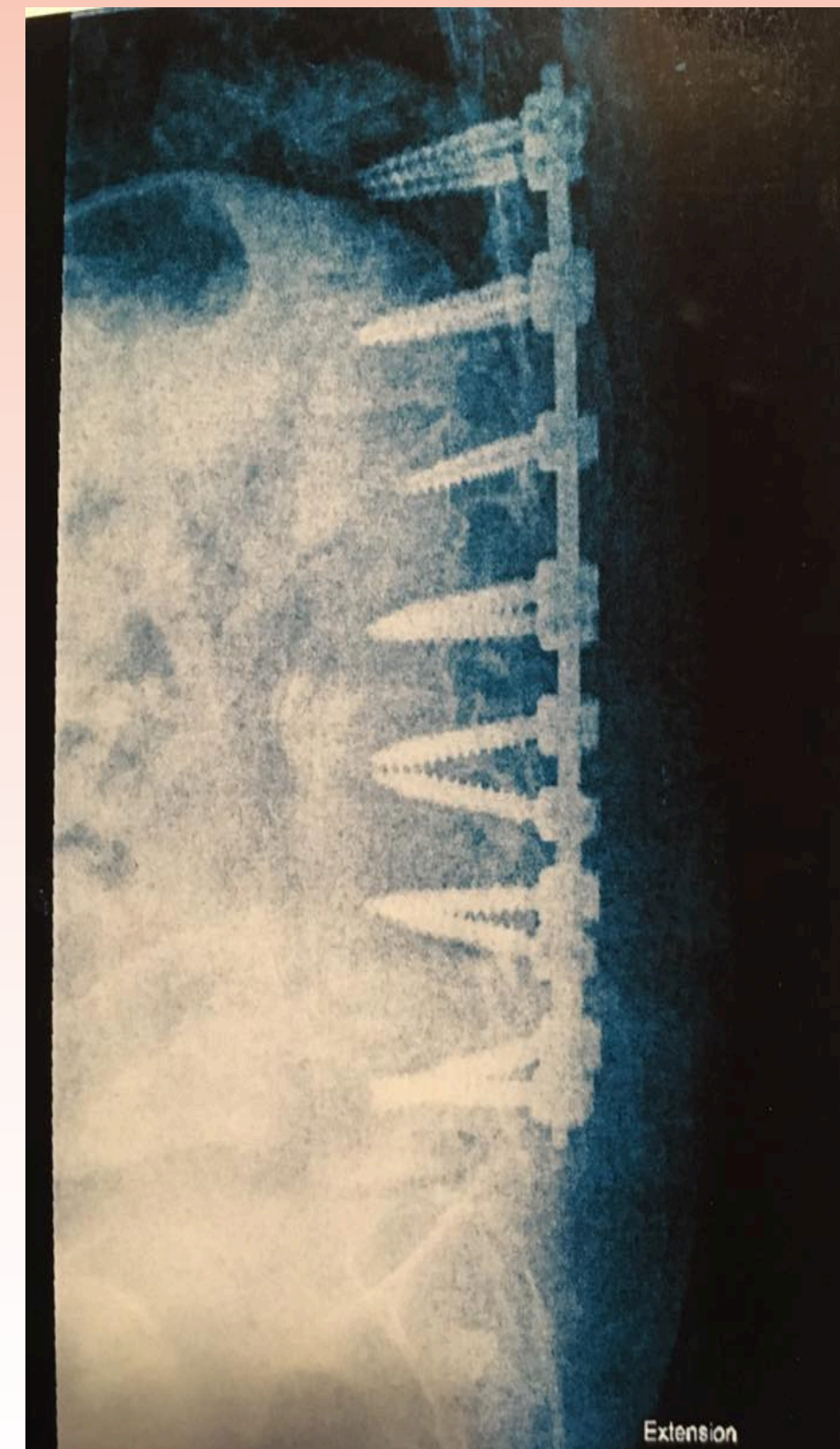
Brian T. Swanson, PT, DSc, OCS, FAAOMPT

Department of Physical Therapy, University of New England, Portland, ME



## Unique

- Abundant evidence available regarding treatment approaches for patients suffering from low back pain (LBP)
- Limited research focusing on PT treatment status post-multilevel spinal fusion with postural impairments
- Must work within post-operative restrictions
- May have delayed healing due to smoking habits<sup>1</sup>



