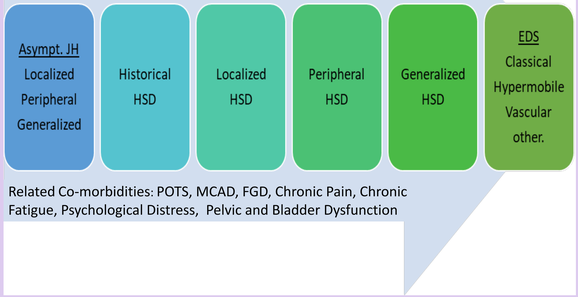
Joint Stability and Proprioception Training to Reduce Chronic Pain for a Female Patient with Hypermobile Ehlers-Danlos Syndrome: A Case Report

Ashley Tullo, BS, DPT Student
Doctor of Physical Therapy Program, University of New England, Portland, Maine

Background

- Ehlers-Danlos Syndrome (EDS) is a heritable connective tissue disorder with many subtypes.[1]
- Hypermobile EDS (hEDS), the most common subtype, is characterized by generalized joint hypermobility, musculoskeletal impairments, systemic involvement, and a familial history of EDS.[1]
- Due to the many subtypes of EDS, and general hypermobility, a categorization of all terms was created called the Hypermobility Spectrum Disorder.[1,2]
- Patients present with physical, psychological, and central nervous system impairments reducing their quality of life (QoL).[3]

Figure 1. Hypermobility Spectrum Disorder



Related Co-morbidities: POTS, MCAD, FGD, Chronic Pain, Chronic Fatigue, Psychological Distress, Pelvic and Bladder Dysfunction

Figure 1: Hypermobility Spectrum Disorder[1]
Illustration of hypermobility categorization as a spectrum between the two end ranges, asymptomatic joint hypermobility and EDS with comorbidities listed. GJH is the most common phenotype for asymptomatic JH and hypermobile EDS is the most common for EDS.
TERMS: EDS: Ehlers-Danlos Syndrome, POTS: Postural Orthostatic Tachycardia Syndrome, MCAD: Mast Cell Activation Disorder, FGD: Functional Gastrointestinal Disorders, JH: Joint Hypermobility, HSD: Hypermobility Spectrum Disorder

Purpose

The purpose of this case report was to describe the interventions utilized for a 28-year-old female with hEDS and chronic pain with the intention of reducing symptoms and promoting return to work.

Case Description

- Patient was a 28-year-old Caucasian female, married with no children, unemployed as a carpenter at time of initial eval.

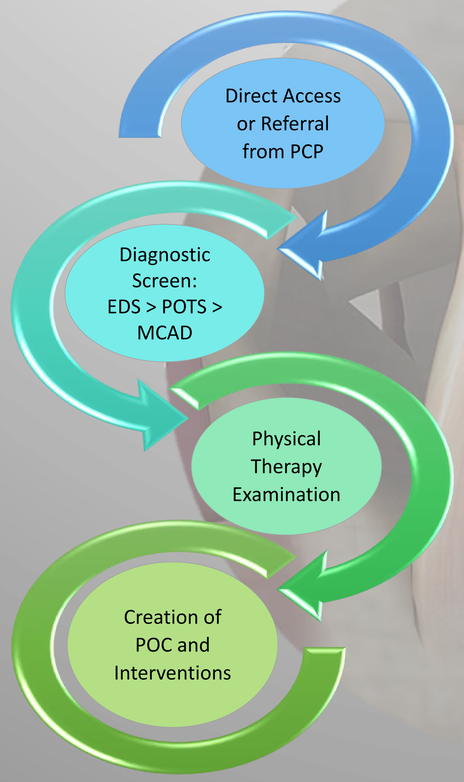
PMH:

- Right knee injury with no mechanism of injury noted in high school
- Surgery of right knee due to persistent pain, revealed a meniscal tear
- Chronic overuse symptoms in bilateral elbows due to high school job and most recent employment
- "New" neck pain with numbness and tingling down her right arm that incurred most recently before initial evaluation

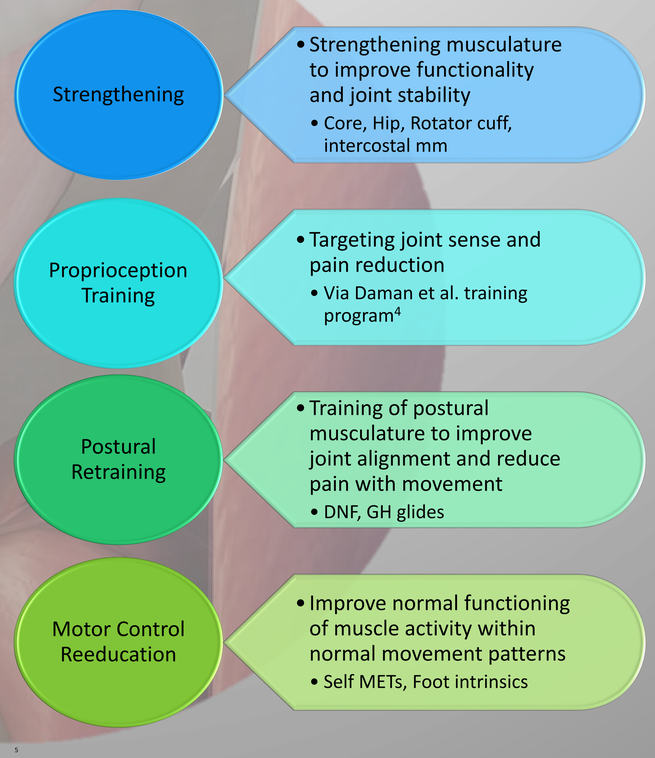
Main Concern:

