UW Medicine
REHABILITATION MEDICINE

PHYSICAL THERAPY

2026 ABSTRACT COMPENDIUM

DPT CAPSTONE SYMPOSIUM

CLASS OF 2026

June 11th, 2026

9:00 AM – 3:00PM

UW Center for Urban Horticulture

UW Medicine
REHABILITATION MEDICINE

Class of 2026 DPT Capstone Symposium
Thursday, June 11, 2026

9:15- 9:30: Check-in
9:30 – 9:45: Welcome

Room NHS Hall A **Room coordinator: Patti**

TIME	STUDENT	PROJECT DESCRIPTION	ADVISOR
10:00 - 10:15	Alex Johansson	Establishing clinician consensus on desired features of sensor-enhanced powered mobility for children: A Delphi Study	Heather Feldner
10:15 - 10:30	Jasmine Jones	Changes in Social Interaction and Joystick Activation Over Time in Young Powered Mobility Learners	Heather Feldner
10:30 - 10:45	Aislinn Knight	Harness or Wheels? Caregiver Perspectives on Mobility Aids for Pre-Ambulatory Children with Down Syndrome	Heather Feldner
10:45 - 11:00	Natalie Thompson	Measures of Muscle Activity in Infants and Toddlers with Spinal Muscular Atrophy: A Systematic Review	Lin-Ya Hsu/Soshi Samejima
11:00 - 11:15	**Break**		
11:15 - 11:30	Tashi Sherpa	Application of Sensory and Behavioral Support Strategies During Outpatient Physical Therapy Session for a Child With Autism Spectrum Disorder	Lin-Ya Hsu
11:30 - 11:45	Jordana Mednick	Physical Therapy Management of a Patient with a C4 Incomplete Spinal Cord Injury and Central Cord Presentation	Patti Matsuda
11:45 - 12:00	Duke Quach	Are We Doing Enough? Orthopaedic Physical Therapist's Approaches for Treating Patients with Diabetes	Kathleen Cummer
12:00 - 12:15	Kristina Mangaliag	Rehabilitation Following Open Curettage and Cancellous Bone Allograft of Tibial and Distal Femoral Subchondral Defects: A Case Report	Kathleen Cummer
12:15 - 12:45	**Lunch**		
12:45 - 1:00	Mathew Haber	Rehab Progression of a Work Induced Injury Post Conservative Care and Surgery Categorized Primarily as a Biceps Tenodesis: A Case Report	Kathleen Cummer
1:00 - 1:15	Ella Mahler	The Role of Physical Therapy in Patient Treatment Decision-Making: Rehabilitation or Surgical Intervention For Rotator Cuff Tears and Related Shoulder Pathologies: A Case Study	Gretchen Deutshlander
1:15 - 1:30	Emilie Nakasone	Physical Therapy Management of Bilateral Peroneal Tendinopathy with Progressive Loading and Consideration of the Regional Interdependence Model: A Case Report.	Michelle Cangialosi
1:30 - 1:45	Matthew Liu	Physical Therapy Management of Complex Rotator Cuff Tears in an Older Adult with Alzheimer's Disease	Kurt Williams
1:45 - 2:00	**Break**		
2:00 - 2:15	Tyler Le	Physical Therapy Management of Multifocal Right-Sided Pain with Co-occurring Hypochondriasis	Kurt Williams
2:15 - 2:30	Grayson Jones	Conservative Management of a Suspected Lateral Meniscal Injury in a High-Demand Healthcare Worker	Kurt Williams
2:30 - 2:45	Yili Fu	Physical Therapy Management Following Total Knee Arthroplasty: A Case Report Integrating Salsa-Based Balance Training	Kurt Williams
2:45-3:00	Robert Stratton	Bridging the Gap: The Impact of ASL Proficiency and Communication Strategies in Physical Therapy for Deaf/Hard-of-Hearing Patients	Murray Maitland/Valerie Kelly

UW Medicine
REHABILITATION MEDICINE

Room NHS Hall B **Room coordinator: Murray**

TIME	STUDENT	PROJECT DESCRIPTION	ADVISOR
10:00 - 10:15	Peyton Colee	Physical Therapy Management of Post-Surgical Dorsal Hallux Metatarsophalangeal Joint Cheilectomy	Janis McCullough
10:15 - 10:30	Austin Aiona	Physical Therapy Management of an Ultimate Frisbee Athlete with Chronic Low Back Pain and Haglund's Deformity: A Movement System Approach	Murray Maitland
10:30 - 10:45	Josh Feikes	Physical Therapy of an Older Adult 27 Years Post-fibromatosis and Tumor Resection: A Case Study	Murray Maitland
10:45 - 11:00	Jeffery Overbaugh	Physical Therapy Management of a Middle-aged Man with an Anterior Cruciate Ligament Rupture and Early-Onset Parkinson's Disease	Murray Maitland
11:00 - 11:15	**Break**		
11:15 - 11:30	Reina Yamashita	Physical Therapy Management of a High School Dancer with Lateral Patellar Dislocation	Torey Gilbertson
11:30 - 11:45	Ana Priscila Espindola Garzon	Patient Centered Rehabilitation Management Following Total Knee Arthroplasty: A Case Report of Functional Recovery	Torey Gilbertson
11:45 - 12:00	Ellaine Villano	A Case Report: Physical Therapy Management of a Total Knee Arthroplasty via Subvastus Approach versus the Medial Parapatellar Approach	Ellie Ostrand
12:00 - 12:15	Nate Bright	Physical Therapy Management of Non-Complex Knee Injury in Pediatric Patients with Post-Concussion Syndrome	Ellie Ostrand
12:15 - 12:45	**Lunch**		
12:45 - 1:00	Jenin Farajallah	Physical Therapy Management of an Older Adult Undergoing Total Knee Arthroplasty with Challenges of Caregiver Support	Megan Scudder
1:00 - 1:15	Shannon Eddy	Evaluation and Treatment of a Patient with Greater Trochanteric Pain Syndrome: A Case Study	Megan Scudder
1:15 - 1:30	Alicia Evans	Physical Therapy Management of Return to Heavy Deadlifting in a Patient with Chronic Low Back Pain and Associated Kinesiophobia	Megan Scudder
1:30 - 1:45	Chantelle Davenport	Delayed Outpatient Physical Therapy Treatment Following Lumbar Decompression and Fusion Surgery 4 Months Post Op: A Case Report	Adam Babitts
1:45 - 2:00	**Break**		
2:00 - 2:15	Isaac Stone	Outpatient Physical Therapy Treatment Following Recurrent Lumbar Disc Herniation: A Case Report.	Janis McCullough
2:15 - 2:30	Sean Nguyenle	Return-to-Sport Rehabilitation for Iliopsoas Tendinopathy in a Collegiate Baseball Pitcher: A Case Report	Adam Babitts
2:30 - 2:45	Lilia Matevosyan	Impact of Lower Extremity Weightbearing Restrictions on Pelvic Floor Dysfunction in Outpatient Rehabilitation: A Case Study	Janis McCullough
2:45 - 3:00	Mathew Sorlie	Trauma and Repetitive Stress are not Meaningfully Associated with Exam findings in Suspected Cervical Instability	Sarah Kaiser/Sean Rundell

Room NHS Hall C **Room coordinator: Sujata**

TIME	STUDENT	PROJECT DESCRIPTION	ADVISOR
10:00 - 10:15	Austin Chau	Acute physical therapy treatment following vestibular schwannoma removal using translabryrinthine approach: A case report.	Brooke Lindsley
10:15 - 10:30	Andy Senkerik	A Rehabilitation Road Map for Complex Visual, Cervical, and Vestibular Dysfunction Following Corneal Transplantation: A Case Report	Brooke Lindsely
10:30 - 10:45	Janelle Hoganson	Physical Therapy Management of a Traumatic Spinal Cord Injury Caused by Secondary Impairments of West Nile Virus: A Case Report	Sujata Pradhan
10:45 - 11:00	Allen Saewong	Effects of Dual Task Walking in People with Functional Movement Disorder	Valerie Kelly/Sujata Pradhan/Ivan Molten
11:00 - 11:15	**Break**		
11:15 - 11:30	Josephine Cooke	Effects of Part Practice on Gait in Functional Movement Disorders: A Case Series	Valerie Kelly/Sujata Pradhan/Ivan Molten
11:30 - 11:45	Miles Tibbits	Effect of Environmental Constraints on Turning in People with Parkinson Disease	Sujata Pradhan/Valerie Kelly
11:45-12:00	Zoe Chang	Gait impairments in people with Parkinson Disease During Navigation of a Virtual Doorway	Sujata Pradhan/Valerie Kelly
12:00-12:15	JJ Shen	Effects of Personalized Virtual Cues on Gait in People with Parkinson Disease	Valerie Kelly/Sujata Pradhan
12:15 - 12:45	**Lunch**		
12:45 - 1:00	Benjamin Aguila	Transcutaneous Spinal Cord Stimulation plus Arm Cycling for Autonomic Recovery after Cervical Spinal Cord Injury: A Case Series	Soshi Samejima
1:00 - 1:15	Samantha McHugh-McGlothin	Effects of Transcutaneous Spinal Cord Stimulation with Locomotor Training on Lower Urinary Tract Function after Incomplete Spinal Cord Injury: A Four-Subject Case Series	Soshi Samejima/Chet Moritz
1:15-1:30	Emilee Putsche-Young	Non-invasive spinal cord stimulation for autonomic function in multiple system atrophy: A Case Report	Soshi Samejima
1:30 - 1:45	John N. Williams Jr.	Effects of Cervical Transcutaneous Spinal Cord Stimulation on the Lumbosacral Spinal Cord.	Chet Moritz
1:45 - 2:00	**Break**		
2:00 - 2:15	Sean Andrew-Chevalier	Physical Therapy Intervention for an Acute Ischemic Stroke following Transcatheter Aortic Valve Replacement in a Medically Complex Patient: A Case Study	Anne Moore
2:15 - 2:30	Christina Giang	Physical Therapy Management of a Patient with Unstable Housing Diagnosed with Acute Ischemic Cerebrovascular Accident: A Case Study	Jenny Chang
2:30 - 2:45	Farzana Mohamedali	Effects of Learning and Community Engagement on Self-reported and Objectively Measured Physical Activity in Lymphangioleiomyomatosis	Beth Brown/Claire Child
2:45 - 3:00	Nomin Rinchin	Physical Therapy Management of Chronic Posterior Tibialis Tendon Dysfunction in an Older Adult	Michelle Cangialosi

Abstracts and accompanying references are compiled by project type, and then alphabetically by last name of DPT students

Research Projects

Benjamin Aguila 1
Zoe Chang 2
Josephine I Cooke 3
Alex Johansson 4
Jasmine Jones 5
Aislinn Knight 6
Samantha McHugh-McGlothin 7
Farzana Mohamedali 8
Emilee Putsche-Young 9
Duke Quach 10
Allen Saewong 11
Jiayi Shen 12
Matthew Sorlie 13
Robert Stratton 14
Natalie Thompson 15
Miles Tibbits 16
John Neal Williams Jr 17

Case Report

Austin Aiona....18
Nathan Bright....19
Austin Chau....20
Sean Andrew - Chevalier....21
Peyton Colee....22
Chantelle Davenport....23
Shannon Delaney Eddy....24
Alicia Evans....25
Jenin Farajallah....26
Joshua Feikes,....27
Yili Fu....28
Ana Priscila Espindola Garzon....29
Christina Giang....30
Matthew Haber....31
Janelle Hoganson....32
Gray Jones....33
Tyler Le....34
Matthew Liu....35
Ella Mahler....36
Kristina Mangaliag....37
Lilia Matevosyan....38
Jordana Mednick....39
Emilie Nakasone....40
Sean Nguyenle....41
Jeff Overbaugh....42
Nomin Rinchin....43
Andrew Senkerik....44
Mingma Tashi Sherpa....45
Isaac Stone....46
Ellaine Villano....47
Reina Yamashita....48

Transcutaneous Spinal Cord Stimulation plus Arm Cycling for Autonomic Recovery after Cervical Spinal Cord Injury: A Case Series

Benjamin Aguila

This study investigated the effect of transcutaneous spinal cord stimulation (tSCS) with arm cycle ergometry training (ACET) to improve autonomic function in individuals with chronic cervical spinal cord injury (SCI). We hypothesize that tSCS when combined with arm cycling will improve autonomic function greater than with arm cycling alone. Preliminary data from an ongoing clinical trial includes three men with chronic cervical complete or motor-complete SCI. Each participant completed three 30-minute training sessions with tSCS or sham stimulation per week for a total of 8 weeks or 24 sessions, followed by an additional 8 weeks with training plus tSCS. Assessments were conducted pre and post-intervention to measure sensory and motor function, aerobic capacity, respiratory function, and bowel, bladder, and sexual function. Sensory and motor function were assessed via the International Standards for Neurological Classification of Spinal Cord Injury (ISNSCI) exam. Aerobic capacity was measured via a graded cardiopulmonary exercise test (CPET) where parameters such as peak VO2, peak heart rate (HR), rate of perceived exertion (RPE), and peak stroke volume via oxygen pulse were analyzed. Bowel, bladder, and sexual functions were measured via a battery of questionnaires. After 8 weeks of training, participants in the tSCS group did not demonstrate significantly higher VO2 values compared to the sham group, and participants in both groups improved their aerobic capacities. All participants demonstrated some degree of improvement in neurologic and autonomic functions. These results suggest that transcutaneous spinal cord stimulation alongside aerobic exercise may promote recovery of cardiovascular and other autonomic functions beyond exercise alone in people with complete and incomplete cervical SCI, although the capacity to improve may be greater in those with less complete injuries. Continued analysis among other participants is required to confirm these findings and understand the mechanisms involved.

Selected References

1. Sandrow-Feinberg HR, Houlé JD. Exercise after spinal cord injury as an agent for neuroprotection, regeneration and rehabilitation. Brain Res. 2015;1619:12-21. doi:10.1016/j.brainres.2015.03.052
2. Dorey TW, Nightingale TE, Alrashidi AA, et al. Effects of exercise on autonomic cardiovascular control in individuals with chronic, motor-complete spinal cord injury: an exploratory randomised clinical trial. Spinal Cord. 2024;62(10):597-604.
3. Hall B, Sikora M, Jonas D, Matthews E, Żebrowska A. Handcycling Training in Men with Spinal Cord Injury Increases Tolerance To High Intensity Exercise. J Hum Kinet. 2022;82:233-241. Published 2022 Apr 26. doi:10.2478/hukin-2022-0080.
4. Samejima, S. et al. Effects of non-invasive spinal cord stimulation on lower urinary tract, bowel, and sexual functions in individuals with chronic motor-complete spinal cord injury: Protocol for a pilot clinical trial. PloS one 17, e0278425, doi:10.1371/journal.pone.0278425 (2022).
5. Shackleton, C. et al. Motor and autonomic concomitant health improvements with neuromodulation and exercise (MACHINE) training: a randomised controlled trial in individuals with spinal cord injury. BMJ open 13, e070544, doi:10.1136/bmjopen-2022-070544 (2023).

Gait impairments in people with Parkinson disease during navigation of a virtual doorway

Zoe Chang

Purpose: Freezing of gait (FoG) is a debilitating symptom in Parkinson's disease (PD) that can lead to falls and reduced mobility, with known triggers such as walking through narrow doorways. This study examined gait impairments in a virtual reality (VR) doorway environment, in people with PD compared to healthy adults (HA). We hypothesized that gait impairments would worsen when navigating a VR doorway due to the increased spatial constraints of the doorway, with greater declines in the PD group.

Methods: We recruited people with PD, with (PD+FoG) and without (PD-Control) FoG as well as HAs. All participants walked in two environments: a VR laboratory (VR-Lab) and a VR doorway (VR-Door). Participants walked at their self-selected pace through the environments, which were viewed through a VR headset. Gait speed was the primary outcome.

Results: Participants were 6 HA (mean [standard deviation, SD] age: 69.2 [10.5] years), 8 PD-Control participants (67.3 [7.9] years, and 7 PD+FoG participants (68.9 [10.0] years). For the HA group, mean (SD) gait speed was 1.12 (0.13) m/s in the VR-Lab and 1.10 (0.12) m/s in the VR-Door condition. For the PD-Control group, gait speed was 0.97 (0.21) m/s in the VR-Lab and 0.91 (0.20) m/s in the VR-Door. For the PD+FoG group, gait speed was 0.88 (0.15) m/s in VR-Lab and 0.84 (0.17) m/s in the VR-Door.

Conclusions: Navigating a VR-Door resulted in reduced gait speed compared to the VR-Lab environment, particularly for participants with PD. This suggests that the spatial constraint of a VR-Door can impact gait in people with PD, even among those who have mild motor severity. For physical therapists, VR environments may serve as controlled, safe tools for assessing gait and FoG under conditions that closely mimic real-world challenges, aiding in the early detection of FoG and guiding individualized intervention planning.

Selected References:

1. Mirelman A, Bonato P, Camicioli R, et al. Gait impairments in Parkinson's disease. *Lancet Neurol*. 2019;18(7):697-708.
2. Conde CI, Lang C, Baumann CR, Easthope CA, Taylor WR, Ravi DK. Triggers for freezing of gait in individuals with Parkinson's disease: a systematic review. *Front Neurol*. 2023;14:1326300.
3. Lin PH, Lai YR, Lien CY, et al. Investigating spatiotemporal and kinematic gait parameters in individuals with Parkinson's disease with a history of freezing of gait. *Front Neurosci*. 2024;18:1404613.
4. Cockx HM, Lemmen EM, van Wezel RJA, Cameron IGM. The effect of doorway characteristics on freezing of gait in Parkinson's disease. Front Neurol. 2023;14:1265409.
5. Besharat A, Imsdahl SI, Yamagami M, et al. Virtual reality doorway and hallway environments alter gait kinematics in people with Parkinson disease and freezing. *Gait Posture*. 2022;92:442-448.

Effects of Part Practice on Gait in Functional Movement Disorders: A Case Series

Josephine I Cooke

Background: Functional movement disorders (FMD) are characterized by involuntary and unusual movement patterns that negatively impact daily activities like walking. Excessive self-focused attention is theorized to play a role in FMD's pathophysiology, but it is unclear if dysfunctional attentional mechanisms can be re-directed through sequential retraining of a movement task. This study assessed the effects of practicing gait components on walking quality in people with FMD, testing the hypothesis that directing attention toward specific gait components improves movement quality.

Methods: A case series design was used to investigate this hypothesis in two adults with FMD. Participants were asked to walk naturally before and after a 10–15-minute guided practice of specific gait components, including standing, weight shifting, marching, and targeted stepping with heel strikes. Full-body motion capture was used to quantify spatiotemporal and kinematic variables prior to, during, and after part practice.