## Purpose

- Describe the management and functional improvement of a patient s/p spinal fusion with:
  - Severe postural impairments
  - Elevated fall risk
  - High levels of low back pain

## Foundation

- Lumbar spinal fusion surgery is utilized to manage LBP and instability<sup>1</sup>
- Pain often persists post-operatively
- Age-related hyperkyphosis may contribute to ADL difficulty, ↓ quality of life, and ↑ mortality rates<sup>2</sup>
- Evidence supports use of Transverse Abdominis recruitment and hip strengthening exercises in patients with LBP<sup>3,4</sup>

## Patient Description

Examination	
History	Subjective/Objective
<ul style="list-style-type: none"> <li>68 year-old male 8 weeks s/p T11-L5 spinal fusion</li> <li>COPD, smoked 2 packs per day</li> <li>Patient did not exercise pre-operatively</li> <li>Used rolling walker in community for 1 year pre-operatively</li> <li>No assistive device use at home</li> <li>Patient goals for PT: stand up straighter, return to work as guitar teacher</li> </ul>	<ul style="list-style-type: none"> <li>NPRS</li> <li>ODI</li> <li>BBS</li> <li>DGI</li> <li>Posture</li> <li>Gross LE strength</li> <li>Functional strength assessment</li> <li>Palpation</li> <li>Gait</li> </ul>

## Interventions

### Strengthening

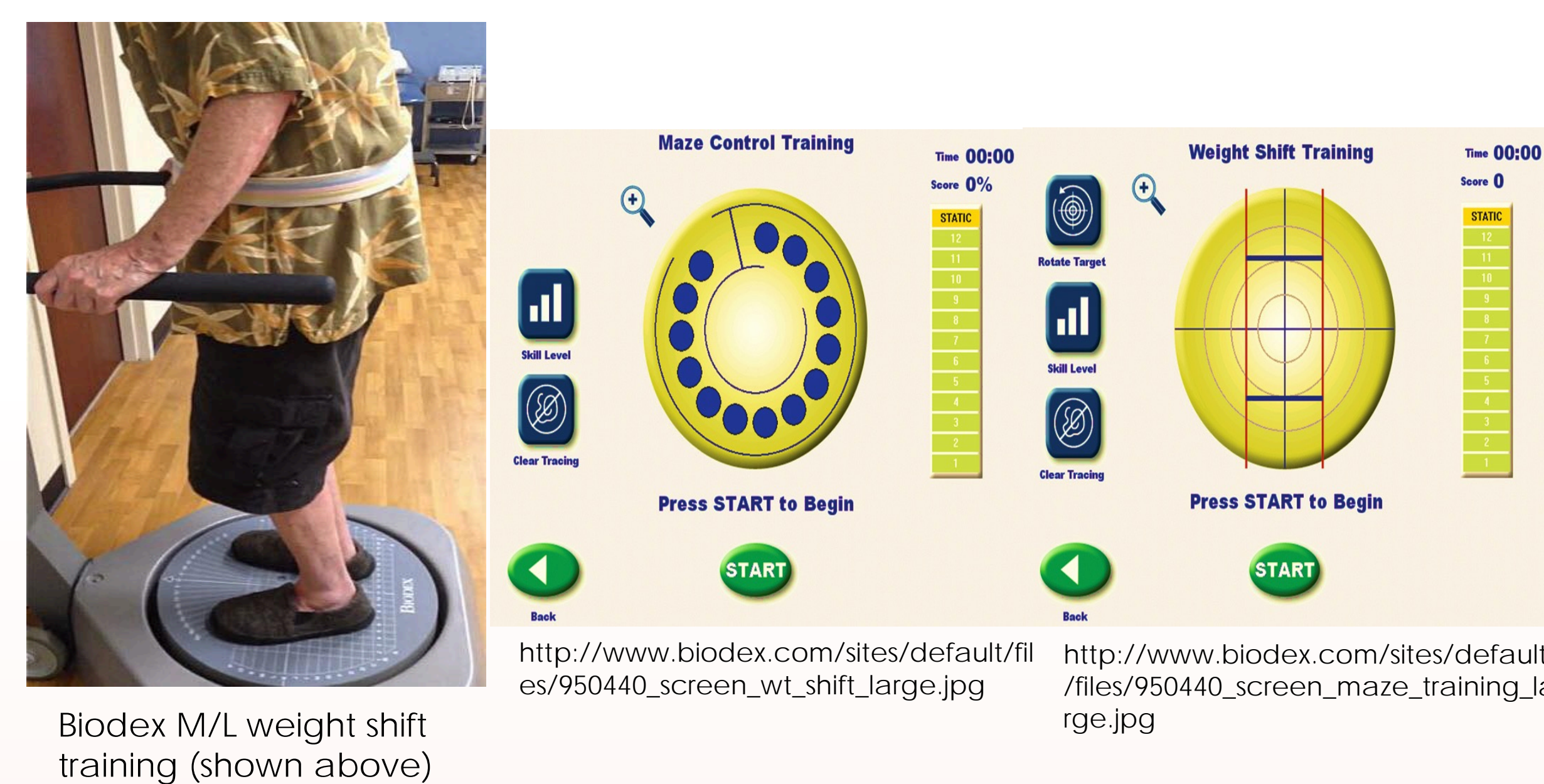
- TA recruitment
- Clamshells
- Std. hip abd./ext.
- Lateral walks
- STS
- Step ups
- Bridging
- Posterior pelvic tilt
- Rows
- Shoulder ext.
- Shoulder ER
- Chin tucks
- Chicken wings
- Angels