- Neck, elbow, and knee pain limiting her physical activity
- Suspected EDS diagnosis in relation to her pain
- Psychological distress of unemployment due to exacerbated symptoms with activity, reducing her QoL

Evaluation Procedure



Procedural Intervention Categories



Procedural Interventions

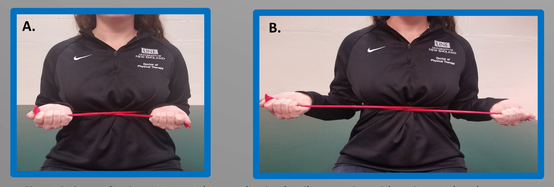


Figure 2. Strengthening: Intercostal strengthening by rib expansion with resistance band
A. Starting position: Ribs and resistance band relaxed
B. End position: Activation of intercostal muscles by holding ribs at half of full inhalation with tightening of resistance band

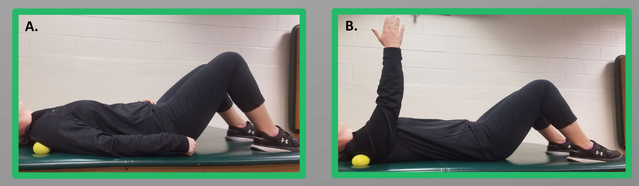


Figure 3. Postural Retraining: Glenohumeral posterior glide with ball
A. Starting position: Ball placed behind humeral head, shoulder and arm relaxed
B. End position: Glenohumeral posterior glide pressing ball into table while flexing arm towards ceiling

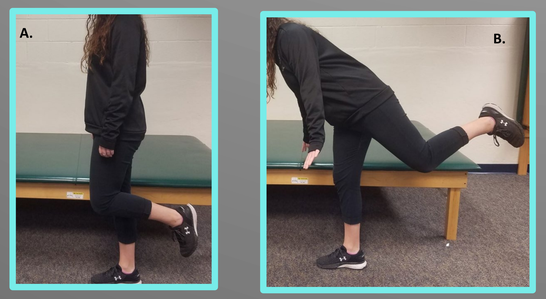


Figure 4. Proprioception Training: Drinking Bird
A. Starting position: Single leg stance
B. End position: Bending forward at the hip in single leg stance maintaining balance

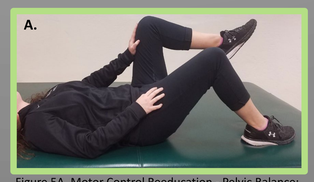


Figure 5A. Motor Control Reeducation - Pelvic Balance: Self MET with contralateral hip flexion and extension

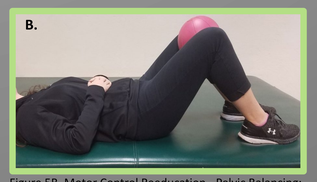


Figure 5B. Motor Control Reeducation - Pelvic Balancing: Self MET with hip adduction

Figure 5C. Motor Control Reeducation - Pelvic Balancing: Self MET with hip abduction

Outcomes

Test & Measure	Initial Evaluation		11th visit	
Cervical ROM				
Flexion	48°, painful posterior		50°	
Extension	43°, dizziness		60°	
Side bend	Right: 37°, Painful	Left: 37°	Right: 43°	Left: 45°
Rotation	Right: 50°, subjective tightness	Left: 55°	Right: 60°	Left: 60°
Hip MMT	Right	Left	Right	Left
Extension: knee straight	4+/5	4-/5	5-/5	5-/5
Abduction	5/5	5/5	NT	NT
Adduction	4+/5 painful	4/5	5/5	5/5
Internal Rotation	4+/5 painful	4+/5	5/5	5/5
External Rotation	5/5 painful	4+/5	5/5	5/5
Knee MMT	Right	Left	Right	Left
Flexion	5/5 painful	5/5	5/5 dull pain	5/5
Extension	4+/5 painful	5/5	5-/5 dull pain	5/5

ROM: Range of motion, MMT: Manual Muscle Testing, NT: Not Tested

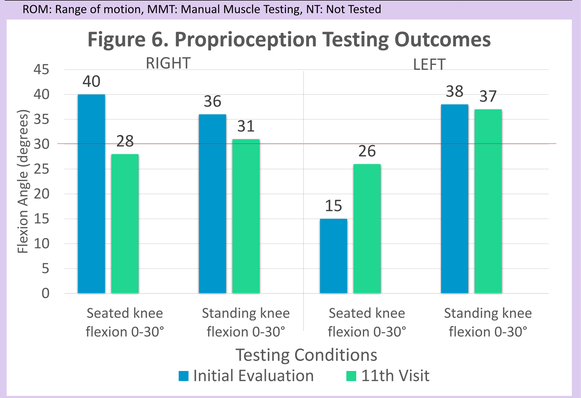


Figure 6: Red line represents targeted 30° of knee flexion the patient is trying to achieve with eyes closed during proprioception testing.

Conclusion

- The patient demonstrated improvement in strength, pain, proprioception, range of motion, and functional mobility.
- Graded strengthening, postural retraining, proprioception training, and motor control reeducation were shown to may be beneficial for a hypermobility patient with chronic pain.
- The patient continued to require skilled physical therapy.
- Due to patient variability in the EDS population, designing a POC based on symptom presentation and primary complaints may be the most effective way to address symptoms.
- More research needs to be conducted on specific physical therapy interventions for EDS patients to improve their QoL and function.

Acknowledgments:
The author acknowledges Amy Litterini, PT, DPT, for the assistance with this case report conceptualization, Chie Tadaki, PT, DPT, for the assistance and supervision with the patient's care during the clinical practicum, and the patient for participating in this case report.

Contact Information:
Ashley Tullo,
716 Stevens Ave, Portland, ME 04103
Address all correspondence to atullo@une.edu

References: