

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

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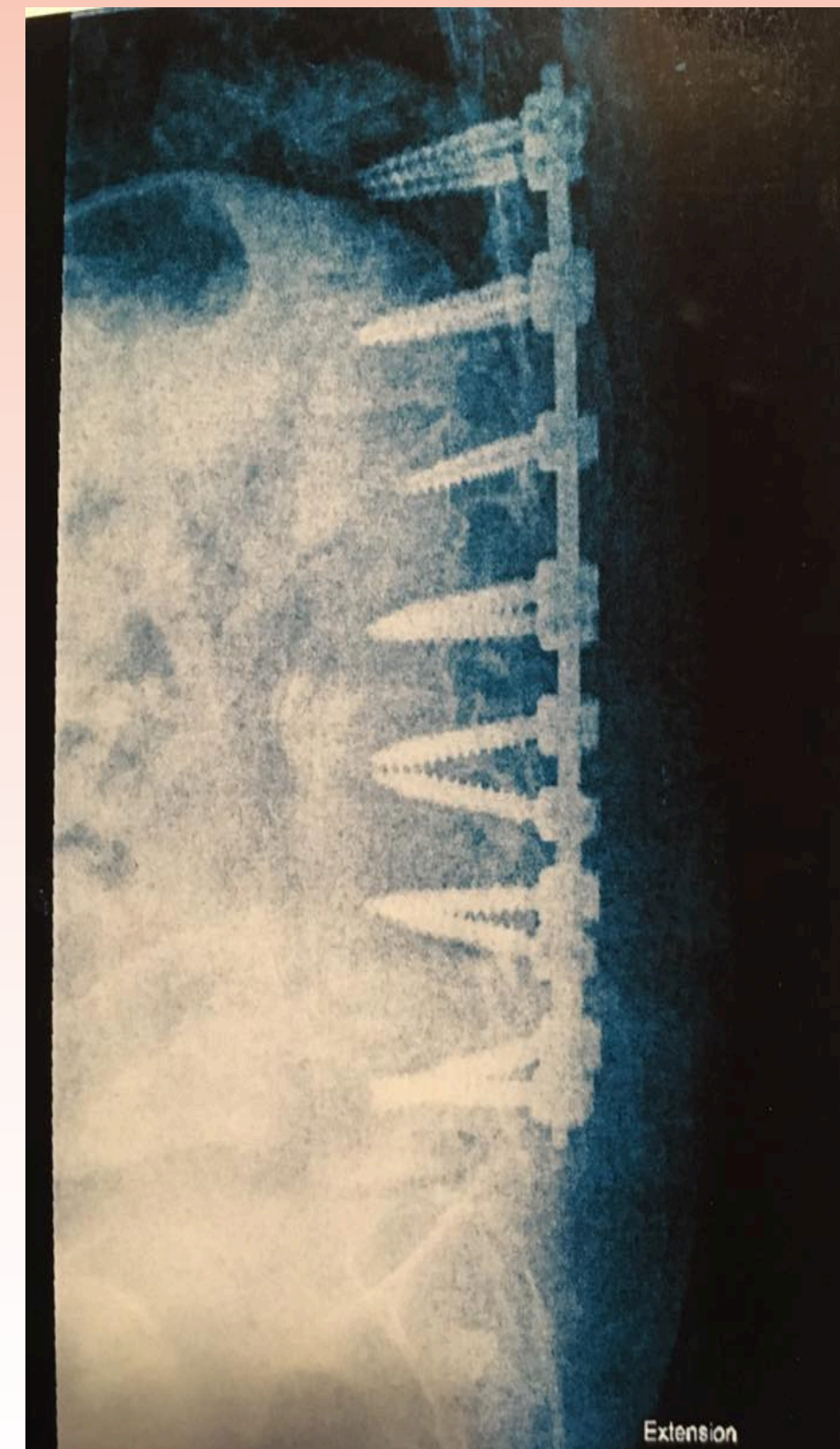
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Unique

- 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 habits¹



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 instability¹
- Pain often persists post-operatively
- Age-related hyperkyphosis may contribute to ADL difficulty, ↓ quality of life, and ↑ mortality rates²
- Evidence supports use of Transverse Abdominis recruitment and hip strengthening exercises in patients with LBP^{3,4}