### Stretching

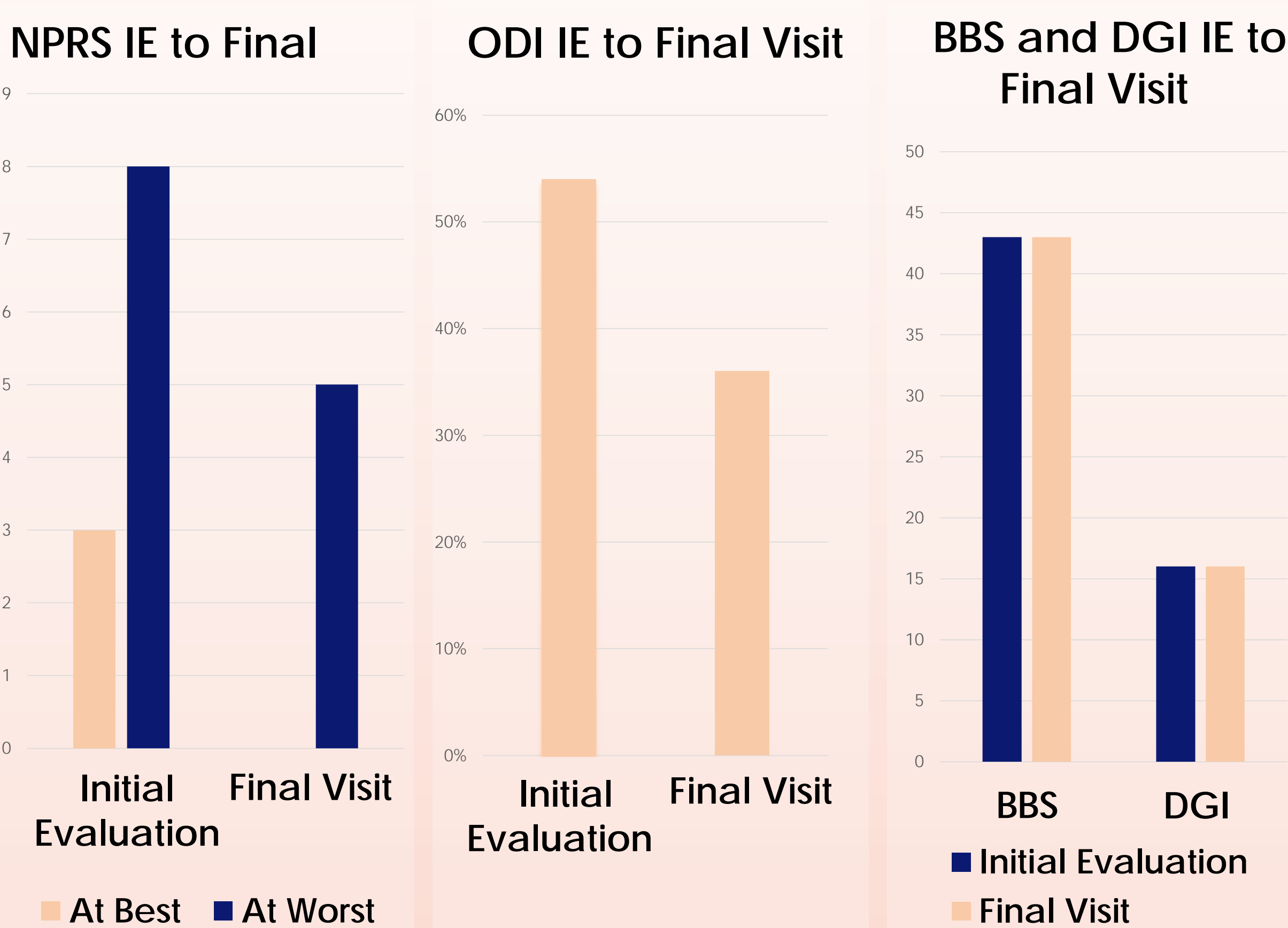
- Manual and self hamstrings
- Manual and self hip flexors
- Self pectoralis
- Self quadriceps

### Balance Training

- Three-point gait training
- Manual perturbations/reaching out of BOS at parallel bars
- Alternating toe taps on step
- Tandem and SLS in parallel bars
- M/L and A/P weight shift and maze control on Biodex



## Outcomes



## Outcomes

	Initial Evaluation	Final Visit
Posture	<ul style="list-style-type: none"> <li>Marked flexed trunk (~45 degrees)</li> <li>Rounded shoulders</li> <li>Forward head</li> </ul>	<ul style="list-style-type: none"> <li>Moderate flexed trunk (~15 degrees)</li> <li>↑ scapular retraction</li> <li>↓ rounded shoulders/forward head</li> </ul>
Functional strength assessment	<ul style="list-style-type: none"> <li>Fair eccentric quadriceps control</li> <li>Slow initiation of STS</li> <li>~30 degrees hip ER side stepping</li> </ul>	<ul style="list-style-type: none"> <li>Good eccentric quadriceps control</li> <li>Fewer attempts to achieve a full standing position during STS</li> <li>~15 degrees hip ER during functional side stepping</li> </ul>
MMT	<ul style="list-style-type: none"> <li>Iliopsoas: 4/5</li> <li>Quadriceps: 4/5</li> <li>Hamstrings: 4-/5</li> <li>Hip ER: 4-/5</li> <li>Hip abductors: 3/5 L, 3+/5 R</li> </ul>	<ul style="list-style-type: none"> <li>Iliopsoas: 4/5</li> <li>Quadriceps: 4+/5</li> <li>Hamstrings: 4+/5</li> <li>Hip ER: 4/5</li> <li>Hip abductors: 4-/5</li> <li>Scapular retractors/depressors: 4/5</li> </ul>
Muscle length	<ul style="list-style-type: none"> <li>Severe iliopsoas restrictions</li> <li>90/90 hamstring: 40 degrees from 0</li> </ul>	<ul style="list-style-type: none"> <li>Moderate iliopsoas restrictions</li> <li>90/90 hamstring: 20 degrees from 0</li> </ul>



The photos above demonstrate the patient's improvement in forward flexed posture at the final visit.

## Discussion

- Lower extremity strengthening, stretching, and balance training may be beneficial treatment approaches
- Cigarette smoking may inhibit spinal fusion and adversely affect outcomes, including return to work



## Limitations

- Cannot infer cause and effect between these interventions and clinical improvement of the patient
- The functional improvements and decreased forward flexed posture suggest these interventions were likely a contributing factor
- Further research is warranted

## Acknowledgements

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## References

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