Patient Description

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

Interventions

Strengthening

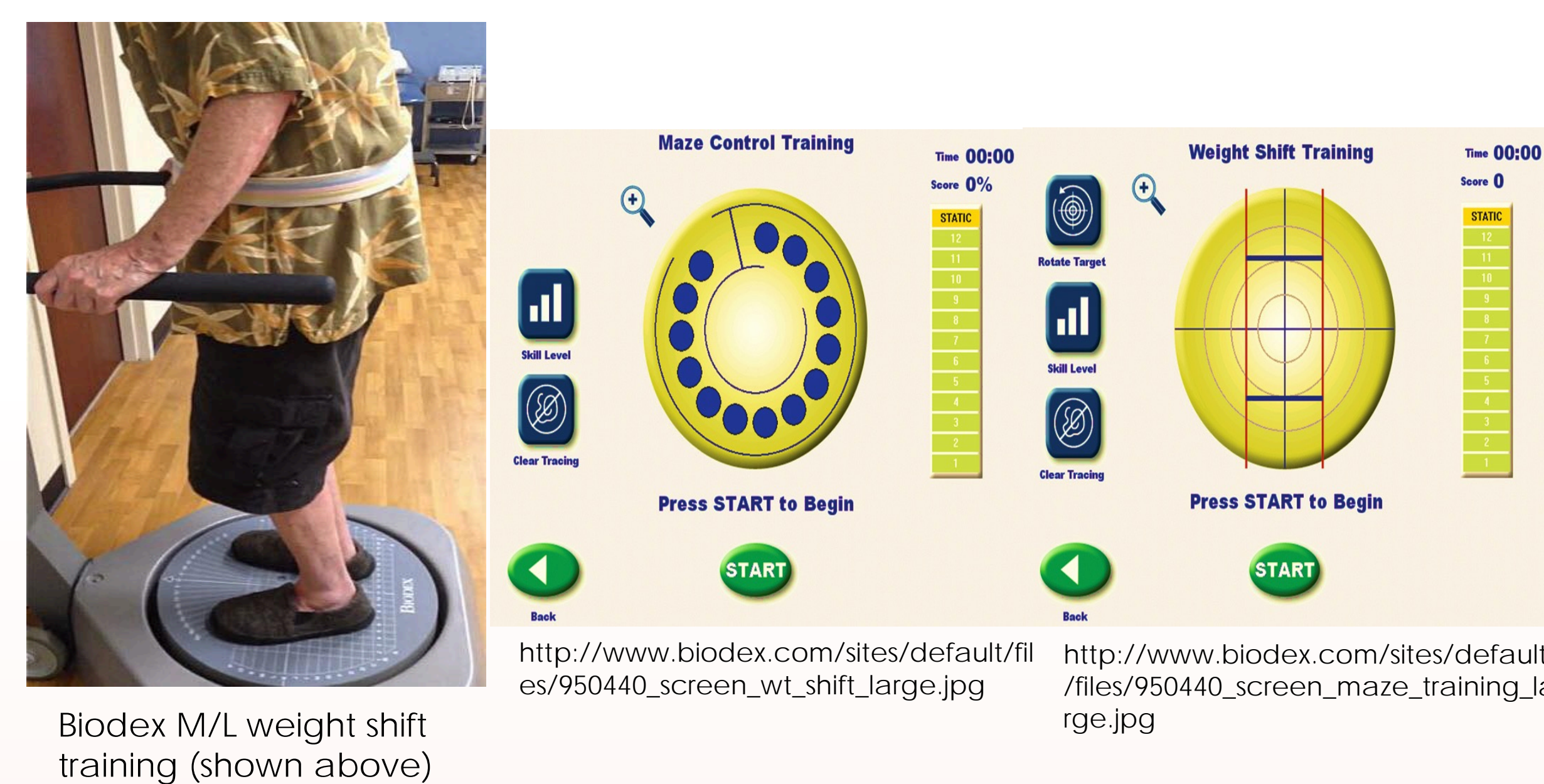
- TA recruitment
- Clamshells
- Std. hip abd./ext.
- Lateral walks
- STS
- Step ups
- Bridging
- Posterior pelvic tilt
- Rows
- Shoulder ext.
- Shoulder ER
- Chin tucks
- Chicken wings
- Angels

Stretching

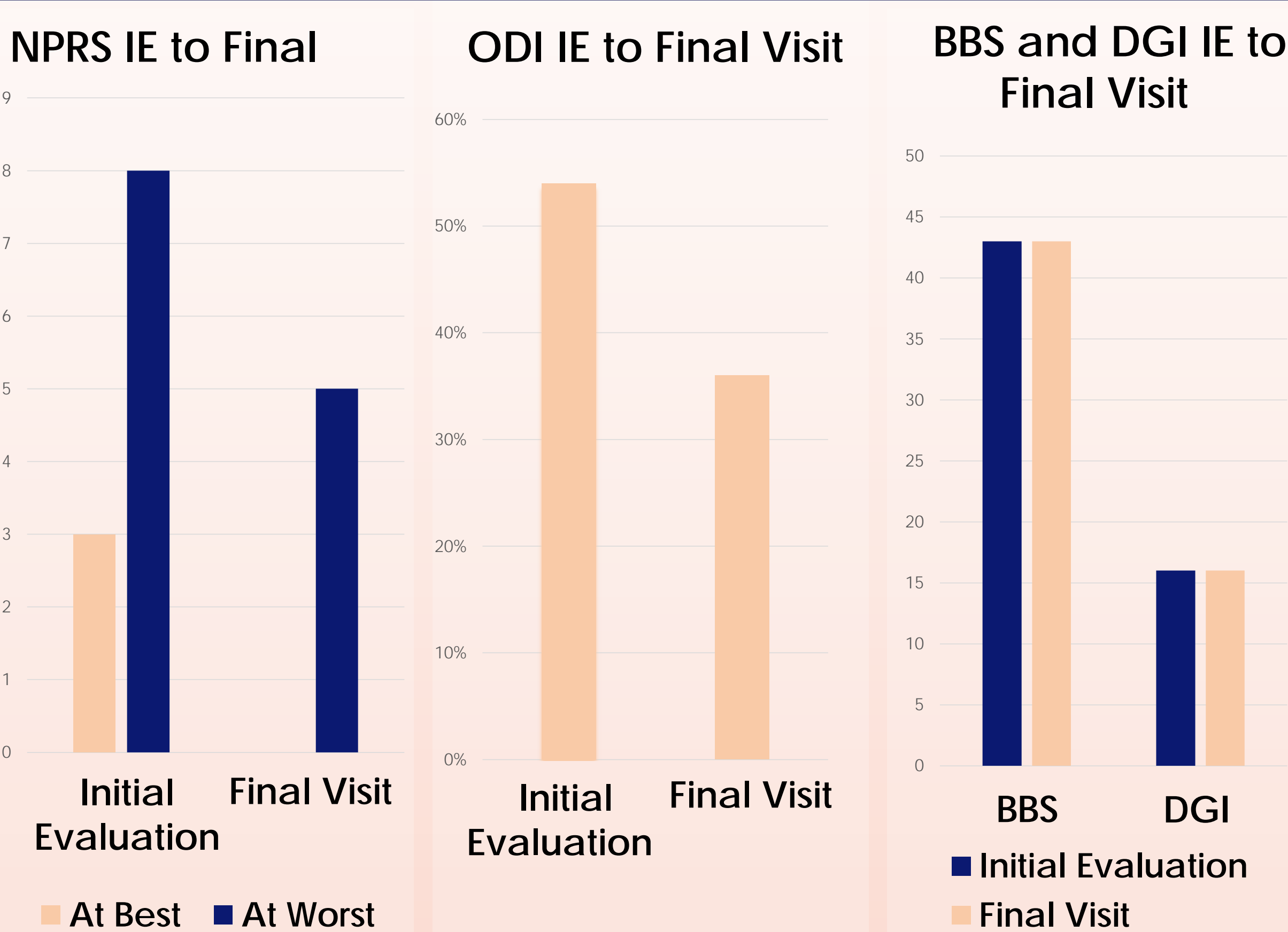
- Manual and self hamstrings
- Manual and self hip flexors
- Self pectoralis
- Self quadriceps

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



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

The author acknowledges Michael Wezel, DPT, FAAOMPT, for supervising and assisting with patient management. I would also like to acknowledge the patient for his compliance and participation.

References

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