Results: Participant 1 was a 62-year-old female diagnosed with FMD 9 months prior, who presented with notable step asymmetry. She demonstrated reduced asymmetry of step length (Pre: 0.013 m, Post: 0.010 m) and step time (Pre: 0.028 s, Post: 0.010 s) after practice of specific gait components, as well as increased knee and ankle excursion. Participant 2 was a 25-year-old female diagnosed with FMD 8 months prior, who had residual hemiparetic-like gait deficits after receiving interdisciplinary outpatient treatment. After practice of specific gait components, she demonstrated increased ankle excursion and arm swing.

Conclusions: Despite being an increasingly common movement disorder, FMD remains difficult to diagnose and treat. This study demonstrated improvements in spatiotemporal and kinematic gait measures, with individual variability, after a brief exposure to practice of specific gait components. These findings have implications for understanding mechanisms of sequential gait training and optimizing selection of task components during sequential gait training in people with FMD.

Selected References:

1. Hallet M, Aybek S, Dworetzky BA, et al. Functional neurological disorder: New subtypes and shared mechanisms. Lancet Neurol. 2022; 21: 537-550.
2. Jacob AE, Kaelin DL, Roach AR, et al. Motor Retraining (MoRe) for Functional Movement Disorders: Outcomes from a 1-week multidisciplinary rehabilitation program. PM&R. 2018; 10(11): 1164-1172.
3. Nielsen G, Stone J, Buszewicz M, et al. Physio4FMD: protocol for a multicentre randomised controlled trial of specialist physiotherapy for functional motor disorder. BMC Neurol. 2019; 19: 242.
4. Nielsen G, Stone J, Matthews A, et al. Physiotherapy for functional motor disorders: a consensus recommendation. J Neurol Neurosurg Psychiatry. 2014:1-16.
5. Nonnekes J, Ruzicka E, Serranová T, Reich SG, Bloem BR, Hallet M. Functional gait disorders: a sign based approach. Neurol. 2020; 94: 1-7.

Establishing clinician consensus on desired features of sensor-enhanced powered mobility for children: A Delphi Study

Alex Johansson

Purpose/Hypothesis: Environmental exploration is formative for children, promoting motor, social, and cognitive development. Self-initiated mobility enables exploration and can be aided with early provision of powered mobility (PM) for children with disabilities. Advancements in technology allow PM to be enhanced with sensors and graphical user interfaces (GUIs), to assist clinical decision making and tracking progress. GUIs display data via a tablet-based app but are not widely available in clinical practice. Thus, it is crucial to understand factors clinicians prioritize to develop GUIs that capture meaningful data and may increase access to PM. The purpose of this study was to establish clinician priorities for a sensor-enhanced PM device and companion GUI that can objectively measure device learning and use by children in clinical environments.
Number of Subjects: 15
Materials and Methods: We conducted a two-round modified Delphi survey with new and experienced pediatric rehabilitation clinicians. Round 1 gathered open-ended responses of considerations for using sensor-based tools to enhance PM training data availability, including: goals, quantitative/qualitative data, and barriers. Unique responses were collated in Round 2, and clinicians indicated agreement and rank-ordered categorical priorities to establish consensus (≥75% agreement).
Results: Round one: Over 46 unique considerations for PM training were described. Round two: 24 items reached consensus. The highest priority: goal for PM use was 'independence and exploration'; quantitative data metric was 'Percentage of time assistance is needed to use the joystick'; qualitative metrics were 'assistance and independence' and 'cognitive awareness and development'; barrier was funding. Consensus was reached on ideal setup time of 5-10 minutes for the GUI.
Conclusions: Pediatric clinician responses reaffirm the need and interest for sensor-enhanced PM devices while identifying priority considerations for their development and clinical implementation with companion GUIs. Clinical Relevance: Devising a robust sensor-enhanced PM device based on clinician priorities may empower clinicians with more objective data visualization capabilities and increase opportunities for children in rehabilitation to promote their development via PM.

Selected Reference:

1. Plummer T, Logan SW, Morress C. Explorer mini: Infants' initial experiences with a novel pediatric powered mobility device. Phys Occup Ther Pediatr. 2020;41(2):192-208. doi: 10.1080/01942638.2020.1819935
2. Feldner HA, Gaebler-Spira D, Awasthi V, Bjornson KK. Supportive mobility devices across the lifespan in cerebral palsy: A modified delphi study to establish stakeholder research priorities. Disabil RehabilAssist Technol. 2024;19(4):1739-1747. doi: 10.1080/17483107.2023.2233564
3. Ingraham KA, Feldner HA, Steele KM. Forward first: Joystick interactions of toddlers during digital play. PLoS One. 2024;19(12):e0316097. doi: 10.1371/journal.pone.0316097
4. Jones MA, McEwen IR, Neas BR. Effects of power wheelchairs on the development and function of young children with severe motor impairments. Pediatr Phys Ther. 2012;24(2):131-140. doi: 10.1097/pep.0b013e31824c5fdc
5. Adolph KE, Hoch JE. Motor development: Embodied, embedded, enculturate, and enabling. Annu Rev Psychol. 2019;70:141-164. doi: 10.1146/annurev-psych-010418-102836

Changes in social interaction and joystick activation over time in young powered mobility learners

Jasmine Jones

Background: Self-initiated mobility is crucial to an infant's learning, autonomy, and social development. For children with motor disabilities, powered mobility (PM) devices provide access to independent exploration. However, research is lacking on PM use for children under three years old, particularly quantitative research examining changes in driving behaviors and social interaction over time. This study's goal was to quantify the evolution of social interaction and joystick activation across short-term PM intervention in young children with motor disabilities.

Methods: In this quantitative observational study, four children aged 21-27 months ($\bar{x}$=23.75) with motor disabilities engaged in 12 PM driving visits utilizing the Permobil Explorer Mini in an enriched play environment. Each visit involved two 15–20-minute video-recorded sessions. Two researchers completed behavioral video coding using momentary time sampling for driving behaviors and social and joystick interaction at visits 1, 6, and 12, yielding 11,976 observational data points. Inter-rater reliability was established between researchers with ≥90% agreement across all categories.

Results: On average, from baseline to study completion, driving time increased, both in exploratory driving ($\bar{x}$ =12.30%, range 0.53% to 38.46%) and in goal directed driving ($\bar{x}$=8.46%, range 0% to 30.77%). On average, the frequency of time spent not interacting with the surrounding objects or people, including active driving time increased ($\bar{x}$=32.32%, range 1.68% to 50.00%) and the frequency of time spent stationary decreased ($\bar{x}$=-18.56%, range -43.14% to 2.52%).

Conclusion: Results indicate substantial variability in the acquisition of driving behaviors in early PM users with positive trends in exploratory and goal-directed driving, increased adult interaction, and reduced stationary time. These patterns may correlate with the children's increased proficiency in driving and ability to explore their surrounding environment, utilizing driving to access toys and caregivers during play.

Clinical Relevance: Clinicians can use powered mobility as a critical tool for enabling young children with motor disabilities to independently explore their environment and develop autonomy. Behavioral video coding can be a valuable tool for researchers and clinicians alike to quantify driving and social behaviors, demonstrate change over time, and improve access to PM in key developmental stages.

Selected References :

1. Adolph KE, Hoch JE. Motor Development: Embodied, Embedded, Enculturated, and Enabling. *Annu Rev Psychol*. 2019;70:141-164. doi:10.1146/annurev-psych-010418-102836
2. Hoch JE, Rachwani J, Adolph KE. Where Infants Go: Real-Time Dynamics of Locomotor Exploration in Crawling and Walking Infants. *Child Dev*. 2020;91(3):1001-1020. doi:10.1111/cdev.13250
3. Jones MA, McEwen IR, Neas BR. Effects of power wheelchairs on the development and function of young children with severe motor impairments. Pediatr Phys Ther. 2012;24(2):131-140. doi:10.1097/PEP.0b013e31824c5fdc
4. Logan SW, Ross SM, Schreiber MA, et al. Why We Move: Social Mobility Behaviors of Non-Disabled and Disabled Children across Childcare Contexts. *Front Public Health*. 2016;4:204. Published 2016 Sep 21. doi:10.3389/fpubh.2016.00204
5. Ripat JD, Woodgate RL. The role of assistive technology in self-perceived participation. *Int J Rehabil Res*. 2012;35(2):170-177. doi:10.1097/MRR.0b013e3283531806

Harness or Wheels? Caregiver Perspectives on Mobility Aids for Pre-Ambulatory Children with Down Syndrome

Aislinn Knight

Background: Children with Down syndrome (DS) experience delayed motor milestone achievement, yet are rarely provided assistive technology in the interim. Research suggests that the use of a partial body weight support system or early powered mobility may be effective for promoting motor and cognitive development. There is a lack of research on caregiver perceptions of the use of these devices for children with DS.

Purpose: To learn about caregiver perceptions of the use of a partial bodyweight support system (Portable Mobility Aid (PUMA), Enliten, LLC) and a pediatric powered wheelchair that can be used in sitting and standing postures (Explorer Mini (EM), Permobil, Inc.) for their children with DS.

Methods: In this mixed-methods study, four children with DS, 14-25 months old, participated in four play conditions: no device, EM seated, EM supported stand, and PUMA. Caregivers participated in interviews which were analyzed qualitatively. Caregivers completed two surveys: Quebec User Evaluation of Satisfaction (QUEST) 2.1: Children's Version and a 3-category perceptual implementation measure of acceptability, intervention appropriateness, and feasibility.

Results: Five themes emerged: (1) The EM is a fun way to move and learn, (2) PUMA as a step toward independent walking, (3) Incorporating and adjusting to mobility aids can be challenging, (4) Building confidence in motor ability with mobility aids, and (5) Supporting mobility together as a family. Caregivers indicated high satisfaction with both devices and found them to be feasible to use, appropriate for their child's needs, and acceptable.

Conclusion: Caregivers thought the EM was fun but perceived the PUMA as better for motor development. Mobility aids were considered helpful for developing movement self-efficacy. Families desired increased access to mobility aids but needed support with incorporating them into their lives. These devices may be practical for clinical and home use, yet families may benefit from education on their use.

Selected References:

1. Baumer N, DePillis R, Pawlowski K, Zhang B, Mazumdar M. Developmental milestones for children with Down Syndrome. *Pediatrics*. 2024; 154(4):e2023065402.
2. Sabet A, Feldner H, Tucker J, Logan SW, Galloway JC. ON time mobility: advocating for mobility equity. *Pediatr. Phys Ther.* 2022; 546-550.
3. Feldner HA, Logan SW, & Galloway JC. Why the time is right for a radical paradigm shift in early powered mobility: the role of powered mobility technology devices, policy and stakeholders. *Disability and Rehabilitation: Assistive Technology*. 2016; 11(2):89-102.
4. Abuatiq RA, Hoffman MA, LaForme Fiss A, Looper J, Feldner HA. Exploring the Efficacy of a Dynamic Harness System on Gross Motor Development and Motivation for Infants With Down Syndrome: A Pilot Study. *Pediatr Phys Ther*. 2024.
5. Feldner HA, Logan SW, Otieno S, et al. Short-term powered mobility intervention is associated with improvements in development and participation for young children with cerebral palsy: a randomized clinical trial. *Physical Therapy*. 2025; 105(1).

Effects of Transcutaneous Spinal Cord Stimulation with Locomotor Training on Lower Urinary Tract Function after Incomplete Spinal Cord Injury: A Four-Subject Case Series

Samantha McHugh-McGlothin

Purpose: Neurogenic lower urinary tract dysfunction (NLUTD) is a common impairment following spinal cord injury (SCI). It affects quality of life by eliciting compromised bladder storage, detrusor overactivity, incontinence, and complications such as urinary tract infections. Current management strategies primarily focus on symptom control and have significant limitations. Transcutaneous spinal cord stimulation (tSCS) is a novel, non-invasive intervention for improving NLUTD after SCI. This case series explored the effects of tSCS combined with locomotor training (LT) on lower urinary tract function in four individuals with chronic cervical SCI classified as American Spinal Cord Injury Association Impairment Scale (AIS) C or D.

Method: Participants first completed a wash-in phase of LT for 18 sessions, or until their walking function plateaued, followed by 18 sessions of lumbosacral tSCS paired with LT, and 18 additional sessions of both cervical and lumbosacral tSCS paired with LT. Pre- and post-intervention assessments for pelvic organ function included urodynamic studies (UDS) and the Neurogenic Bladder Symptom Score (NBSS).

Results: Objective urodynamic outcomes demonstrated improvements in bladder storage and detrusor function across participants. Maximum cystometric capacity trended toward uninjured average capacity regardless of baseline volume, bladder compliance increased in all participants, and detrusor pressure during filling decreased in three participants. In participants with neurogenic detrusor overactivity, the volume at first detrusor overactivity increased following intervention. One participant demonstrated improved voluntary voiding efficiency with elimination of post-void residual volume. Subjective improvements measured by NBSS were variable.

Conclusions: These findings suggest that tSCS combined with locomotor training may improve objective measures of lower urinary tract function in individuals with chronic SCI. Further controlled studies with larger sample sizes are needed to better characterize the therapeutic potential of tSCS for NLUTD.

Selected References:

1. Hubscher CH, Herrity AN, Williams CS, et al. Improvements in bladder, bowel and sexual outcomes following task-specific locomotor training in human spinal cord injury. PLoS One. 2018;13(1):e0190998. doi:10.1371/journal.pone.0190998
2. Kreydin E, Zhong H, Latack K, Ye S, Edgerton VR, Gad P. Transcutaneous electrical spinal cord neuromodulator (TESCoN) improves symptoms of overactive bladder. Frontiers in Systems Neuroscience. 2020;14:1. doi:10.3389/fnsys.2020.00001
3. Perrin A, Corcos J. The utility of urodynamic studies in neuro-urological patients. Biomedicines. 2023;11(4):1134. doi:10.3390/biomedicines11041134
4. Shackleton C, Samejima S, Williams AM, et al. Motor and autonomic concomitant health improvements with neuromodulation and exercise (MACHINE) training: a randomised controlled trial in individuals with spinal cord injury. BMJ Open. 2023;13(7):e070544. Published 2023 Jul 14. doi:10.1136/bmjopen-2022-070544
5. Wecht JM, Krassioukov AV, Alexander M, et al. International standards to document autonomic function following SCI (ISAFSCI): second edition. Topics in Spinal Cord Injury Rehabilitation. 2021;27(2):23-49. doi:10.46292/sci2702-23

Effects of Learning and Community Engagement on Self-reported and Objectively Measured Physical Activity in Lymphangioleiomyomatosis

Farzana Mohamedali

Purpose: To determine for individuals with the rare, female-predominant, cystic lung disease lymphangioleiomyomatosis (LAM) whether 1) accuracy of self-reported physical activity (PA) is impacted by learning after participation in a digital fitness program, and 2) change in objective PA following the digital fitness program is impacted by engagement in an online community forum provided in conjunction with the program.

Subjects: 25 women with LAM (mean age 53±13 years) enrolled in the novel digital fitness program for LAM called 'LAMFit'

Materials and Methods: A secondary analysis was performed on a dataset acquired during LAMFit. After a 2-week run-in period, LAMFit participants received a customized digital fitness program for 24 weeks, consisting of 4 times/week continuous aerobic exercise 30 to 45 minutes, and 2 times/week resistance training. LAMFit included personalized goal setting for daily minutes of moderate-to-vigorous physical activity and for adherence to the exercise program. Wrist-worn accelerometry objectively measured PA and metabolic equivalents (METs) of exercise. Maintenance of PA behaviors was assessed post-intervention for 2 weeks and compared to Baseline. Self-report of PA was also collected at these timepoints, via the International Physical Activity Questionnaire - Short Form (IPAQ-SF). An optional online LAMFit community forum facilitated sharing of insights into overcoming barriers related to exercise and LAM and celebration of group activity goal achievements. Pearson correlations examined relationships between 1) self-reported and objectively measured PA before and after the intervention to estimate the impact of learning on accuracy of self-report, and 2) active engagement on the LAMFit community forum (defined as number of replies to posts) and change in mean daily moderate intensity PA and weekly step count.

Results: PA obtained by self-report (IPAQ-SF) more closely aligned with PA objectively measured by wrist-worn accelerometry (mean MET*mins) after the 24-week home exercise program ($r=0.72$, $p=0.001$) compared to at Baseline ($r=0.46$, $p=0.04$). Active engagement on the LAMFit community forum was associated with a greater change from Baseline in amount of accelerometry-measured moderate PA ($r = 0.54$, $p = 0.025$) and steps per week ($r = 0.61$, $p =0.016$) achieved by participants.

Conclusions: A learning effect was observed in accuracy of self-reported habitual PA following the 24-week LAMFit exercise intervention, with self-reported values more closely reflecting objective values. Engagement in a community forum positively impacted LAMFit's effect on PA, suggesting an association between higher engagement and PA behavior change. Clinical Relevance: In the absence of wrist-worn accelerometry and other objective PA easures, the IPAQ-SF may be useful to estimate PA behaviors of patients who have participated in a digital fitness program like LAMFit. Active engagement in an online community forum may be useful as a supplemental PA behavior change technique.

Selected References:

1. Child CE, Ho LA, Lachant D, et al. Unsupervised Exercise in Interstitial Lung Disease: A Delphi Study to Develop a Consensus Preparticipation Screening Tool for Lymphangioleiomyomatosis. Chest. 2024;166(5):1108-1123. doi:10.1016/j.chest.2024.06.3803
2. Child CE, Kelly ML, Sizelove H, et al. A remote monitoring-enabled home exercise prescription for patients with interstitial lung disease at risk for exercise-induced desaturation. Respir Med. 2023;218:107397. doi:10.1016/j.rmed.2023.107397
3. Hemnes AR, Silverman-Lloyd LG, Huang S, et al. A Mobile Health Intervention to Increase Physical Activity in Pulmonary Arterial Hypertension. Chest. 2021;160(3):1042-1052. doi:10.1016/j.chest.2021.04.012
4. McCarthy C, Gupta N, Johnson SR, Yu JJ, McCormack FX. Lymphangioleiomyomatosis: pathogenesis, clinical features, diagnosis, and management. Lancet Respir Med. 2021;9(11):1313-1327. doi:10.1016/S2213-2600(21)00228-9

Non-invasive spinal cord stimulation for autonomic function in multiple system atrophy: a case report

Emilee Putsche-Young

Background and Purpose: Multiple System Atrophy (MSA) is a rapidly progressing adult-onset neurodegenerative disease. Aggregation of misfolded proteins in oligodendrocytes causes a range of impairments including severe orthostatic hypotension (OH) and bowel dysfunction. The application of spinal cord stimulation to improve autonomic function has been studied in various neurologic conditions, but evidence in MSA is limited. This study assessed the effect of transcutaneous spinal cord stimulation (tSCS) on OH and bowel dysfunction in an individual with MSA.

Subject: A 68-year-old male diagnosed with MSA in 2015. His impairments include severe OH and constipation, both managed pharmacologically.

Methods: We assessed the acute effects of tSCS during mapping, a sit-up test, and a 6-minute walk test. tSCS Mapping involved tSCS at cervical, thoracic, and thoracolumbar regions, assessing cardiovascular response with continuous blood pressure (BP) and middle cerebral artery (MCA) blood flow monitoring. Sustained effects of tSCS were evaluated for three single sessions, each one month apart. Single session data included 24-hr BP monitoring and a bowel diary with bowel management duration, frequency, and Bristol Stool Score.

Results: Mapping showed a 15mmHg elevation in systolic BP at with tSCS at C3-4 and C6-7 and no clear BP elevation at lower levels. BP and MCA blood flow velocity were stabilized during the sit-up test with cervical tSCS. Changes in walking performance and BP stability following single sessions were inconsistent. There was an improvement in stool type, and an immediate bowel movement was reported right after every single session.

Discussion and Conclusions: Though this study did not find consistent effects on BP or bowel management with single sessions of cervical tSCS, tSCS was effective in mitigating OH acutely and provided positive changes in stool form and quality. Further research is warranted on people with MSA at varying stages of disease progression and with repeated tSCS.

Key Words: transcutaneous spinal cord stimulation, non-invasive, multiple system atrophy, autonomic function, orthostatic hypotension, bowel management

Selected References:

1. Krismer F, Fanciulli A, Meissner WG, Coon EA, Wenning GK. Multiple system atrophy: advances in pathophysiology, diagnosis, and treatment. Lancet Neurol. 2024;23(12):1252-1266. doi:10.1016/S1474-4422(24)00396-X
2. Claassen DO, Adler CH, Hewitt LA, Gibbons C. Characterization of the symptoms of neurogenic orthostatic hypotension and their impact from a survey of patients and caregivers. BMC Neurol. 2018;18(1):125. Published 2018 Aug 25. doi:10.1186/s12883-018-1129-x
3. Gong H, Liu Y, Zhu X, Gong X. Spinal Cord Stimulation Improved Freezing of Gait and Hypokinetic Dysarthria of a Patient with Dopamine-Resistant Multiple System Atrophy-Parkinsonian Type. Neurol India. 2022;70(2):757-759. doi:10.4103/0028-3886.344653
4. Zhu X, Huang S, Li N, et al. Cervical spinal cord stimulation for sleep-disordered breathing in multiple system atrophy. Brain Stimul. 2023;16(3):854-856. doi:10.1016/j.brs.2023.05.001
5. Squair JW, Berney M, Castro Jimenez M, et al. Implanted System for Orthostatic Hypotension in Multiple-System Atrophy. N Engl J Med. 2022;386(14):1339-1344. doi:10.1056/NEJMoa2112809

Are We Doing Enough? Orthopaedic Physical Therapist's Approaches for Treating Patients with Diabetes

Duke Quach

Purpose/Hypothesis: Over 80% of patients referred to outpatient physical therapy (PT) have diabetes, pre-diabetes or diabetes risk factors. Patients with diabetes and musculoskeletal injuries have worse clinical outcomes compared to those without diabetes. Globally PTs lack a strong understanding of diabetes and the implications for exercise. Therefore, the purpose of this study is to describe practice approaches of PTs in outpatient orthopedics who have experience treating patients with diabetes.

Participants: 10 outpatient orthopedic PTs with a percentage of patients with diabetes ranged from 5-100%.

Methods: Virtual semi-structured interviews. Interviews were coded inductively and deductively independently by two researchers until data saturation occurred and themes emerged. Data were compared between researchers for congruency.

Results: Three main themes emerged: 1) 'Variable clinical practice' describes inconsistent history taking to discover diabetes as a condition and inconsistent diabetes management support during PT session, 2) 'Perception of the patient' describes individual approaches used by PTs to determine if further discussion about diabetes management was needed, and 3) 'Education' describes limited patient education and guidance that was provided by most PTs versus no education at all.

Conclusion and clinical relevance: Approaches when treating patients with diabetes varied across PTs, throughout the US. PTs discovered if patients had diabetes through documentation, verbal patient history or organically during treatment sessions. Perception of patient's health literacy or level of importance of diabetes to the patient impacted the PTs' decision of whether to discuss diabetes further. Additionally, general diabetes knowledge, which has the potential to impact safety, was limited in this cohort. These findings suggest that PTs are providing limited support in diabetes management during PT treatment sessions, leaving it up to the patient to manage. Further diabetes education, understanding how diabetes impacts clinical care and diabetes checklist could improve care for patients with diabetes in outpatient PT.

Selected References:

1. Harris- Hayes M, Schootman M, Schootman J, Hastings M. The role of physical therapists in fighting the type 2 diabetes epidemic. J Orthop Sport Phys Ther. 2020, 50(1) 5-16.
2. Ross M, Purrington B, Zuniga C, Farnand B, Pattacciato F. Survey of physical therapists' knowledge of screening and management practices for patients with prediabetes. 2020. Physio Prac Res. 41;213-23.
3. Alhowimel A, Alshahrani A, Abulaban A, Althobeit A, Alenazi A, Alshehri M, Alqahtani B, Alodaibi F. Saudi Arabian physical therapists' knowledge, attitudes, and clinical practice in diabetes prevention and management. Diabetes, Metabolic Syndrome and Obesity. 2023:16, 2967-77.
4. Zhou B, Rayner AW, Gregg EW, et al. Worldwide trends in diabetes prevalence and treatment from 1990 to 2022: a pooled analysis of 1108 population-representative studies with 141 million participants. The Lancet. 2024;404(10467):2077-2093.
5. Dyer B, Burton C, Rathod-Mistry T, Blagojevic-Bucknall M, van der Windt D. Diabetes as a prognostic factor in frozen shoulder: a systematic review. Archives of Rehabilitation Research and Clinical Translation. 2021;3:100141.

Effects of Dual Task Walking in People with Functional Movement Disorder

Allen Saewong

Purpose/Hypothesis: Functional movement disorder (FMD) is a neurologic condition characterized by involuntary habitual movements resulting in dysfunctional gait that negatively impacts daily function. Abnormal self-directed attention is theorized to contribute to these gait impairments. Dual task walking may reduce abnormal attention, but evidence supporting its efficacy as an intervention is limited. Therefore, this study aimed to examine the immediate effects of dual task walking in individuals with FMD. We hypothesized dual task walking would improve movement quality and gait metrics by distracting participants from abnormal self-directed attention.

Methods: This single session study compared single task walking performance before and after dual task walking in two female participants ages 62 and 25 years. Inclusion criteria were: age 18-90 years, able to walk 10 meters (m) with assistance if needed, neurologist-confirmed FMD, and symptoms not better explained by an ongoing psychiatric condition. Participants completed single and dual task walking trials and a seated cognitive task involving counting backwards by 3s. Gait and kinematic data were obtained using total body motion capture.

Results: Participant 1 presented with an antalgic gait pattern. After dual task walking, single task gait speed increased (1.04 m/s pre, 1.08 m/s post), and step length asymmetry decreased (0.030 m pre, 0.015 m post). Participant 2 presented with a hemiparetic gait pattern. Gait speed was unchanged (0.93 m/s pre and post), step length asymmetry increased (0.007 m pre, 0.018 m post), and arm swing increased bilaterally during dual task walking and persisted afterward. Gait speed was slower in both participants during dual tasking. Cognitive task performance was unchanged in Participant 1, but worsened in Participant 2.

Conclusions: Initial results suggest dual task walking had variable effects on movement quality and gait metrics between participants. This suggests interventions may need to differ based on individual presentations of FMD.

Selected Referenes:

1. Espay AJ, Aybek S, Carson A, et al. Current Concepts in Diagnosis and Treatment of Functional Neurological Disorders. *JAMA Neurology.* 2018;75(9):1132–1141. doi: 10.1001/jamaneurol.2018.1264
2. Keatley E, Molton I. A Shift in Approach: Assessment and Treatment of Adults With Functional Neurological Disorder. *Journal of Health Service Psychology*. 2022; 48:79-87. doi: 10.1007/s42843-022-00061-w
3. LaFaver K. Treatment of Functional Movement Disorders. *Neurologic Clinics*. 2020; 38(2): 469-480. doi: 10.1016/j.ncl.2020.01.011'
4. Lin D, Castro P, Edwards A, et al. Dissociated Motor Learning and De-Adaptation in Patients With Functional Gait Disorders. *Brain*. 2020; 143(8):2594-2606. doi:10.1093/brain/awaa190
5. Nielsen G, Stone J, Matthews A, et al. Physiotherapy for Functional Motor Disorders: A Consensus Recommendation. *Journal of Neurology, Neurosurgery and Psychiatry*. 2015; 86(10):1113-1119. doi:10.1136/jnnp-2014-309255
6. Nonnekes J, Růžička E, Serranová T, et al. Functional Gait Disorders. *Neurology*. 2020; 94(24):1093-1099. doi: 10.1212/WNL.0000000000009649

Effects of Personalized Virtual Cues on Gait in People with Parkinson Disease

Jiayi Shen

Purpose: Current recommendations for people with Parkinson disease (PD) support the use of external cues – auditory, tactile, visual – to increase gait speed and step length. Virtual reality (VR) can simulate real-world environments with embedded visual cues that can be easily individualized to each person's gait pattern. The study examined the effects of personalized virtual visual cues on gait in people with PD and healthy controls (HC). We hypothesized that personalized visual cues would result in increased gait speed in people with PD.
Methods: Participants walked in a VR doorway environment with and without virtual lines (cues) positioned on the ground perpendicular to the travel path. Lines were tailored to the individual at an estimated 110% of each participant's stride length in a virtual laboratory environment. Gait speed was measured and analyzed using a Qualisys motion capture system.
Results: Fourteen participants (healthy controls (HC) [n=4], PD [n=5], PD with freezing of gait (PD+FoG) [n=5]) were included. Gait speed was 1.12 (0.12) m/s without cues and 1.23 (0.18) m/s with cues in the HC group, 0.85 (0.24) m/s without cues and 1.04 (0.25) m/s with cues in the PD group and 0.75 (0.10) m/s without cues and 0.82 (0.13) m/s with cues in the PD+FoG group.
Conclusion: The HC group walked faster than people with PD in both conditions, and all groups increased gait speed with personalized cues. Increased gait speed suggests that virtual visual cues can be used to target step length in PD. Personalizing visual cues in physical environments is challenging and time consuming, but the use of VR enables the flexible and rapid implementation of virtual personalized visual cues in a variety of environments. While data collection is ongoing, these results demonstrate potential for the use of personalized cues to increase speed and step length for people with PD.

Selected References:

1. Ginis P, Nackaerts E, Nieuwboer A, Heremans E. Cueing for people with Parkinson's disease with freezing of gait: A narrative review of the state-of-the-art and novel perspectives. *Ann Phys Rehabil Med*. 2018;61(6):407-413.
2. Cosentino C, Putzolu M, Mezzarobba S, et al. One cue does not fit all: A systematic review with meta-analysis of the effectiveness of cueing on freezing of gait in Parkinson's disease. *Neurosci Biobehav Rev*. 2023;150:105189.
3. Gilat M, Ginis P, Zoetewei D, et al. A systematic review on exercise and training-based interventions for freezing of gait in Parkinson's disease. *NPJ Park Dis*. 2021;7(1):81.
4. Muthukirshnan N, Abbas JJ, Shill HA, et al. Cueing paradigms to improve gait and posture in Parkinson's disease: A narrative review. *Sensors*. 2019; 19: 5498.
5. Vitorio R, Morris R, Graham L, et al. Effects of Internal and External Cues on Brain Activity and Gait in Parkinson's Disease: Findings From BARC-PD. *Neurorehabil Neural Repair*. 2025;39(10):826-838.

Trauma and Repetitive Stress are not Meaningfully Associated with Exam findings in Suspected Cervical Instability

Matthew Sorlie

Background and purpose: It is theorized that physical trauma or repetitive stress may be a factor in developing cervical instability. However, there is little data on whether these factors contribute to multi-segment hypermobility or multi-segment pain. Our purpose is to examine how a history of traumatic injury and repetitive activities is associated with the number of hypermobile segments and the number of painful hypermobile segments in patients with suspected cervical instability.

Materials/methods: Participants were recruited from a single physical therapy clinic. Potential participants with an initial visit scheduled for neck pain or headache were sent an email with a study invitation. Participants completed an online survey with questions on demographics, a history of motor vehicle collision, prior falls where a person hit their head, a concussion diagnosis, and jobs that require awkward positions, prolonged sitting or unilateral activities. A single physical therapist completed standardized cervical segmental mobility testing. We used descriptive statistics to characterize the sample, history of prior traumatic injury or repetitive activities, and examination findings. We used Poisson regression, adjusted for age and sex, to estimate the association between each question on trauma or repetitive activities and the number of hypermobile segments.

Results: We enrolled 28 patients (26 female). Most (n=26, 93%) had neck pain or headaches for > 1 year. The median (interquartile range) number of hypermobile segments was 3.5 (3 to 4), and the median number of painful hypermobile segments was 3 (2 to 3.5). Those with a history of a motor vehicle collision had a 36% higher mean number of hypermobile segments (95% CI: 1.02 to 1.79) compared to those without. No other factors were associated with number of hypermobile segments. Having a job that required prolonged sitting was associated with 33% fewer painful hypermobile segments (95% CI: 0.47 to 0.96) compared to those without.

Conclusion: Our analysis does not support that a history of these specific traumas or repetitive stresses are predictors of either number of hypermobile segments or number of painful hypermobile segments. Potential limitations in the study include small sample size, selection bias, and reliability of having one physical therapist perform assessments.

Selected References:

1. Panjabi MM. The stabilizing system of the spine. Part II. Neutral zone and instability hypothesis. J Spinal Disord. 1992;5(4):390-397. doi:10.1097/00002517-199212000-00002
2. Steilen D, Hauser R, Woldin B, Sawyer S. Chronic neck pain: making the connection between capsular ligament laxity and cervical instability. Open Orthop J. 2014;8:326-345. Published 2014 Oct 1. doi:10.2174/1874325001408010326
3. Cook C, Brismée JM, Fleming R, Sizer PS Jr. Identifiers suggestive of clinical cervical spine instability: a Delphi study of physical therapists. Phys Ther. 2005;85(9):895-906.
4. Chalela S, Russek LN. Presentation and physical therapy management using a neuroplasticity approach for patients with hypermobility-related upper cervical instability: a brief report. Front Neurol. 2024;15:1459115. Published 2024 Nov 8. doi:10.3389/fneur.2024.1459115
5. Tanishima S, Mihara T, Ogawa S, Takeda C, Fujiwara S, Nagashima H. Bilateral facet effusion is a risk factor for segmental instability with cervical injury without vertebral fracture. Sci Rep. 2021;11(1):12531. Published 2021 Jun 15. doi:10.1038/s41598-021-91981-y

Bridging the Gap: The Impact of ASL Proficiency and Communication Strategies in Physical Therapy for Deaf/Hard-of-Hearing Patients

Robert Stratton

Purpose: People who are Deaf or Hard of Hearing (Deaf/HoH) are faced with challenges in healthcare settings that put them at higher risk of unintended and undesirable healthcare outcomes. Recent research highlights the importance of improving access to health information and strengthening relationships between Deaf/HoH people and their healthcare providers.

Similar to the needs of other linguistic minority populations, Deaf/HoH people whose primary language is American Sign Language (ASL) require either an ASL-proficient provider who can communicate directly with the patient or through the services of a qualified sign language interpreter in health care settings. This report describes the development of a professional toolkit for clinicians to improve care provision for people who identify as Deaf/HoH.

Description: This capstone involved review of the literature, didactic coursework, 1:1 mentorship, and volunteer teaching and clinical observations. The complete toolkit included didactic instruction covering Deaf culture; recommendations for communication, including differences between in-person and virtual interpretation services; and resources for learning ASL and for Augmented and Alternative Communication (AAC) modifications.

Summary of use: Federal laws require healthcare providers to ensure that effective communication takes place between the provider and the patient. However, the scarcity of ASL proficient providers, the monetary challenges of budgeting for language and/or communication services, and the relatively poor awareness of the needs of the Deaf/HoH population all contribute greatly to the health care disparities in this community. This toolkit is intended to be used by physical therapists with limited competency in communicating with Deaf/HoH people. This toolkit also aims to address the preferred modes of communication for Deaf/HoH: ASL proficient healthcare providers, In-person interpretation, video Interpretation, or no accommodations. This toolkit previews AAC methods for communicating with Deaf/HoH people, nonverbal communication, and influence communication with Deaf/HoH people.

References:

1. Schniedewind E, Lindsay RP, Snow S. Comparison of Access to Primary Care Medical and Dental Appointments Between Simulated Patients Who Were Deaf and Patients Who Could Hear. *JAMA Netw Open.* 2021;4(1):e2032207.
2. Chandanabhumma PP, Ratakonda S, Panko T, Cuculick J, Hauser P, Paasche-Orlow MK, Fetters MD, McKee MM. Examining the differences of perceptions and experience with online health information accessibility between deaf and hearing individuals: A qualitative study. *Patient Educ Couns.* 2024;122:108169.
3. Mirza M, Harrison EA, Roman M, et al. Walking the talk: understanding how language barriers affect the delivery of rehabilitation services. *Disabil Rehabil.* 2022;44(2):301-14.
4. National Association of the Deaf. Position Statement on Health Care Access for Deaf Patients.www.nad.org/about-us/position-statements/position-statement-on-health-care-access-for-deaf-patients Accessed 13 May 2025.
5. McKee M, James TG, Helm KVT, et al. Reframing Our Health Care System for Patients With Hearing Loss. *J Speech Lang Hear Res.* 2022;65(10):3633-45.

Measures of Muscle Activity in Infants and Toddlers with Spinal Muscular Atrophy: A Systematic Review

Natalie Thompson

Aim: In this systematic review, we explored the availability, feasibility, and quality of muscle activity measures for infants and toddlers with Spinal Muscular Atrophy (SMA) types 1 and 2.

Method: A systematic search was conducted in seven electronic databases. Publications were included if they reported at least one subject age 0-36 months with a diagnosis of SMA type 1 or 2, and if their outcomes included at least one quantitative measure of motor function (including lab-based as well as clinical rater-based measures). The NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies was used to evaluate the evidence.

Results: 626 studies were screened, and 28 were included in this review. These involved 1,190 total participants, of which 518 were ages 0-36 months with SMA type 1 (n=458) or type 2 (n=60). Muscle activity measures were used 59 times: 63% of these were clinical rater-based measures, while 37% were lab-based.

Interpretation: Clinical rater-based measures were the most used tests of muscle activity for this population, likely due to their higher feasibility. However, the details of their implementation were rarely reported. These details were more often provided for lab-based measures, but reported parameters were inconsistent across studies. The variability in reporting of muscle activity measures is moderating the quality of current evidence.

Selected References:

1. Barrois R, Tervil B, Cacioppo M, et al. Acceptability, validity and responsiveness of inertial measurement units for assessing motor recovery after gene therapy in infants with early onset spinal muscular atrophy: a prospective cohort study. J Neuroeng Rehabil. 2024; 21(1): 183. doi:10.1186/s12984-024-01477-9
2. Blaschek A, Hesse N, Warken B, et al. Quantitative motion measurements based on markerless 3D full-body tracking in children with SMA highly correlate with standardized motor assessments. J Neuromuscul Dis. 2022; 9(1): 121-128. doi:10.3233/JND-200619
3. Kolb SJ, Coffey CS, Yankey JW, et al. Baseline results of the NeuroNEXT spinal muscular atrophy infant biomarker study. Ann Clin Transl Neurol. 2016; 3(2): 132-145. doi:10.1002/acn3.283
4. Mercuri E, Sumner CJ, Muntoni F, Darras BT, Finkel RS. Spinal muscular atrophy. Nat Rev Dis Primers. 2022; 8(1): 52. doi:10.1038/s41572-022-00380-8
5. Wik-Klokk M, Rasmussen M, Ørstavik K, et al. Type 1 spinal muscular atrophy treated with nusinersen in Norway, a five-year follow-up. Eur J Paediatr Neurol. 2024; 53: 109-116. doi:10.1016/j.ejpn.2024.09.009

Effect of Environmental Constraints on Turning in People with Parkinson Disease

Miles Tibbits

Purpose: Turning impairments in people with Parkinson disease (PD) may stem from disrupted perceptuomotor coupling, suggesting visuospatial characteristics of the environment may impact turns. This study used immersive virtual reality (VR) to investigate how spatially constrained environments impact turning in people with PD. We hypothesized that people with PD would demonstrate worse turning performance in a constrained VR elevator compared to an open VR lab environment.

Methods: This study included people with PD and HC participants who were age 40-90 years, could walk 400 meters unaided, had no medical conditions impacting study participation, and, for the PD group, had a diagnosis of PD. Virtual environments were developed in Unity and presented via an HTC Vive headset. Participants performed a 180° turn-and-stop task, recorded with motion capture, within VR Lab and VR Elevator environments. Primary outcomes were turn duration and number of steps to turn.

Results: Participants were six healthy adults and 16 people with PD. For the HC group, mean (standard deviation) turn duration was 2.4 (0.7) s, with 3.8 (0.9) steps to turn, in the VR Lab compared to 2.2 (0.3) s, with 3.7 (0.3) steps to turn, in the VR Elevator. For people with PD, turn duration was 3.3 (1.0) s, with 5.3 (1.1) steps to turn, in the VR Lab and 3.5 (0.9) s, with 5.9 (1.4) steps to turn, in the VR Elevator.

Conclusion: Participants with PD demonstrated worse turning performance than HC, with longer turn duration and increased steps to turn in constrained compared to open environments. In contrast, HC were not impacted by the environment. This suggests a perceptual component to turning impairments. Immersive VR simulates realistic environmental constraints, offering a novel approach to characterize turning and potentially informing more targeted rehabilitation strategies for turning impairments in PD.

Selected References:

1. Hulbert S, Ashburn A, Robert L, Verheyden G. A narrative review of turning deficits in people with Parkinson's disease. Disabil Rehabil. 2015;37:1382-9.
2. Parry R, Buttelli O, Riff J, et al. "The whole perimeter is difficult": Parkinson's disease and the conscious experience of walking in everyday environments. Disabil Rehabil. 2019;41:2784-91.
3. Roytman S, Paalanen N, Carli G, et al. Multisensory mechanisms of gait and balance in Parkinson's disease: an integrative review. Neural Regen Res. 2025;20:82-92.
4. Weiss D, Schoellmann A, Fox MD, et al. Freezing of gait: understanding the complexity of an enigmatic phenomenon. Brain. 2020 Mar 1;143:e24.
5. Zoetewei D, Ginis P, Goris M, et al. Which Gait Tasks Produce Reliable Outcome Measures of Freezing of Gait in Parkinson’s Disease? J Park Dis. 2024;14(6):1163-74.

Effects of Cervical Transcutaneous Spinal Cord Stimulation on the Lumbosacral Spinal Cord.

John Neal Williams Jr

Purpose: This study is to gain insight into how transcutaneous spinal cord stimulation at both the cervical and lumbar levels affects spinal circuits and muscle excitability in patients with spinal cord injury. Comparison between the effects of only lumbar stimulation versus combined cervical and lumbar stimulation can provide insight into cervical spinal circuit effects on lower extremity (LE) musculature, and guide clinical decisions for use of transcutaneous spinal cord stimulation during locomotor or LE training.

Number of Subjects: 8 participants were selected from a convenience sample of individuals who were participating in a study trialing the use of transcutaneous spinal cord stimulation with locomotor training to improve walking function. Patients were included in this study if they were between the ages of 21 and 70 and had an existing sensory incomplete spinal cord injury above the level of T12 with at least one year duration.

Materials and Methods: Data collection involved a single session of EMG data collection to characterize muscle responses to direct transcutaneous stimulation to the spinal cord at various locations and intensities. After skin prep, patients had surface EMG electrodes placed bilaterally along 6 lower extremity muscles for EMG recording. EMG recordings were performed during 10 second simulation bouts at differing spinal levels and intensities. EMG data processing and analysis was done in Matlab. Processing included determination of the motor threshold. The motor threshold corresponds to the first intensity where a motor-evoked potential, or muscular response following stimulation, was detected in at least 6 of the 10 pulses delivered.

Results: To determine the effect of the presence or absence of cervical stimulation on the motor threshold of different muscles at each stimulation site, we performed a multiple regression analysis on our data with motor threshold as the dependent variable and location of stimulation, presence or absence of cervical stimulation, participant, and muscle as independent variables. Participant, location, and cervical stim presence were found to be significant. The model improves with interaction effect accounted for between cervical stim and location. The presence of cervical stimulation reduces the stimulus intensity needed to facilitate a lower extremity muscle response, with a more pronounced effect observed when stimulus pulses are provided to the L1 spinal level.

Conclusions: This result demonstrates that cervical stimulation combined with lumbar stimulation causes an excitatory effect on LE muscles when compared to lumbar stimulation alone. This indicates the presence of spinal circuitry at the cervical level that may be relevant to the activation of lower extremity muscles for activities like locomotion training.

Clinical Relevance: Stimulation and sensory or proprioceptive inputs to cervical circuitry may be an important aspect in locomotor training in patients with spinal cord injury. Cervical circuits have an impact on lower extremity muscle activity, likely demonstrating relevance for training of behaviors like walking.

Selected References:

1. Finn, Harrison T., Elizabeth A. Bye, Thomas G. Elphick, et al. "Transcutaneous Spinal Stimulation in People with and without Spinal Cord Injury: Effect of Electrode Placement and Trains of Stimulation on Threshold Intensity." *Physiological Reports* 11, no. 11 (2023): e15692. https://doi.org/10.14814/phy2.15692.
2. Inanici, Fatma, Lorie N. Brighton, Soshi Samejima, Christoph P. Hofstetter, and Chet T. Moritz. "Transcutaneous Spinal Cord Stimulation Restores Hand and Arm Function After Spinal Cord Injury." *IEEE Transactions on Neural Systems and Rehabilitation Engineering* 29 (2021): 310–19. https://doi.org/10.1109/TNSRE.2021.3049133.
3. Parhizi, Behdad, Trevor S. Barss, and Vivian K. Mushahwar. "Simultaneous Cervical and Lumbar Spinal Cord Stimulation Induces Facilitation of Both Spinal and Corticospinal Circuitry in Humans." *Frontiers in Neuroscience* 15 (2021): 615103. https://doi.org/10.3389/fnins.2021.615103.
4. Samejima, Soshi, Charlotte D. Caskey, Fatma Inanici, et al. "Multisite Transcutaneous Spinal Stimulation for Walking and Autonomic Recovery in Motor-Incomplete Tetraplegia: A Single-Subject Design." *Physical Therapy* 102, no. 1 (2022): pzab228. https://doi.org/10.1093/ptj/pzab228.

Physical Therapy Management of an Ultimate Frisbee Athlete with Chronic Low Back Pain and Haglund's Deformity A Movement System Approach

Austin Aiona

Background and Purpose: Non-specific low back pain and Achilles tendinopathy are common musculoskeletal conditions that can significantly impair function, particularly when occurring concurrently. Achilles tendinopathy associated with Haglund's deformity involves structural irritation at the tendon insertion, while proximal impairments such as reduced lumbopelvic control and hip strength may alter load distribution throughout the kinetic chain. These combined factors can increase mechanical stress during higher-level activities, such as running and participation in sports. The purpose of this case report is to demonstrate the use of a movement system approach within region-specific rehabilitation to address multi-segment impairments and improve load tolerance for return to sport.

Setting: Outpatient orthopedic physical therapy clinic.

Case Description: A 26-year-old recreational athlete presented with persistent mid-to-low back pain and chronic bilateral Achilles pain associated with Haglund's deformity. Symptoms were provoked by prolonged driving, running, and participation in sports, limiting tolerance for sustained postures and higher-impact activities. Evaluations revealed lumbar hypermobility, thoracolumbar stiffness, impaired lumbopelvic control, proximal hip weakness, restricted hip mobility, and ankle dorsiflexion deficits with reduced medial arch control, causing inefficient load distribution.

Outcomes: After 5 weeks, the patient progressed from limited driving tolerance and avoidance of running to driving greater than 3 hours without symptoms and initiating a return-to-running program with minimal discomfort. Improvements in strength and motor control were accompanied by increased tolerance to hopping and running without Achilles pain.

Discussion: This case demonstrates the interaction between proximal impairments and distal structural factors, including Haglund's deformity, contributing to altered load distribution. Improvements in motor control, strength, and tendon load tolerance support regional interdependence. Outcomes reflect early adaptations with continued progression needed for a full return to sport.

Selected References:

1. Beyer R, Kongsgaard M, Hougs Kjær B, et al. Heavy slow resistance versus eccentric training as treatment for Achilles tendinopathy: a randomized controlled trial. Am J Sports Med. 2015;43(7):1704-1711. doi:10.1177/0363546515584760
2. Cook JL, Purdam CR. Is tendon pathology a continuum? A pathology model to explain the clinical presentation of load-induced tendinopathy. Br J Sports Med. 2009;43(6):409-416. doi:10.1136/bjsm.2008.051193
3. George SZ, Fritz JM, Silfies SP, et al. Interventions for the management of acute and chronic low back pain: Revision 2021. J Orthop Sports Phys Ther. 2021;51(11):CPG1-CPG60. doi:10.2519/jospt.2021.0304
4. Vaishya R, Agarwal AK, Azizi AT, Vijay V. Haglund's syndrome: A commonly seen mysterious condition. Cureus. 2016;8(10):e820. doi:10.7759/cureus.820.
5. Van Dillen LR, Sahrmann SA, Norton BJ, et al. Movement system impairment-based categories for low back pain: Stage 1 validation. J Orthop Sports Phys Ther. 2003;33(3):126-142. doi:10.2519/jospt.2003.33.3.126

Physical Therapy Management of Non-Complex Knee Injury in Pediatric Patients with Post-Concussion Syndrome

Nathan Bright

Background and Purpose: Non-Complex knee injury in the pediatric athlete is one of the more common results of sports participation during adolescence. However, the physical therapy management is complicated by subsequent neurological insult and resulting Post-Concussion Syndrome in the athlete. The purpose of this paper is to examine evaluation and treatment strategies for acute knee injury in pediatric athletes and how that treatment and plan of care shift when complicated by a neurological insult.

Case Description: The patient is a 13 year-old female with a history of high level sports participation in basketball, soccer, tumbling, and theater production. She has a history of prior concussion, ankle sprains, and various non-emergent injuries. During treatment for her knee injury, she sustained a severe concussion resulting in a hospital stay and examination by neurological specialists. The concussion and receipt of medical diagnosis of Post-Concussion Syndrome had direct impacts on her function and progress in physical therapy treatment. Treatment shifted to address neurological insult and concussion symptoms, while simultaneously addressing a regression in knee function.

Outcomes: Over the following 12 weeks of treatment for her concussion we saw improvements in neurological symptoms as well as lower extremity strength, reduction in pain, and increased participation in preferred activities.

Discussion and Conclusions: This case represents an intersection between musculoskeletal and neurological impairments that happens frequently in youth sports. When sports injury occurs simultaneously with neurological insult it emphasizes the need for a thorough evaluation, quality subjective interview that goes beyond just the acute injury as well as treatment that is flexible to match the patient's function, goals, and irritability.

Key Words: Post-Concussion Syndrome, Pediatric, Physical Therapy

Selected References:

1. Leddy JJ, Baker JG, Willer B. Active Rehabilitation of Concussion and Post-concussion Syndrome. Phys Med Rehabil Clin N Am. 2016 May;27(2):437-54. doi: 10.1016/j.pmr.2015.12.003. PMID: 27154855.
2. Gajalakshmi G, Meenakshi S. Understanding the psycho-social problems of vulnerable adolescent girls and effect of intervention through life skill training. J Educ Health Promot. 2024 Jan 22;12:429. doi: 10.4103/jehp.jehp_612_23. PMID: 38464658; PMCID: PMC10920669.
3. Conder A, Conder R, Friesen C. Neurorehabilitation of Persistent Sport-Related Post-Concussion Syndrome. NeuroRehabilitation. 2020;46(2):167-180. doi: 10.3233/NRE-192966. PMID: 32083597.
4. Kuwabara A, Kraus E, Fredericson M. Narrative Review - Knee Pain in the Pediatric Athlete. Curr Rev Musculoskelet Med. 2021 Jun;14(3):239-245. doi: 10.1007/s12178-021-09708-5. Epub 2021 Apr 5. PMID: 33818701; PMCID: PMC8137791.

Acute physical therapy treatment following vestibular schwannoma removal using translabryrinthine approach

Austin Chau

Background and Purpose: Vestibular schwannoma resection via a translabyrinthine approach results in acute unilateral vestibular loss, often leading to impairments in balance, mobility, and independence. While vestibular rehabilitation is supported in outpatient settings, there is limited guidance for its use in the immediate postoperative period in acute care settings. Early intervention is thought to improve recovery, but treatment parameters in the acute care setting remain sunclear. The purpose of this case report is to describe physical therapy management and outcomes following vestibular schwannoma resection and to explore early intervention postoperatively.

Case Description: The patient is a 57-year-old female who underwent right vestibular schwannoma resection after progressive tinnitus and hearing loss beginning in August 2024. On postoperative day 1, she presented with dizziness/nausea, impaired balance, and required hands on assist with all mobility. Physical therapy focused on early mobilization, gait and balance training, and gaze stability exercises.

Outcomes: From eval to postoperative day 2, Timed Up and Go (TUG) improved from 34 seconds to 18.75 seconds and ambulation increased to 200 feet with contact guard assistance. and Modified Clinical Test of Sensory Integration in Balance (MCTSIB) improved with eyes closed on foam from 7 seconds to 21 seconds. At one month, the patient demonstrated significant improvement in self-reported balance (Activities Activities-specific Balance Confidence Scale (ABC) scoring 85%, Dizziness Handicap Inventory (DHI) score of 10/100) and was independent with ambulation.

Discussion: This case highlights the importance of early, individualized intervention in the acute care setting. Early focus on functional mobility, and tolerable bouts of vestibular challenge seems effective at improving outcomes, though further research is needed to guide practice.

Key Words: Vestibular schwannoma; vestibular rehabilitation; acute care; balance; unilateral vestibular hypofunction; physical therapy

Selected references:

1. Michel L, Laurent T, Alain T. Rehabilitation of dynamic visual acuity in patients with unilateral vestibular hypofunction: earlier is better. Eur Arch Otorhinolaryngol. 2020 Jan;277(1):103-113. doi: 10.1007/s00405-019-05690-4. Epub 2019 Oct 21. PMID: 31637477.
2. Hall CD, Herdman SJ, Whitney SL, et al. Vestibular rehabilitation for peripheral vestibular hypofunction: an evidence-based clinical practice guideline: from the American Physical Therapy Association Neurology Section. J Neurol Phys Ther. 2016;40(2):124-155.
3. Whitney SL, Alghwiri AA, Alghadir A. An overview of vestibular rehabilitation. Handb Clin Neurol. 2016;137:187-205.
4. Kao LC, Cohen HS. Early vestibular rehabilitation after acoustic neuroma resection: outcomes and clinical implications. J Vestib Res. 2014;24(5-6):403-410.
5. Gupta VK, Thakker A, Gupta KK. Vestibular Schwannoma: What We Know and Where We are Heading. Head Neck Pathol. 2020;14(4):1058-1066. doi:10.1007/s12105-020-01155-x

Acute physical therapy treatment following vestibular schwannoma removal using translabryrinthine approach

Sean Andrew - Chevalier

Background and Purpose: Neurological insult within 24 hours of transcatheter aortic valve replacement (TAVR), although rare, is a potential risk of this surgery. This case study examines the physical therapy assessment and intervention for a patient that experienced ischemic stroke following a TAVR as well as the interaction of the patient's medical complexity with the plan of care delivery and prognosis.

Case Description: The patient was a 60-year-old female who was admitted to the emergency department with intractable pain related to bilateral lower extremity (BLE) wounds and atrial fibrillation. After undergoing a TAVR procedure, an acute ischemic right Middle Cerebral Artery Cerebrovascular accident was found on MRI. Relevant co-morbidities included; scleroderma, rheumatic heart disease, atrial fibrillation, mitral flutter, previous tricuspid valve replacement, cirrhosis, hepatitis C, congestive heart failure, gout, chronic non-healing BLE wounds and multiple prior hospitalizations. Treatment consisted of functional mobility training, gait training, neuromuscular reeducation and balance training.

Outcomes: The patient was discharged from the acute inpatient hospital setting to an acute rehabilitation facility (ARF). By the time of discharge from the ARF, the patient met all her functional physical therapy goals including safe bed mobility, functional transfers, and ambulation.

Discussion: In this case, we discuss the impact of physical therapy evaluation and intervention for stroke patients, especially in the setting of increased medical complexity. Use of functional outcome measures during rehabilitation for patients' post-stroke can help provide prognostic value and guidance for targeted intervention.

Conclusion: This case study emphasizes the importance of physical therapy assessment, intervention, use of targeted outcome measures, and discharge planning for a medically complex patient who experienced a post-operative acute neurologic injury.

Key words: Cerebrovascular Accident, Stroke, Physical Therapy, Comorbidities.

Selected References:

1. Wright, J. R., Koch-Hanes, T., Cortney, C., Lutjens, K., Raines, K., & Young, D. (2023). Quantifying the Risk for Hospital Readmission When Physical Therapist Discharge Recommendations Are Not Followed. *Journal of Acute Care Physical Therapy*, *Publish Ahead of Print*. https://doi.org/10.1097/jat.0000000000000212 Links to an external site.
2. West, T., Churilov, L., & Bernhardt, J. (2013). Early Physical Activity and Discharge Destination after Stroke: A Comparison of Acute and Comprehensive Stroke Unit Care. *Rehabilitation Research and Practice*, *2013*, 1–9. https://doi.org/10.1155/2013/498014 Links to an external site.
3. An, M., & Shaughnessy, M. (2011). The Effects of Exercise-Based Rehabilitation on Balance and Gait for Stroke Patients. *Journal of Neuroscience Nursing*, *43*(6), 298–307. https://doi.org/10.1097/jnn.0b013e318234ea24 Links to an external site.
4. West, T., Churilov, L., & Bernhardt, J. (2013). Early Physical Activity and Discharge Destination after Stroke: A Comparison of Acute and Comprehensive Stroke Unit Care. *Rehabilitation Research and Practice*, *2013*, 1–9. https://doi.org/10.1155/2013/498014 Links to an external site.

Physical Therapy Management of Post-Surgical Dorsal Hallux Metatarsophalangeal Joint Cheilectomy

Peyton Colee

Background and Purpose: Hallux rigidus, or first metatarsophalangeal (MTP) joint osteoarthritis, is the second most common degenerative condition affecting the foot, and is commonly treated with a surgery after a failed trial of conservative treatment. The purpose of this case study was to demonstrate the post-surgical rehabilitation for first MTP Cheilectomy.

Case Description: The patient described in this case report was a 68 year old male presenting post first MTP cheilectomy surgery with a history of chronic arthritis and gout, and pain with functional movements and activities of daily living (ADL's). Initial treatment was focused on restoring range of motion (ROM) in the ankle, foot, and first MTP joint, as well as strengthening foot intrinsic muscles. Additionally, later treatment focused on balance exercises and gait mechanics.

Outcomes: After a 12 week physical therapy course, the patient regained full ROM and strength in the left foot and ankle and returned to his prior level of function (PLOF) with his exercise routine and hobbies. **Discussion and Conclusions:** Although there is a lack of current research for specific protocols to follow for post-cheilectomy rehabilitation, the patient had good outcomes with physical therapy management from first MTP Cheilectomy surgery that focused on restoring ankle ROM, strengthening foot intrinsic muscles, and focusing on balance and gait mechanics.

Key Words: Hallux Rigidus, Physical Therapy, Dorsal MTP Cheilectomy

Selected References:

1. Glenn, R. L., Gonzalez, T. A., Peterson, A. B., & Kaplan, J. (2021). Minimally invasive dorsal cheilectomy and hallux metatarsal phalangeal joint arthroscopy for the treatment of hallux rigidus. Foot & Ankle Orthopaedics, 6(1), 2473011421993103.
2. Anderson, M. R., Ho, B. S., & Baumhauer, J. F. (2023). Republication of "current concepts review: hallux rigidus". Foot & Ankle Orthopaedics, 8(3), 24730114231188123.
3. Coughlin, M. J., & Shurnas, P. S. (2003). Hallux rigidus: grading and long-term results of operative treatment. JBJS, 85(11), 2072-2088.

Delayed Outpatient Physical Therapy Treatment Following Lumbar Decompression and Fusion Surgery 4 Months Post Op

Chantelle Davenport

Background and Purpose: There are many rural towns in the United States. The U.S. Bureau of the Census defines rural areas as open country and areas with fewer than 2,000 housing units and 5,000 residents. In rural areas, access to health care is difficult for many people. The state of Hawaii is generally considered rural due to approximately 6,000 square miles of undeveloped land, which makes up 93.9% of Hawaii's total land area. Living in a rural area can delay care and negatively impact outcomes. The purpose of this case study is to present potential barriers to effective management in Hawaii, using this case as an example.

Case Description: The patient is a 55-year-old female referred to an outpatient orthopedic physical therapy facility for initial evaluation 4 months postoperative lumbar decompression and fusion surgery due to a work-related injury. The patient's initial functional performance was not at expected postoperative recovery levels. Physical therapy treatment incorporated teach-back methods into balance and strengthening exercises for the nerve roots affected by the surgery, core stabilization exercises, and functional exercises.

Outcomes: The patient met 3 of 6 goals within the first 6 weeks of care. She improved her 5-times sit-to-stand score from 15 seconds to
9 seconds and her Functional Gait Assessment score from 9 to 13 out of 30, reducing her risk of falls. **Discussion and Conclusion:** Outcomes improved despite a delay in care. Rural areas present a barrier to recovery that may be overcome with consistent adherence to care. Further studies should investigate the influence of the teach-back method on patient adherence, patient-reported outcomes, and clinical measures among those in rural areas with limited healthcare resources.

Keywords: Rural health care, Lumbar decompression and fusion surgery, Physical therapy, Teach back method

Selected References:

1. Wade SM, Fredericks DR, Elsenbeck MJ, et al. The incidence, risk factors, and complications associated with surgical delay in multilevel fusion for adult spinal deformity. GSJ. 2020;12(3):441-446. doi:10.1177/2192568220954395
2. Javed A. Bridging the health care gap in rural populations: Challenges, innovations, and solutions. AJM. 2025;138(5):761-762. doi:10.1016/j.amjmed.2025.01.008
3. Marques LBF, Moreira BS, Ocarino JM, Sampaio RF, Bastone AC, Kirkwood RN. Construct and criterion validity of the functional gait assessment-Brazil in community-dwelling older adults. Braz J Phys Ther. 2021;25(2):186-193. doi:10.1016/j.bjpt.2020.05.008
4. Albalwi AA, Alharbi AA. Optimal procedure and characteristics in using five times sit to stand test among older adults: A systematic review. Medicine. 2023;102(26). doi:10.1097/md.0000000000034160
5. Holbert SE, Andersen K, Stone D, Pipkin K, Turcotte J, Patton C. Social determinants of health influence early outcomes following lumbar spine surgery. Ochsner J. 2022;22(4):299-306. doi:10.31486/toj.22.0066

Evaluation and Treatment of a Patient with Greater Trochanteric Pain Syndrome: A Case Study

Shannon Delaney Eddy

Background and Purpose: Greater Trochanteric Pain Syndrome is a common orthopedic condition with symptoms of sharp point tenderness over the lateral aspect of the hip. There is extensive evidence that supports the physical therapy management of this condition alone but limited evidence that explores its development and management in a more diverse patient contextualization, such as with those with chronic pain. The purpose of this paper is to explore the relationship and management of longstanding chronic pain and the emergence of regional pain syndromes, such as greater trochanteric pain syndrome (GTPS).

Case Description: Patient is a 72-year-old female referred to physical therapy (PT) for left sided hip pain and chronic low back pain (LBP). The patient was treated with conservative physical therapy interventions including manual therapy techniques, modalities, and progressive strengthening focusing hip and core musculature with therapeutic exercise.

Outcomes: In 10 weeks, the patient demonstrated notable improvements in lower extremity (LE) strength and range of motion, as well as major improvements in lateral hip and low back pain. The patients Lower Extremity Functional Scale outcome measure score, increased from 33 to 73 indicating almost complete resolution of disability and substantial functional recovery.

Discussion and conclusion: Patient completed a 15-session treatment plan with consistent attendance and adherence to progressive HEP. Patient experienced full resolution of Left hip pain and substantial decrease in otherwise symptomatic low back pain which may support the effectiveness of treating both the acute musculoskeletal impairment as well as the chronic low back pain.

Key Words: Greater Trochanteric Pain Syndrome, chronic low back pain, outpatient physical therapy, pain neuroscience education.

Selected References:

1. Binkley JM, Stratford PW, Lott SA, Riddle DL. The Lower Extremity Functional Scale (LEFS): Scale development, measurement properties, and clinical application. Phys Ther. 1999;79(4):371-383.
2. Mehta SP, Fulton A, Quach C, Thistle M, Toledo C, Evans NA. Measurement properties of the Lower Extremity Functional Scale: A systematic review. J Ortho Sports Phys Ther. 2016;46(3):200-216.
3. Stratford PW, Kennedy DM. Does parallel item content on the Lower Extremity Functional Scale exhibit differential item functioning? Phys Ther. 2004;84(12):1196-1204.
4. Farrar JT, Young JP Jr, LaMoreaux L, Werth JL, Poole RM. Clinical importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. Pain. 2001;94(2):149-158.

Physical Therapy Management of Return to Heavy Deadlifting in a Patient with Chronic Low Back Pain and Associated Kinesiophobia

Alicia Evans

Background and Purpose: The return to heavy lifting must be appropriately addressed in physical therapy rehabilitation of patients with low back pain due to lifting requirements of daily life, jobs, and sports. Perceptions of lifting as dangerous for the low back contribute to kinesiophobia in those with low back pain, which can lead to altered lifting mechanics, heightened anticipatory pain perceptions, and increased disability. Addressing and treating kinesiophobia regarding heavy lifting is an essential component of low back pain rehabilitation. Ameliorating kinesiophobia may help to reduce compensatory mechanics, pain, and associated disability. The purpose of this case study is to examine physical therapy management of low back pain and kinesophobia with a goal to return to heavy lifting.
Case Description: The patient is a 42-year-old male active-duty U.S. Army paratrooper with chronic recurrent low back pain attributed to lumbar intervertebral disc degeneration and lumbar radiculopathy. The patient was required to perform a three repetition 250-pound deadlift for the Army Fitness Test. Examination revealed painful limitations in lumbar spine range of motion and hip strength, and reliance on Valsalva maneuver during strength testing. **Outcomes:** Interventions were modalities, mobility, core and posterior chain strengthening, and addressing kinesiophobia with deadlift mechanics training which progressed to a straight barbell with heavy load. Over the treatment period the patient improved his tolerance to lifting as evidenced by completing the Army deadlifting test without pain, however his self-reported modified Oswestry Disability Index score increased 8%.
Discussion and Conclusions: This paper highlights the importance of identifying and addressing task-specific kinesiophobia over the course of rehabilitation. In the case of chronic low back pain and return to heavy deadlifting, physical therapy management must target fear-altered mechanics for a full return to function.

Key Words: chronic low back pain; kinesiophobia; physical therapy; deadlift; radiculopathy

Selected References:

1. Godges J, Norman K, George S, Fritz J, Silfies S, Schneider M. Low Back Pain Decision Tree. Orthopaedic Physical Therapy Practice. 2021. Accessed December 8, 2025. https://www.orthopt.org/uploads/content_files/files/FINAL_ALL_LBP_CPG_Revision_Decision_Tree_2021.pdf.
2. Tataryn N, Simas V, Catterall T, Furness J, Keogh JWL. Posterior-Chain Resistance Training Compared to General Exercise and Walking Programmes for the Treatment of Chronic Low Back Pain in the General Population: A Systematic Review and Meta-Analysis. *Sports Med Open*. 2021;7(1):17. Published 2021 Mar 8. DOI:10.1186/s40798-021-00306-w
3. Ross R, Han J, Slover J. Chronic Lower Back Pain in Weight Lifters: Epidemiology, Evaluation, and Management. *JBJS Rev*. 2023;11(6):10.2106/JBJS.RVW.22.00228. Published 2023 Jun 14. DOI:10.2106/JBJS.RVW.22.00228
4. Knechtle D, Schmid S, Suter M, et al. Fear-avoidance beliefs are associated with reduced lumbar spine flexion during object lifting in pain-free adults. *Pain*. 2021;162(6):1621-1631. DOI:10.1097/j.pain.0000000000002170
5. Fujii R, Imai R, Tanaka S, Morioka S. Kinematic analysis of movement impaired by generalization of fear of movement-related pain in workers with low back pain. *PLoS One*. 2021;16(9):e0257231. Published 2021 Sep 17. DOI:10.1371/journal.pone.0257231

Physical Therapy Management of an Older Adult Undergoing Total Knee Arthroplasty with Challenges of Caregiver Support

Jenin Farajallah

Background and Purpose: Total knee arthroscopy (TKA) is a common elective procedure for end-stage knee osteoarthritis (OA), and the expected demand will exponentially increase as the population ages. There is extensive research regarding physical therapy management prior to and following TKA; however, there is limited research regarding challenges in rehabilitation when one is a primary caregiver to an elderly spouse. This case study examines the challenges of caregiver support in an older adult prior to and following TKA.

Case Description: The patient was an 82-year old female referred to outpatient physical therapy by her surgeon for pre-operative rehabilitation prior to TKA. She experienced severe knee pain, limitations in performing activities of daily living (ADLs), headaches and dizziness, fear of falling, and general fatigue due to being the primary caregiver to her husband with dementia. This patient had range of motion limitations, especially knee extension, and gross hip and knee weakness. Physical therapy treatment consisted of gait training, knee active range of motion (AROM), lower extremity strengthening, stair training, and balance exercises. She participated in five physical therapy sessions prior to TKA and this author obtained follow up measures four and seven weeks post-op.

Outcomes: The patient demonstrated progress with gait, stair navigation, and balance prior to TKA, but experienced high levels of right knee pain and knee AROM limitations following TKA which limited her ability to perform ADLs and participate in physical therapy sessions. LEFS and KOOS were performed and no appreciable change in scores were noted at 7 weeks post operatively. Discussion and Conclusion: It is essential for Physical Therapists to address caregiver duties and responsibilities when assisting in a post-operative plan of care as the stressors and challenges of the caregiver experience can be heightened following surgery. The role reversal of the patient as both caregiver and surgical patient further highlights the need to acknowledge the burden and strain caregiving can have on pre-operative and post-operative care. Physical Therapists are in a unique position to support a return to ADLs, including caregiving responsibilities.

Selected References:

1. Etters L, Goodall D, Harrison BE. Caregiver burden among dementia patient caregivers: A review of the literature. Journal of the American Academy of Nurse Practitioners. 2008;20(8):423-428. doi:10.1111/j.1745-7599.2008.00342.x
2. Mullins S, Hosseini F, Gibson W, Thake M. Physiological changes from ageing regarding pain perception and its impact on pain management for older adults. *Clin Med (Lond)*. 2022;22(4):307-310. doi:10.7861/clinmed.22.4.phys
3. Page BM, Urbach DR, Wolfstadt JI, Clavel N, Brull R. Beast of burden? Understanding the impact of outpatient total hip and knee replacement on caregivers at home. Canadian journal of anesthesia. 2022;69(4):423-426. doi:10.1007/s12630-021-02140-w
4. Sontag-Milobsky IL, Selph TJ, Madhan A, et al. Caring for the Caregiver: Caregiver Preparation and Stress Following Total Joint Arthroplasty. The Journal of arthroplasty. Published online 2025. doi:10.1016/j.arth.2025.11.053
5. Wallis JA, Gearon E, Naylor J, et al. Barriers, enablers and acceptability of home-based care following elective total knee or hip replacement at a private hospital: A qualitative study of patient and caregiver perspectives. *PLoS One*. 2022;17(8):e0273405. Published 2022 Aug 24. doi:10.1371/journal.pone.0273405

Physical Therapy of an Older Adult 27 years Post-fibromatosis and Tumor Resection: A Case Study

Joshua Feikes,

Background and Purpose: Fibromatosis is a rare, non-metastatic soft-tissue tumor with variable long-term functional deficits following surgery. Evidence for the effectiveness of physical therapy decades after treatment is limited. This case study describes physical therapy in an outpatient orthopedic setting for an 81-year-old male, 27 years post-tumor excision and limb salvage surgery in the left lower extremity. The patient sought to improve fall recovery during skiing and functional mobility.

Case Description: The patient presented with chronic neuromuscular deficits, including diminished sensation in a femoral nerve distribution, reduced knee extension strength, impaired single-leg balance, and reported fatigue with activities. Dynamometry revealed a left knee extension peak force at 55.04lbs compared to 105.5lbs on the right. Functional limitations included difficulty rising after falls while skiing and reduced endurance when carrying heavy objects. Interventions: Over 8 visits over 11 weeks, the patient completed a program emphasizing single-leg strengthening, step-up variations, balance training, and exercises that mirror skiing and daily activities. The patient performed a home exercise program 3-4 times per week.

Outcomes: By week 7, the patient had increased left knee extension to 63.56lbs, a significant improvement. Increased single-leg balance on foam on the left leg from 3 to 14 seconds. The patient reported fewer episodes of their left leg "giving out" and increased confidence in recreational activities.

Discussion and Conclusion: This case demonstrates that meaningful gains in strength, balance, and function are achievable decades after oncologic and reconstructive procedures.

Key Words: Fibromatosis, Desmoid Tumor, Tumor Resection, Limb Salvage Surgery, Outpatient, Physical Therapy, Older Adult

Selected References:

1. Master SR, Mangla A, Shah C. Desmoid Tumor. Updated March 1, 2024. In: *StatPearls [Internet].* StatPearls Publishing; 2025. Accessed 2025. https://www.ncbi.nlm.nih.gov/books/NBK459231/
2. 2.Shields CJ, Winter DC, Kirwan WO, Redmond HP. Desmoid tumours. *European Journal of Surgical Oncology.* 2001;27(8):701-706. doi:10.1053/ejso.2001.1169
3. 3.Alman B, Attia S, Baumgarten C, et al. The management of Desmoid Tumours: A joint global consensus-based guideline approach for adult and paediatric patients. *European Journal of Cancer.* 2020;127:96-107. doi:10.1016/j.ejca.2019.11.013
4. 4.Heller L, Kronowitz SJ. Lower extremity reconstruction. *Journal of Surgical Oncology.* 2006;94(6):479-489. doi:10.1002/jso.20485
5. 5.Liu C, Latham NK. Progressive resistance strength training for improving physical function in older adults. *Cochrane Database of Systematic Reviews.* 2009;(1):CD002759. doi:10.1002/14651858.CD002759.pub2

Physical Therapy Management Following Total Knee Arthroplasty: A Case Report Integrating Salsa-Based Balance Training

Yili Fu

Background and Purpose: Total knee arthroplasty (TKA) is commonly performed for end-stage knee osteoarthritis, though postoperative impairments in balance, gait symmetry, and functional mobility may persist during early recovery. The purpose of this case report is to describe the outpatient physical therapy management of a patient following right TKA, with emphasis on integrating salsa-based dynamic balance training to improve gait symmetry, weight shifting, and functional mobility.

Case Description: The patient was a 63-year-old male referred to outpatient physical therapy following right total knee arthroplasty for end-stage osteoarthritis. Initial examination findings demonstrated impaired dynamic balance, reduced standing tolerance, decreased knee range of motion and strength, pain with weight-bearing activities, and gait deviations including excessive lateral weight shift and widened base of support. Physical therapy intervention focused on progressive strengthening, gait training, balance training, and rhythm-based stepping activities incorporating salsa dance movement patterns.

Outcomes: Following nine weeks of outpatient physical therapy, the patient demonstrated improvements in knee ROM, gait, balance, and functional mobility. Right knee flexion improved from 84° to 126°, and Forward Reach Test performance improved from 11 to 15.6 inches. By week seven, the patient achieved a Dynamic Gait Index score of 20/24 and progressed from ambulation with a front-wheeled walker to independent short-distance ambulation. The patient also returned to driving and light gym-based exercise.

Discussion and Conclusions: This case report highlights the potential benefits of rhythm-based, task-specific balance interventions as an adjunct to traditional rehabilitation following total knee arthroplasty. Incorporation of salsa-based dynamic balance training provided a meaningful approach to address impairments in weight shifting, postural control, and gait symmetry while supporting patient engagement in rehabilitation.

Key Words: total knee arthroplasty, total knee replacement, dynamic balance training, gait rehabilitation, salsa-based intervention, outpatient physical therapy

Selected References:

1. Bakaa N, Chen LH, Carlesso L, Richardson J, Macedo L. Reporting of post-operative rehabilitation interventions for total knee arthroplasty: a scoping review. BMC Musculoskelet Disord. 2021;22:602. doi:10.1186/s12891-021-04460-
2. Cross M, Smith E, Hoy D, et al. The global burden of hip and knee osteoarthritis: estimates from the Global Burden of Disease 2010 study. Ann Rheum Dis. 2014;73(7):1323-1330. doi:10.1136/annrheumdis-2013-204763
3. Domínguez-Navarro F, Igual-Camacho C, Silvestre-Muñoz A, Roig-Casasús S, Blasco JM. Effects of balance and proprioceptive training on total hip and knee replacement rehabilitation: a systematic review and meta-analysis. Gait Posture. 2018;62:68-74. doi:10.1016/j.gaitpost.2018.03.003
4. Dávila Castrodad IM, Recai TM, Abraham MM, et al. Rehabilitation protocols following total knee arthroplasty: a review of study designs and outcome measures. Ann Transl Med. 2019;7(suppl 7):S255. doi:10.21037/atm.2019.07.75
5. Duncan PW, Weiner DK, Chandler J, Studenski S. Functional reach: a new clinical measure of balance. J Gerontol. 1990;45(6):M192-M197. doi:10.1093/geronj/45.6.M192

Patient Centered Rehabilitation Management Following Total Knee Arthroplasty: A Case Report of Functional Recovery

Ana Priscila Espindola Garzon

Background and purpose: Total knee arthroplasty (TKA) is a common surgical intervention for individuals with end stage knee osteoarthritis. Postoperatively there are many impairments such as mobility, strength, and function restrictions. Early and progressive physical therapy is ideal for optimizing recovery. However, protocols can vary based on the patient's specific factors. This case report describes the physical therapy management of a patient following a TKA using the International Classification of Functioning. Disability and Health (ICF) framework.

Case Description: This case follows a 60-year-old female who presented to physical therapy three days post right TKA. She exhibited post operative impairments such as pain, edema, decreased range of motion, reduced muscular activation, altered sensation, and an antalgic gait requiring an assistive device. Her medical history included bilateral knee osteoarthritis, and prior left TKA and total hip arthroplasty. Interventions included early mobilization, patient education, manual therapy, range of motion exercises, neuromuscular re-education, gait training, and progressive quadriceps strengthening. She received therapy twice a week for eight weeks and exercises were progressed based on functional tolerance.

Outcomes: The patient demonstrated improvements in strength, functional performance and mobility. She progressed from using a front-wheeled-walker to independent ambulation. She had improved sit-to-stands and stair navigation. Although not all long-term goals were achieved within the set timeline, she demonstrated increased independence, reduced pain, and improved quality of life.

Discussion and conclusion: This case supports early individualized rehabilitation following a TKA. Treatment focused on progressive quadriceps strengthening, patient education and functional training to promote improved recovery and overall functional mobility. Further research is needed to optimize exercise progression and standardize outcome measures for people following a TKA.

Key Words: Total Knee Arthroplasty, Physical Therapy, Postoperative Care, Quadriceps Strengthening.

Selected References:

1. AAOS updates clinical practice guideline for surgical management of osteoarthritis of the knee. AAOS. Accessed April 19, 2026. https://www.aaos.org/aaos-home/newsroom/press-releases/aaos-updates-clinical-practice-guideline-for-surgical-management-of-osteoarthritis-of-the-knee/.
2. Henderson KG, Wallis JA, Snowdon DA. Active physiotherapy interventions following total knee arthroplasty in the hospital and inpatient rehabilitation settings: A systematic review and meta-analysis. *Physiotherapy*. 2018;104(1):25-35. doi:10.1016/j.physio.2017.01.002
3. King J. Total Knee Arthroplasty (TKA). APTA. October 25, 2011. Accessed April 19, 2026. https://www.apta.org/patient-care/evidence-based-practice-resources/clinical-

Physical Therapy Management of a Patient with Unstable Housing Diagnosed with Acute Ischemic Cerebrovascular Accident: A Case Study

Christina Giang

Background/Purpose: Cerebrovascular accident (CVA) is a neurological condition caused by disrupted cerebral blood flow. Early intervention is critical to minimize brain injury and improve outcomes. Physical therapists play a key role in acute CVA rehabilitation through assessment, early mobilization, neuroplastic recovery, and discharge planning. Individuals experiencing homelessness face barriers to timely care, rehabilitation access, and safe discharge. This case study examines how housing instability alters acute care physical therapy management by shifting rehabilitation priorities towards higher levels of functional independence, increased discharge advocacy, and community-focused mobility goals while discharge disposition remains uncertain within a short hospitalization timeframe.
Setting: Treatment was provided at a 394-bed hospital in an urban-suburban mixed city.
Case Description: The patient was a 62-year-old male with a history of hypertension, peripheral neuropathy, bipolar disorder, depression, and anxiety who presented with right-sided weakness and dysarthria secondary to an acute ischemic CVA. Impairments included decreased strength, balance, gait, and activity tolerance, requiring assistance for all mobility. Additional considerations included permissive hypertension, housing instability, limited social support, and increased time needed to establish therapeutic rapport and trust. Interventions included bed mobility, transfers, gait training, and neuromuscular re-education. Due to the patient's unstable discharge environment, discharge planning and goal development required consideration of higher levels of mobility and independence. Increased interdisciplinary coordination and advocacy were necessary to secure inpatient rehabilitation placement.
Outcomes: The patient demonstrated improvements in bed mobility, transfers, ambulation, Total Basic Mobility Six Click AM-PAC, and 10-Meter Walk Test scores, but did not achieve the established goals at discharge.
Discussion/Conclusion: Several factors may have impacted outcomes, including initial distrust of healthcare providers, housing instability, and the short hospital stay limiting therapy opportunities. Further research is needed to identify optimal rehabilitation strategies for patients experiencing stroke amid social and environmental barriers.
Key Words: CVA, stroke rehabilitation, acute care, housing instability, homelessness
Selected References:

1. Ferriero G, Negrini F, Salgovic L, Ronconi G. Stroke and neuroplasticity: harnessing the brain's adaptive potential for recovery. European Journal of Physical and Rehabilitation Medicine. 2024;60(4):549-551. doi: 10.23736/S1973-9087.24.08679-9.
2. Hurwitz M, Lam J. Unmet needs: Bringing physical rehabilitation to people experiencing homelessness. PM&R. 2025;17(4):445-451. doi:10.1002/pmrj.13311
3. Mariana de Aquino Miranda J, Mendes Borges V, Bazan R, José Luvizutto G, Sabrysna Morais Shinosaki J. Early mobilization in acute stroke phase: a systematic review. Topics in stroke rehabilitation. 2023;30(2):157-168. doi:10.1080/10749357.2021.2008595
4. Omerov P, Craftman ÅG, Mattsson E, Klarare A. Homeless persons' experiences of health and social care: A systematic integrative review. Health and Social Care in the Community. 2020;28:1–11. https://doi.org/10.1111/hsc.12857

Rehab Progression of a Work Induced Injury Post Conservative Care and Surgery Categorized Primarily as a Biceps Tenodesis: A Case Report

Matthew Haber

Background and Purpose: Biceps tenodesis surgery is a relatively common procedure for complaints of anterior shoulder pain with positive imaging findings of degradation to the long head of the biceps tendon. Often biceps tenodesis is not performed in isolation and in some cases other protocols act as the primary guidance for physical therapy. However, for patients with multifactorial surgeries, there is limited research in expected progression and timelines leading to inaccurate patient expectations and heavy reliance on physical therapist judgment.

Case Description: The patient was a 66-year-old male presenting to outpatient therapy 4 weeks post-op right arthroscopic biceps tenodesis, capsular debridement, labral debridement, acromioclavicular joint capsule debridement coracohumeral ligament release and subacromial decompression. The patient reported high pain levels that were easily aggravated. Due to surgical stipulation, pain and tissue restriction treatment focused heavily on improving range of motion and reducing inflammation.

Outcomes: By 10 weeks post-op the patient was achieving nearly 75 percent flexion range of motion of the contralateral side, reported reduced pain relative to preoperatively and was initiating early stages of strength training.

Discussion and Conclusion: Most of the protocols on rehabilitation of biceps tenodesis focus on those with isolated procedures. This case adds to the body of information for more complex surgeries and points to the level of preoperative pain, period of continued degeneration through heavy use post injury and complexity of work injuries as possible factors in higher inflammation and need to adjust expectations and timelines for rehabilitation progression.

Selected References:

1. AlQahtani SM, Bicknell RT. Outcomes following long head of biceps tendon tenodesis. *Curr Rev Musculoskelet Med*. 2016;9(4):378-387. doi:10.1007/s12178-016-9362-7
2. Krupp RJ, Kevern MA, Gaines MD, Kotara S, Singleton SB. Long head of the biceps tendon pain: differential diagnosis and treatment. *J Orthop Sports Phys Ther*. 2009;39(2):55-70. doi:10.2519/jospt.2009.2802
3. Hsu AR, Ghodadra NS, Provencher MT, Lewis PB, Bach BR. Biceps tenotomy versus tenodesis: a review of clinical outcomes and biomechanical results. *J Shoulder Elbow Surg*. 2011;20(2):326-332. doi:10.1016/j.jse.2010.08.019
4. Diplock B, Hing W, Marks D. The long head of biceps at the shoulder: a scoping review. *BMC Musculoskelet Disord*. 2023;24(1):232. Published 2023 Mar 28. doi:10.1186/s12891-023-06346-5
5. Glover MA, Restrepo A, Recker AJ, et al. An Expedited Sling Immobilization Protocol After Isolated Biceps Tenodesis Results in Clinical and Patient-Reported Postoperative Outcomes Equivalent to a Standard Rehabilitation Protocol. *Arthrosc Sports Med Rehabil*. 2023;6(1):100840. Published 2023 Dec 19. doi:10.1016/j.asmr.2023.100840

Physical Therapy Management of ACL Recovery in Women Using Quadricep Grafts Experiencing Fear of Returning to Prior Level of Function- A Case Study

Janelle Hoganson

Background and Purpose: West Nile virus (WNV) is a mosquito-borne infection that is asymptomatic in most individuals but can lead to neuroinvasive disease in a small percentage of cases, causing muscle weakness, paralysis, and impaired motor control. These neurologic deficits increase fall risk and may contribute to secondary traumatic spinal cord injury (SCI), a condition that disrupts motor, sensory, and autonomic function and often results in long-term disability and rehabilitation needs. This purpose of this case study is to highlight the clinical course and rehabilitation outcomes of a patient with WNV-related weakness who sustained an SCI following a fall, emphasizing the role of targeted physical therapy in restoring function and promoting independence.
Setting: Treatment was provided at an outpatient, orthopedic physical therapy clinic that specializes in sports-related injuries.
Case Description: This patient is a 67-year-old Male with history of West Nile Virus who developed severe weakness, fatigue, cognitive deficits, and eventually a fall in his home that impinged his spinal cord at the C4-C5 level. Initial exam focused on assessing limitations in strength, activity tolerance, and functional mobility. Physical therapy interventions consisted of therapeutic exercise, therapeutic activity, and neuromuscular re-education. Specifically, the focus in the patient's early plan of care was patient education, transfer training, and functional strength training.
Outcomes: Objective measures were recorded at initial evaluation and at the patient's progress note at the end of the case study timeline. At initial evaluation, the patient required maximum assistance for sit to stand transfers and demonstrated significantly decreased activity tolerance. The patient was also unable to initiate stepping and collapsed into a chair after three standing weight shifts. Upon the patients' last re-assessment, the patient required moderate assistance for transfers and improved activity endurance tolerate ten repetitions of sit to stand transfers with fifteen lateral weight shifts between each repetition. The patient was still unable to complete a complete step; however, it can be inferred that the patient was limited by psychological factors.
Discussion: The findings in this case report highlight the potential for functional gains through task-specific, evidence-based rehabilitation, even in individuals with chronic neurologic injury and complex presentations.

Selected References:

1. Sejvar JJ, Haddad MB, Tierney BC, et al. Neurologic manifestations and outcome of West Nile virus infection. JAMA. 2003;290(4):511-515. https://pmc.ncbi.nlm.nih.gov/articles/PMC3023428/
2. Sampathkumar P. West Nile virus: epidemiology, clinical presentation, diagnosis, and prevention. Mayo Clin Proc. 2011;86(11):1130-1139. https://pmc.ncbi.nlm.nih.gov/articles/PMC7125680/
3. Centers for Disease Control and Prevention (CDC). About West Nile. Updated September 10, 2025. Accessed January 31, 2026. https://www.cdc.gov/west-nile-virus/about/index.html
4. Fratkin JD, Leis AA, Stokic DS, Slavinski SA, Geiss RW. Spinal cord neuropathology in human West Nile virus infection. Arch Pathol Lab Med. 2004;128(5):533-537. https://pubmed.ncbi.nlm.nih.gov/15086282/
5. Patel H, Sander B, Nelder MP. Long-term sequelae of West Nile virus–related illness: a systematic review. Lancet Infect Dis. 2021;21(9):e232-e246. https://pmc.ncbi.nlm.nih.gov/articles/PMC8533846/

Conservative Management of a Suspected Lateral Meniscal Injury in a High-Demand Healthcare Worker

Gray Jones

Background and Purpose: More than one in five healthcare workers are nurses. Much of a nurse's day is spent on their feet, lifting, bending, and twisting. Meniscal injuries are a common source of knee pain and functional limitation and may contribute to long-term joint degeneration. Exercise-based rehabilitation is increasingly recommended as a first-line intervention for many meniscal pathologies. This case report describes the conservative physical therapy management of an ICU nurse with a suspected lateral meniscal injury, emphasizing adaptive load management in the presence of fluctuating symptoms.

Case Description: The patient was an adult ICU nurse presenting after a fall during a run with lateral knee pain, mechanical symptoms with rotational movements, and limited tolerance for walking, squatting, and occupational tasks. Radiographs were negative for fracture. Physical therapy interventions included progressive strengthening, neuromuscular re-education, manual therapy, and graded exposure to functional and work-related activities. Treatment required frequent modification due to symptom exacerbations associated with occupational and daily activity demands.

Outcomes: After 19 visits over eight weeks, the patient demonstrated reduced pain (worst NPRS decreased from 5–7/10 to 3/10), improved gait mechanics, and increased walking tolerance from less than 10 minutes to over 30 minutes. PROMIS Physical Function improved from 41.37 to 48.45. Functional improvements included normalized gait, independent stair negotiation, and return to modified work duties, although higher-load tasks such as deep squatting and heavy lifting remained symptomatic.

Discussion & Conclusions: This case supports conservative rehabilitation as an effective management strategy for suspected meniscal pathology in individuals with high physical demands. However, it also highlights that patients do not always present or progress in a predictable manner consistent with standardized rehabilitation protocols. Symptom exacerbations related to occupational demands required ongoing modification of exercise dosage and activity recommendations. These findings suggest a need for more detailed and rigorous rehabilitation guidelines that address progression toward higher-load, work-specific tasks, particularly for individuals in physically demanding roles. Continued rehabilitation may be necessary to safely restore tolerance to these demands and support full return to unrestricted function.

Key Words: Meniscal Tear, Knee Pain, Physical Therapy, Conservative Management, Load Management

Selected References:

1. Gee SM, Posner M. Meniscus anatomy and basic science. *Sports Med Arthrosc Rev*. 2021;29(3):e18-e23. doi:10.1097/JSA.0000000000000327
2. Petersen W, Karpinski K, Bierke S, Müller Rath R, Häner M. A systematic review about long-term results after meniscus repair. *Arch Orthop Trauma Surg*. 2022;142(5):835-844. doi:10.1007/s00402-021-03906-z
3. Snoeker BA, Zwinderman AH, Lucas C, Lindeboom R. A clinical prediction rule for meniscal tears in primary care: development and internal validation using a multicentre study. *Br J Gen Pract*. 2015;65(637):e523-e529. doi:10.3399/bjgp15X686089
4. Skou ST, Hölmich P, Lind M, et al. Early surgery or exercise and education for meniscal tears in young adults. *NEJM Evidence*. 2022;1(2). doi:10.1056/EVIDoa2100038

Physical Therapy Management of Multifocal Right-Sided Pain with Co-occurring Hypochondriasis

Tyler Le

Background and Purpose: Anxiety regarding one's own health outcomes is incredibly profound to many individuals, with the desire to live a healthful life to the best of our ability without the worry of underlying pathology. However, there are such individuals that experience this phenomenon both more regularly and more intensely than others, a diagnosis referred to as hypochondriasis. Extensive evidence has been surveyed that a large proportion of patients that attend physical therapy experience psychological distress, but it is also researched how positive our role is in developing a therapeutic alliance by treating symptoms beyond pain.

Case Description: The patient is a 35-year-old male being seen in an outpatient orthopedic physical therapy clinic for an initial evaluation due to a neck strain. On evaluation, he reported unilateral right-sided pain and weakness at multiple focal points. Throughout treatment he exhibited signs and symptoms of his ongoing anxiety. Physical therapy treatment consisted of cognitive behavioral therapy, pain science education, and therapeutic activity.

Outcomes: Patient demonstrated progression with each successive visit, self-discharging after 3 weeks.

Discussion and Conclusion: The patient self-discharging prevented the opportunity for repeating the objective measures that were accomplished on initial evaluation, but it highlights the importance and magnitude of the physical therapists' role. The case brings forth discussion about the ongoing research regarding mental health and how to improve the delivery of physical therapy intervention to achieve desired outcomes while minimizing the adverse effects of anxiety.

Selected References:

1. Aylett E, Small N, Bower P. Exercise in the treatment of clinical anxiety in general practice - a systematic review and meta-analysis. *BMC Health Serv Res*. 2018;18(1):559. Published 2018 Jul 16. doi:10.1186/s12913-018-3313-5
2. Herbert MS, Goodin BR, Pero ST 4th, et al. Pain hypervigilance is associated with greater clinical pain severity and enhanced experimental pain sensitivity among adults with symptomatic knee osteoarthritis. *Ann Behav Med*. 2014;48(1):50-60. doi:10.1007/s12160-013-9563-x
3. Lennon O, Ryan C, Helm M, et al. Psychological Distress among Patients Attending Physiotherapy: A Survey-Based Investigation of Irish Physiotherapists' Current Practice and Opinions. Physiother Can. 2020;72(3):239-248. doi:10.3138/ptc-2019-0010
4. Meier, Sandra M, et al. "Increased Mortality among People with Anxiety Disorders: Total Population Study." *The British Journal of Psychiatry : The Journal of Mental Science*, U.S. National Library of Medicine, Sept. 2016, pmc.ncbi.nlm.nih.gov/articles/PMC5082973/.

Physical Therapy Management of Complex Rotator Cuff Tears in an Older Adult with Alzheimer's Disease

Matthew Liu

Background and Purpose: Age is the greatest risk factor for rotator cuff injuries as well as Alzheimer's Disease. As life expectancy continues to increase, clinicians should be prepared to manage patients with one or both conditions. This case study sought to explore the biopsychosocial factors contributing to the successful management of a patient with complex rotator cuff tears in the setting of Alzheimer's Disease.

Case Description: The patient was an81-year-old woman presenting to an outpatient orthopedic physical therapy clinic with a referring diagnosis of left shoulder rotator cuff arthropathy. The patient's primary impairments were with left shoulder range of motion and strength, with secondary concerns of decreased balance. She was recently diagnosed with mild cognitive impairment due to Alzheimer's Disease. Physical therapy treatment consisted of range-of-motion exercises and progressive strengthening. Difficulties in exercise selection arose due to the patient's memory deficits.

Outcomes: The patient demonstrated significant increases in shoulder range of motion with normalization of scapulohumeral kinetics and modest increases in strength.

Discussion: Numerous biopsychosocial factors influenced the patient's outcomes in physical therapy: her memory deficits and extensive shoulder injury were the primary hindrances. However, her continued motivation and strong family support were facilitating factors in her success. In the physical therapy management of patients with mild cognitive impairments, clinicians should remain flexible and patient in their approach to exercise selection, as well as involving social support systems such as family, to optimize outcomes.

The Role of Physical Therapy in Patient Treatment Decision-Making: Rehabilitation or Surgical Intervention For Rotator Cuff Tears and Related Shoulder Pathologies: A Case Study

Ella Mahler

Background and Purpose: Rotator cuff injuries are a leading source of shoulder pain in the United States. In 2023, nearly 25% of the U.S. population with shoulder pain presented with partial or full rotator cuff tears (RTCT). Multiple risk factors contribute to partial and full-thickness RTCTs - including age, smoking, comorbidities, and occupational demands. RTCTs are managed both operatively and non-operatively, with the optimal approach still unclear. This case report explores the role of rehabilitation and patient education in the management of rotator cuff tears and informing patient decision-making regarding surgical interventions.

Case Description: A 65-year-old retired male was seen at an outpatient orthopedic physical therapy clinic for chronic right shoulder pain. Superior and anterior shoulder pain had been present for over three years. Imaging revealed a partial subscapularis tear, severe tendinopathy of the supraspinatus tendon and partial supraspinatus tear, long head of biceps tendon medial subluxation, and labral fraying at biceps tendon and posterior labrum. The patient's goals were to avoid surgery or minimize complexity of surgical procedures needed, and improve shoulder strength and overall mobility.

Outcomes: With physical therapy, the patient showed significant improvements in postural alignment, shoulder range of motion, movement coordination, strength, and lifting mechanics, as well as a reduction in pain. He returned to caring for his ranch and opted out of surgical intervention due to his high level of functional return and improved quality of life.

Conclusion: This case demonstrates not only how rehabilitation management of RTCTs and related shoulder pathologies can provide functional outcomes, but also how appropriate patient-centered rehabilitation better prepare patients for informed decision-making regarding surgical intervention. This patient both regained shoulder function aligned with his specific goals, as well as felt able to make informed decisions in the future regarding surgical intervention.

Key words: Shoulder Pain, Physical Therapy, Rotator Cuff Tear, Rotator Cuff Repair, Decision-Making

Selected References:

1. Kuhn, J. E. (2023). Prevalence, natural history, and nonoperative treatment of rotator cuff disease. Operative Techniques in Sports Medicine, volume 31 (issue 1). https://doi.org/10.1016/j.otsm.2023.150978 Links to an external site.
2. Radhakrishnan, R., Goh, J., & Tan, A. H. C. (2024). Partial-thickness rotator cuff tears: A review of current literature on evaluation and management. Clinics in Shoulder and Elbow, 27(1), 79–87. https://doi.org/10.5397/cise.2022.01417 Links to an external site.
3. Karpinski, K., Plachel, F., Gerhardt, C., Saier, T., Tauber, M., Auffarth, A., Akgün, D., & Moroder, P. (2022). Different expectations of patients and surgeons with regard to rotator cuff repair. Journal of Shoulder and Elbow Surgery, 31(5), 1096–1105. https://doi.org/10.1016/j.jse.2021.12.043

Rehabilitation Following Open Curettage and Cancellous Bone Allograft of Tibial and Distal Femoral Subchondral Defects: A Case Report

Kristina Mangaliag

Background and Purpose: Subchondral insufficiency fractures of the knee and associated osteochondral defects can lead to persistent pain, impaired mobility, and progressive joint degeneration. Surgical management using open curettage and cancellous bone allograft aims to restore subchondral integrity and delay joint deterioration, but limited evidence exists to guide postoperative rehabilitation. The purpose of this case report is to describe physical therapy management and functional outcomes following surgical treatment of tibial and distal femoral subchondral defects.

Case Description: The patient is a 53-year-old female who underwent right knee open curettage and cancellous bone allograft for subchondral defects of the tibial plateau and distal femur on September 11, 2025. At initial physical therapy evaluation, she presented with significant impairments including limited knee flexion range of motion (ROM) (75°), a 33° knee extension ROM deficit, reduced weightbearing tolerance, and reliance on bilateral axillary crutches. Patient-reported outcome measures indicated substantial

functional limitations. Intervention: Rehabilitation emphasized restoration of knee ROM, early quadriceps muscle activation, progressive weightbearing, and strengthening exercises.

Outcomes: After approximately 13 weeks of rehabilitation, knee flexion, and extension ROM substantially improved and the patient progressed to independent ambulation without an assistive device. Patient-reported outcomes improved, including KOS-ADL (42.9% to 68%) and WOMAC (41.67% to 13.2%). The patient also initiated return to modified yoga. Discussion: This case demonstrates that a structured, progressive rehabilitation program can result in meaningful improvements in mobility, function, and participation following subchondral bone grafting procedures. These findings contribute to the limited literature guiding postoperative rehabilitation for this population.

Key Words: Subchondral bone pathology, osteochondral defect, bone grafting, neuromuscular re-education, functional recovery, knee rehabilitation

Selected references:

1. Ochi J, Nozaki T, Nimura A, Yamaguchi T, Kitamura N. Subchondral insufficiency fracture of the knee: review of current concepts and radiological differential diagnoses. Jpn J Radiol. 2022;40(5):443-457. doi:10.1007/s11604-021-01224-3
2. Zimmerman ZE, Bisson LJ, Katz JN. Perspective on subchondral insufficiency fracture of the knee. Osteoarthritis Cartilage Open.
3. 2021;3(2):100152. doi:10.1016/j.ocarto.2021.10052 2021;3(2):100152
4. Assenmacher AT, Pareek A, Reardon PJ, Macalena JA, Stuart MJ, Krych AJ. Long-term Outcomes After Osteochondral Allograft: A Systematic Review at Long-term Follow-up of 12.3 Years. Arthroscopy. 2016;32(10):2160-2168. doi:10.1016/j.arthro.2016.04.020

Impact of Lower Extremity Weightbearing Restrictions on Pelvic Floor Dysfunction in Outpatient Rehabilitation: A Case Study

Lilia Matevosyan

Background and Purpose: Nearly 1 in every 3 females suffer from some form of pelvic floor disorder or dysfunction (PVD) that inhibits them from vital human function including normal bowel and bladder movements as well as sexual function. Patients of all genders have struggled through pelvic floor dysfunction for decades for many reasons, including lack of comfort of knowledge about pelvic pain disorders from their physicians. Asymmetrical weight-bearing to protect the surgical site can create uneven loading through the pelvic floor, lower extremities, and pelvis, contributing to pain and secondary compensatory impairments.

Case Description: The patient was a 35-year-old female, who began experiencing exacerbation of her history of pelvic floor symptoms after undergoing surgical intervention to her broken first and second metatarsal phalanges (MTP) following a MVA, requiring the use of a kneeling scooter, which caused asymmetrical strain to the pelvic floor musculature causing increased pelvic floor dysfunction.

Outcomes: The patient made significant progress in her pelvic floor symptoms, and was able to regain full recovery from urge incontinence and improve her pelvic floor strength, coordination, and motility. At the time of discharge, she continued to experience some symptoms of dyspareunia, although improved from baseline.

Discussion and Conclusions: Current literature on pelvic floor dysfunction primarily focuses on diagnosis, etiology, and non-surgical management, with limited guidance to the impact of lower extremity impairments and altered weight-bearing. Asymmetrical weight-bearing, such as that seen with walking boots, crutches, or scooter use, can introduce functional leg length discrepancies and shear forces across the pelvis, contributing to compensatory loading patterns throughout the kinetic chain. While direct evidence linking these factors to pelvic floor dysfunction is limited, these biomechanical changes can be extrapolated to influence pelvic floor loading and symptom exacerbation. This highlights the need for a more comprehensive, systems-based approach, as these contributing factors are often under-recognized in clinical practice.

Key words: Pelvic floor dysfunction, weightbearing, dyspareunia, urge incontinence, Lisfranc injury.

Selected References:

1. Wong, J. W., Kaneshiro, B. E., & Oyama, I. A. (2019, April). *Primary care physician perceptions of female pelvic floor disorders*. Hawai'i journal of medicine & public health : a journal of Asia Pacific Medicine & Public Health. https://pmc.ncbi.nlm.nih.gov/articles/PMC6452021/
2. Dewar, C., Grindstaff, T. L., Farmer, B., Sainsbury, M., Gay, S., Kroes, W., & Martin, K. D. (2021, December 8). *EMG activity with use of a hands-free single crutch vs a knee scooter*. Foot & ankle orthopaedics. https://pmc.ncbi.nlm.nih.gov/articles/PMC8664314/
3. Wallace, S. L., Miller, L. D., & Mishra, K. (2019). Pelvic floor physical therapy in the treatment of pelvic floor dysfunction in women. *Current Opinion in Obstetrics &Gynecology*, *31*(6), 485–493. https://doi.org/10.1097/gco.0000000000000584

Physical Therapy Management of a patient with a C4 incomplete spinal cord injury and central cord presentation

Jordana Mednick

Background and Purpose: Central Cord Syndrome covers between 15 to 25% of incomplete spinal cord injuries (iSCI). It results in more significant motor impairments of the upper than lower extremities, urinary retention, and sensory changes below the level of injury. This case study explores the effectiveness of high-intensity gait training and functional electrical stimulation on a patient's ability to regain ambulation ability following an iSCI with a central cord presentation.
Setting: Inpatient Rehabilitation (IPR): Three hours of combined physical and occupational therapy, five days per week.
Case Description: Patient is a 53-year-old male who presented with limb weakness (upper extremities more than lower extremities), hypersensitivity, spasticity, neurogenic pain, and orthostatic hypotension after a syncopal fall resulting in a central cord contusion. Interventions included high-intensity gait training, functional electrical stimulation, and task-specific training for wheelchair propulsion and transfers.
Outcomes: After five weeks of IPR, the patient improved from dependence to supervision with transfers, and contact-guard assistance for short distance ambulation with a front-wheeled walker (gait speed, 0.30m/s). He also propelled a wheelchair 160' independently in preparation for community mobility.
Discussion and Conclusion: Interventions were effective in improving ambulation outcomes. However, outcomes were influenced by the need to use subjective reports of intensity during gait sessions, the available time for gait training during sessions, and the fluctuating medication dosage and schedule. Further research is needed to determine the best treatment approach for patients with similar presentations.
Key Words: central cord syndrome, high-intensity gait training, functional electrical stimulation, ambulation
Selected references:

1. Harkema, S. J., Schmidt-Read, M., Lorenz, D. J., Edgerton, V. R., & Behrman, A. L. (2012). Effect of locomotor training on recovery of walking in individuals with incomplete spinal cord injury. *The Lancet, 379*(9826), 1938–1947. https://doi.org/10.1016/S0140-6736(12)60542-1
2. A comparison of functional electrical stimulation and spinal cord stimulation for neuroplastic recovery after spinal cord injury. *Frontiers in Neurology*. https://www.frontiersin.org/
3. Leech, K. A., Kinnaird, C. R., Holleran, C. L., Kahn, J., & Hornby, T. G. (2018). High-intensity variable stepping training in persons with motor incomplete spinal cord injury. *Journal of Neurologic Physical Therapy, 42*(4), 193–204. https://doi.org/10.1097/NPT.0000000000000244
4. Van Middendorp, J. J., et al. (2011). A clinical prediction rule for ambulation outcomes after traumatic spinal cord injury: A longitudinal cohort study. *The Lancet, 377*(9770), 1004–1010. https://pubmed.ncbi.nlm.nih.gov/
5. Schädler, P., Shue, J., & Girardi, F. (2016). Central cord syndrome: A review of epidemiology, treatment, and prognostic factors. *JSM Neurosurgery and Spine, 4*, 1075.

Rehabilitation of Bilateral Quadriceps Tendon Strain in a Commercial Pilot: A Case Report on Non-operative Functional Recovery

Emilie Nakasone

Background and Purpose: Bilateral quadriceps tendon injuries are rare, especially in otherwise healthy individuals without systemic conditions such as diabetes, renal disease, or corticosteroid use. These injuries bring unique challenges due to the lack of an unaffected limb for compensation. The purpose of this case report is to highlight the clinical presentation and conservative rehabilitation of a 56-year-old male airline pilot who sustained a bilateral quadriceps tendon strain, emphasizing individualized care and functional goal-setting in a patient with physically demanding occupational requirements.

Case Description: The patient sustained bilateral quadriceps tendon strain (R > L) following a fall in October 2024. He presented to outpatient physical therapy 12 weeks post-injury with complaints of bilateral knee pain, quadriceps weakness, gait abnormalities, and difficulty with prolonged sitting, ambulation, and return to recreational activities. Objective findings included patella alta, right quadriceps atrophy, hypomobility of superior patellar glide, and a Lower Extremity Functional Scale (LEFS) score of 41/80. A rehabilitation program was designed to address strength, neuromuscular control, and functional limitations through progressive resistance training, proprioceptive exercises, and activity-specific interventions.

Outcomes: Over the course of care, the patient demonstrated improved quadriceps strength, enhanced knee stability, and reduced gait compensations. He progressed from isometric to eccentric strengthening and demonstrated improved tolerance for prolonged sitting and walking. Functional gains included increased confidence in stair navigation, sit-to-stand transfers after a long flight of prolonged sitting, and gradual reintroduction of weight-bearing recreational activities.

Discussion and Conclusion: This case illustrates the complexities of conservative rehabilitation for bilateral quadriceps tendon strain in an active adult without predisposing systemic conditions. The patient's occupation as an airline pilot added functional constraints that informed treatment planning. The individualized, progressive approach was effective in restoring function and reducing pain. This case contributes to the limited literature on non-operative management of bilateral quadriceps injuries and emphasizes the need for further research to guide clinical decision-making in similar presentations.

Key Words: bilateral quadriceps tendon strain, conservative rehabilitation, non-surgical management

Selected References:

1. Aga, P., Panchal, R., Bhargava, A., & Bhamra, J. S. (2016). Bilateral quadriceps tendon rupture: A rare case and review of literature. Journal of Orthopaedic Case Reports, 6(3), 5–7. https://doi.org/10.13107/jocr.2250-0685.501
2. Brossard, P., Legac, O., Huten, D., & Dujardin, F. (2019). Acute quadriceps tendon rupture repair using a suture anchor technique: Clinical outcomes and complications. Orthopaedics & Traumatology: Surgery & Research, 105(5), 977–981. https://doi.org/10.1016/j.otsr.2019.03.021
3. Camarda, L., D'Arienzo, A., Morello, S., Guarneri, M., & D'Arienzo, M. (2018). Bilateral quadriceps tendon rupture: A diagnostic pitfall. BMJ Case Reports, 2018, bcr-2018-224642. https://doi.org/10.1136/bcr-2018-224642
4. Choi, J. H., Chang, M. J., & Oh, T. S. (2016). Bilateral simultaneous quadriceps tendon rupture without predisposing systemic disease or steroid use: A case report and literature review. Annals of Rehabilitation Medicine, 40(3), 553–558. https://doi.org/10.5535/arm.2016.40.3.553
5. Davis, I. S., Bowser, B. J., & Mullineaux, D. R. (2010). Greater vertical impact loading in female runners with medically diagnosed injuries: A prospective investigation. British Journal of Sports Medicine, 44(10), 658–663. https://doi.org/10.1136/bjsm.2009.070128

Return-to-Sport Rehabilitation for Iliopsoas Tendinopathy in a Collegiate Baseball Pitcher: A Case Report

Sean Nguyenle

Background & Purpose: Iliopsoas tendinopathy is a potential source of anterior hip and groin pain in athletes, yet limited literature exists describing rehabilitation and return-to-sport (RTS) decision-making for this condition, particularly in overhead athletes such as baseball pitchers. Objective performance testing including limb symmetry index (LSI) is increasingly used to guide RTS progression, although the traditional 90% symmetry threshold remains debated. The purpose of this case report was to describe the physical therapy management of iliopsoas tendinopathy in a collegiate baseball pitcher and the use of RTS testing to guide rehabilitation and return-to-play progression.

Case Description: The patient was an 18-year-old collegiate baseball pitcher presenting with right anterior groin pain (2/10 at rest, 6/10 with activity) aggravated by squatting, sprinting, and pitching. Key impairments included pain, limited hip range of motion, and hip strength deficits. Interventions included hip mobility exercises, progressive posterior chain strengthening, neuromuscular reeducation for single-leg stability, and plyometric training. RTS testing was used to assess functional symmetry.

Outcomes: Hip range of motion and hip strength improved bilaterally, and pain decreased to 4/10 at worst and 0/10 at rest. Average LSI during RTS testing improved from 88% to 98%. Discussion: This case demonstrates how a treatment approach emphasizing progressive loading and early implementation of RTS testing can help identify asymmetries and guide targeted intervention for athletes with iliopsoas tendinopathy. However, relying solely on limb symmetry can obscure bilateral deficits and may not adequately represent sport-specific functional requirements. Early RTS testing is important to establish an accurate baseline—particularly for the unaffected side—while integrating both bilateral and unilateral interventions to enhance functional performance for sport-specific demands.

Keywords: iliopsoas tendinopathy, hip flexor tendinopathy, return-to-sport, limb symmetry index, sports rehabilitation

Selected References:

1. Tramer JS, Holmich P, Safran MR. The iliopsoas: anatomy, clinical evaluation, and its role in hip pain in the athlete: a scoping review. J Am Acad Orthop Surg. 2024; 32(13):p e620-e630. doi: 10.5435/JAAOS-D-23-01166
2. Haskel JD, Kaplan DJ, Fried JW, Youm T, Samim M, Burke C. The limited reliability of physical examination and imaging for diagnosis of iliopsoas tendinitis. Arthroscopy. 2021;37(4):1170-1178. doi:10.1016/j.arthro.2020.12.184
3. Tsukada S, Niga S, Nihei T, Imamura S, Saito M, Hatanaka J. Iliopsoas disorder in athletes with groin pain: prevalence in 638 consecutive patients assessed with MRI and clinical results in 134 patients with signal intensity changes in the iliopsoas. JBJS Open Access. 2018; 3(1):e0049. doi:10.2106/JBJS.OA.17.00049
4. Li X, Ma R, Zhou H, et al. Evaluation of hip internal and external rotation range of motion as an injury risk factor for hip, abdominal and groin injuries in professional baseball players. Orthop Rev (Pavia). 2015;7(4):6142. doi:10.4081/or.2015.6142
5. Moran TE, Ignozzi AJ, Burnett Z, Bodkin S, Hart JM, Werner BC. Deficits in contralateral limb strength can overestimate limb symmetry index after anterior cruciate ligament reconstruction. Arthrosc Sports Med Rehabil. 2022;4(5):e1713-e1719. doi:10.1016/j.asmr.2022.06.018

Physical Therapy Management of a Middle-aged Man with an Anterior Cruciate Ligament Rupture and Early-Onset Parkinson's Disease

Jeff Overbaugh

Background and Purpose: An anterior cruciate ligament tear is a common orthopedic injury in the United States. The purpose of this case study was to assess multiple physical therapy interventions on the treatment of a 56-year-old male who presented to physical therapy with a medical diagnosis of a ruptured right anterior cruciate ligament and right meniscal tear, who wanted to manage his right knee intra-articular injuries conservatively.

Case Description: The patient was a 56-year-old male with a past medical history of right anterior cruciate ligament tear 8 years prior that was reconstructed and an 11-year history of Parkinson's disease. He had been experiencing pain, swelling, and instability in the right knee after a traumatic fall on the knee in May of 2025. He reported pain 2/10 at best and 6/10 at worst, for approximately 4 months. Primary impairments include pain, swelling, instability, and reduced strength of the right lower extremity compared to the unaffected leg. Interventions included quadriceps strengthening, stair training, and patient education on the LSVT BIG protocol.

Outcomes: The patient demonstrated functional improvements in independent ambulation distance. He reported a significant improvement in pain but still had moderate functional limitation, as indicated by his score on the Lower Extremity Functional Scale.

Discussion and Conclusion: The outcomes for this patient's case were impacted by many factors, including the pre-existing comorbidity of Parkinson's disease and his self-discharge from physical therapy. Further research is indicated to determine the optimal treatment approach for patients with similar presentations.

Key Words: anterior cruciate ligament, orthopedics, Parkinson's disease

Selected References:

1. Osborne JA, Botkin R, Colon-Semenza C, et al. Physical therapist management of parkinson disease: a clinical practice guideline from the American Physical Therapy Association, Physical Therapy, 2022;102:4
2. Stensrud S, Risberg MA, Roos EM. Effect of exercise therapy compared with arthroscopic surgery on knee muscle strength and functional performance in middle-aged patients with degenerative meniscus tears: a 3-mo follow-up of a randomized controlled trial. Am J Phys Med Rehabil. 2015;94:460-473.
3. Schilling BK, Pfeiffer RF, Ledoux MS, et al. Effects of moderate-volume, high-load lower-body resistance training on strength and function in persons with Parkinson's disease: a pilot study. Parkinsons Dis.2010
4. Thoma LM, Grindem H, Logerstedt D, et al. Coper classification early after anterior cruciate ligament rupture changes with progressive neuromuscular and strength training and is associated with 2-Year success: the Delaware-Oslo ACL cohort study. Am J Sports Med. 2019;47:807-814.

Physical Therapy Management of Chronic Posterior Tibialis Tendon Dysfunction in an Older Adult

Nomin Rinchin

Background and Purpose: Posterior tibialis tendon dysfunction (PTTD) is a progressive musculoskeletal condition characterized by degeneration of the posterior tibialis tendon, resulting in collapse of the medial longitudinal arch, pes planus deformity, gait dysfunction, and reduced functional mobility. Conservative rehabilitation has been shown to improve outcomes in early-stage PTTD; however, limited evidence exists regarding physical therapy management of chronic bilateral PTTD in older adults with rigid deformity, balance impairment, and high symptom irritability. This case report describes the physical therapy management of an older adult with chronic bilateral PTTD using a modified progressive loading program based on the Alvarez protocol.

Case Description: The patient was an 87-year-old female living independently who presented with chronic bilateral foot pain (L>R), pes planus deformity, impaired balance, LE edema, antalgic gait, and reduced walking tolerance secondary to bilateral PTTD. Physical therapy intervention was guided by the Alvarez protocol and modified based on patient tolerance, motor learning limitations, and equipment availability. Interventions emphasized progressive tendon loading, high-repetition strengthening, balance training, gait training, lower extremity strengthening, and functional mobility training.

Outcomes: Following intervention, the patient demonstrated improved walking tolerance, reduced reliance on an assistive device, and improved tolerance to functional strengthening activities. **s** This case demonstrates that individualized, progressive rehabilitation based on tendon-loading principles may improve pain, balance, and functional mobility in older adults with chronic bilateral PTTD, even in the presence of rigid deformity and high symptom irritability. The case also highlights the importance of modifying exercise programs to address motor learning limitations and generalized weakness in geriatric populations. Further research can be done to explore conservative management of later-stage PTTD as an alternative to surgical intervention.

Selected References

1. Alvarez RG, Marini A, Schmitt C, Saltzman CL. Stage I and II posterior tibial tendon dysfunction treated by a structured nonoperative management protocol: an orthosis and exercise program. Foot Ankle Int. 2006;27(1):28. https://doi.org/10.1177/107110070602700102
2. Kulig K, Reischl S, Pomrantz AB, et al. Nonsurgical management of posterior tibial tendon dysfunction with orthoses and resistive exercise: a randomized controlled trial. Phys Ther. 2009;89(1):26-37. https://scispace.com/pdf/nonsurgical-management-of-posterior-tibial-tendon-408l9rxd48.pdf
3. Ross MH, Smith MD, Mellor R, Vicenzino B. Exercise for posterior tibial tendon dysfunction: a systematic review of randomised clinical trials and clinical guidelines. BMJ Open Sport Exerc Med. 2018;4. https://doi.org/10.1136/bmjsem-2018-000430

A Rehabilitation Road Map for Complex Visual, Cervical, and Vestibular Dysfunction Following Corneal Transplantation: A Case Report

Andrew Senkerik

Background and Purpose: Persistent visual disturbance following ocular surgery can create functional limitations beyond the primary ocular pathology. This case report describes physical therapy management of a patient with chronic head and eye pain, photophobia, impaired depth perception, gait instability, and reduced tolerance to work, driving, and recreation following bilateral ocular procedures related to Fuchs Endothelial Corneal Dystrophy and epithelial basement membrane dystrophy.

Case Description: The patient was a 42-year-old female with multifactorial visual, vestibular, and cervicogenic dysfunction. Examination findings included impaired gaze stability, possible peripheral vestibular hypofunction, convergence insufficiency, impaired cervical sensorimotor control, visual motion sensitivity, cervicogenic headache and dizziness, and reduced balance confidence. Physical therapy used a staged approach including education, pacing, symptom modulation, cervical traction, dry needling, cervical sensorimotor control, cervico-ocular integration, graded oculomotor and vestibular loading, balance training, cardiovascular activity, and functional reintegration.

Outcomes: Due to limited visits, large objective changes were difficult to detect. Headache intensity decreased from 10/10 to approximately 5 to 6/10 after dry needling and cervical-focused treatment. The patient also reported improved rowing tolerance and gradual re-engagement with exercise.

Discussion and conclusions: This case suggests persistent symptoms following ocular pathology and surgery may benefit from targeting modifiable downstream contributors, including cervical dysfunction, impaired gaze stability, visual fatigue, symptom irritability, and movement avoidance. Future research is warranted to better understand physical therapy management for patients with overlapping ocular, vestibular, and cervicogenic dysfunction after ocular surgery.

Key Words: Corneal transplantation, Vestibular rehabilitation, Cervicogenic dizziness, Physical therapy

Selected References

1. Ong Tone S, et al. Fuchs endothelial corneal dystrophy: The vicious cycle of Fuchs pathogenesis. Prog Retin Eye Res. 2021;80:100863.
2. Torricelli AAM, et al. The corneal epithelial basement membrane: Structure, function, and disease. Invest Ophthalmol Vis Sci. 2013;54(9):6390-6400.
3. Hall CD, et al. Vestibular Rehabilitation for Peripheral Vestibular Hypofunction: An Updated Clinical Practice Guideline. J Neurol Phys Ther. 2022;46(2):118-177.
4. Treleaven J. Dizziness, unsteadiness, visual disturbances, and sensorimotor control in traumatic neck pain. J Orthop Sports Phys Ther. 2017;47(7):492-502.
5. De Vestel C, et al. Therapeutic management of patients with cervicogenic dizziness: systematic review and meta-analysis. J Man Manip Ther. 2022;30(5):273-283

Application of Sensory and Behavioral Support Strategies During Outpatient Physical Therapy Session for a Child With Autism Spectrum Disorder

Mingma Tashi Sherpa

Background and Purpose: Autism spectrum disorder (ASD) is a neurodevelopmental condition commonly associated with motor, sensory, and behavioral differences that affect participation in physical therapy. This case study describes the feasibility and considerations of implementing sensory and behavioral support strategies during outpatient pediatric physical therapy sessions for a 6-year-old child with ASD, developmental delay, and birth history of extreme prematurity.

Case Description: Interventions targeted strength, balance, coordination, and functional mobility while incorporating individualized sensory and behavioral supports, including vestibular and sensorimotor input, environmental modifications, verbal and auditory cueing for transitions, and task chaining to improve engagement and regulation.

Outcomes: Across five treatment sessions, the child demonstrated mild improvements in balance, coordination, stair negotiation, and floor-to-stand transitions. Environmental modifications, such as adjusting lighting and using music, improved participation. Vestibular input through swinging had a calming effect and became an effective transition activity at the start of sessions. Visual schedules were less effective than verbal cueing strategies, such as first-then phrases and countdowns, for supporting transitions. Forward chaining and therapist demonstration were helpful for teaching more complex tasks.

Discussions and Conclusions: This case study highlights the importance of individualized sensory and behavioral supports, flexibility in intervention planning, and interdisciplinary collaboration when working with children with ASD. Limitations included inconsistent attendance and short duration of care. Future practice may benefit from earlier sensory profile assessment and increased caregiver involvement to improve efficiency and carryover.

Keywords: Autism spectrum disorder, pediatric physical therapy, sensory strategies, behavioral supports.

Selected References

1. Abu-Dahab SM, Skidmore ER, Holm MB, Rogers JC, Minshew NJ. Motor and tactile-perceptual skill differences between individuals with high-functioning autism and typically developing individuals ages 5-21. J Autism Dev Disord. 2013;43(10):2241-2248. doi:10.1007/s10803-011-1439-y
2. Kangarani-Farahani M, Malik MA, Zwicker JG. Motor Impairments in Children with Autism Spectrum Disorder: A Systematic Review and Meta-analysis. J Autism Dev Disord. 2024;54(5):1977-1997. doi:10.1007/s10803-023-05948-1
3. Anixt JS, Ehrhardt J, Duncan A. Evidence-Based Interventions in Autism. Pediatr Clin North Am. 2024;71(2):199-221. doi:10.1016/j.pcl.2024.01.001
4. Hume K, Steinbrenner JR, Odom SL, et al. Evidence-Based Practices for Children, Youth, and Young Adults with Autism: Third Generation Review. J Autism Dev Disord. 2021;51(11):4013-4032. doi:10.1007/s10803-020-04844-2
5. Suprunowicz M, Bogucka J, Szczerbińska N, Modzelewski S, Oracz AJ, Konarzewska B, Waszkiewicz N. Neuroplasticity-Based Approaches to Sensory Processing Alterations in Autism Spectrum Disorder. International Journal of Molecular Sciences. 2025; 26(15):7102. https://doi.org/10.3390/ijms26157102

Outpatient physical therapy treatment following recurrent lumbar disc herniation: A case report.

Isaac Stone

Background and Purpose: Recurrent lumbar disc herniation can contribute to persistent pain, neurological deficits, and functional limitations. While surgical revision is often considered for significant symptoms, conservative management, including physical therapy, plays an important role in optimizing recovery and functional outcomes. This case report describes the rehabilitation of a patient with recurrent lumbar disc herniation who demonstrated a positive response to outpatient physical therapy.

Case Description: The patient was a 21-year-old female presenting to outpatient physical with low back pain and recent imaging findings of a herniated disc at L5/S1. The patient reported a history of prior lumbar surgery with a gradual return of symptoms over time. At initial evaluation, she presented with lower extremity weakness, numbness and tingling in the lower extremities, decreased functional mobility, and severe pain. Physical therapy interventions emphasized symptom management, mobility, progressive resistance training, and balance activities.

Outcomes: After five weeks of physical therapy, the patient demonstrated notable improvements in symptoms, lower extremity strength, and overall functional mobility. She reported decreased pain levels and increased tolerance for daily activities. Gait mechanics improved, with increased stability and endurance noted during ambulation.

Discussion and Conclusions: This case highlights the potential for meaningful functional gains following recurrent lumbar disc herniation with a structured physical therapy program. While much of the literature emphasizes surgical management, this report underscores the value of rehabilitation in enhancing recovery and quality of life. Positive outcomes in this case suggest that consistent, targeted physical therapy interventions can contribute significantly to improved strength, mobility, and pain reduction following recurrent lumbar disc herniation.

Key Words: Lumbar Disc Herniation, Physical Therapy, Recurrent

Selected References

1. American Physical Therapy Association, Delitto, A., George, S. Z., Van Dillen, L. R., Whitman, J. M., Sowa, G. A., Shekelle, P., Denninger, T. R., & Godges, J. J. (2012). Low back pain clinical practice guidelines linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association. *Journal of Orthopaedic & Sports Physical Therapy, 42*(4), A1â€“A57. https://doi.org/10.2519/jospt.2012.42.4.A1
2. May S, Aina A. Centralization and directional preference: a systematic review. ManTher. 2012;17(6):497-506. doi:10.1016/j.math.2012.05.003
3. El Melhat AM, Youssef ASA, Zebdawi MR, Hafez MA, Khalil LH, Harrison DE. Non-Surgical Approaches to the Management of Lumbar Disc Herniation Associated with Radiculopathy: A Narrative Review. *Journal of Clinical Medicine*. 2024; 13(4):974. https://doi.org/10.3390/jcm13040974
4. Foster NE, Anema JR, Cherkin D, et al. Prevention and treatment of low back pain:evidence, challenges, and promising directions. Lancet. 2018;391(10137):2368-2383. doi:10.1016/S0140-6736(18)30489-6
5. Brotis AG, Kalogeras A, Spiliotopoulos T, Fountas KN, Demetriades AK. Physical therapies after surgery for lumbar disc herniation- evidence synthesis from 55 randomized controlled trials (RCTs) and a total of 4,311 patients. Brain Spine.2025;5:104238. Published 2025 Mar 13. doi:10.1016/j.bas.2025.104238

A Case Report: Physical Therapy Management of a Total Knee Arthroplasty via Subvastus Approach versus the Medial Parapatellar Approach

Ellaine Villano

Background and Purpose: The knee is the most commonly replaced joint in the body due to the prevalence of osteoarthritis. With severe osteoarthritis, surgical methods are often recommended to decrease pain and restore function. The type of surgical approach can affect the rehabilitation after a total knee arthroplasty. This case study examines the physical therapy management of a patient who has received a total knee arthroplasty procedure via a subvastus approach and how that compares to the medial parapatellar approach.

Case Description: The patient is a 65 year old female who presented to outpatient physical therapy 2 weeks postoperative right total knee arthroplasty via subvastus approach due to severe osteoarthritis. Her impairments consisted of lower extremity weakness, limited right knee range of motion, altered gait, and pain. Physical therapy interventions focused on lower extremity strengthening, increasing range of motion, gait training, and pacing education.

Outcomes: The patient demonstrated improvements in lower extremity strength in all planes, increased right knee range of motion in all directions, and a better score on the 2 minute walk test and 30 second sit to stand.

Discussion and Conclusion: While many factors can affect a patient's outcome after an invasive total knee procedure, intensive rehabilitation may improve the outcomes for people who have undergone a quad-sparing surgery in the early stages of their recovery. Further research is needed to determine the role of physical therapy in different surgical approaches.

Key Words: total knee arthroplasty; subvastus; medial parapatellar; osteoarthritis; physical therapy

Selected References:

1. Geng L, Fu J, Xu C, et al. The Comparison between Mini-Subvastus Approach and Medial Parapatellar Approach in TKA: A Prospective Double-Blinded Randomized Controlled Trial. Orthop Surg. 2022;14(11):2878-2887.
2. Hosseini-Monfared, P., Mirahmadi, A., Amiri, S., Minaie, R., Ghafouri, M.H. & Kazemi, S.M. (2024) Comparable long-term functional outcomes of subvastus and medial parapatellar approach in total knee arthroplasty: A 10-year follow-up study. Journal of Experimental Orthopaedics, 11, e70035.
3. https://www.physio-pedia.com/Total_Knee_Arthroplasty
4. Li Z, Cheng W, Sun L, et al. Mini-subvastus versus medial parapatellar approach for total knee arthroplasty: a prospective randomized controlled study. Int Orthop. 2018;42(3):543-549.
5. Lin TC, Wang HK, Chen JW, Chiu CM, Chou HL, Chang CH. Minimally invasive knee arthroplasty with the subvastus approach allows rapid rehabilitation: a prospective, biomechanical and observational study. J Phys Ther Sci. 2013;25(5):557-562.

Physical Therapy Management of a High School Dancer with Lateral Patellar Dislocation

Reina Yamashita

Background and Purpose: Lateral patellar dislocation typically occurs due to the disruption of the stabilizing forces surrounding the patellofemoral joint and are more common in females, with girls between ages 10-17 at highest risk. One factor of patellofemoral pain is weakness of the vastus medialis obliquus which resists lateral patellar translation. The purpose of this case report is to record the physical therapy management of a female pediatric dancer after a closed lateral patellar dislocation.
Setting: Treatment was provided at an outpatient, orthopedic physical therapy clinic that specializes in sports rehabilitation and Pilates-based therapy.
Case Description: I.L. was a 16-year-old female dancer who complained of right peripatellar knee pain secondary to a medical diagnosis of a closed dislocation of the right patella. Key impairments included pain as well as decreased strength, range of motion, muscular activation, motor control, endurance, and stability. Intervention included quadriceps strengthening, neuromuscular electrical stimulation, range of motion, stretching, gait training, stability training, and correction of dance mechanics.
Outcomes: I.L. demonstrated improvements in all examination areas. Since she continued to demonstrate impairments in dynamic balance, she continued to receive outpatient physical therapy services to safely return to sport.
Discussion and Conclusion: After 9 weeks of intervention, I.L. met most of her therapy goals and was preparing to return to dance. Several factors may have impacted her outcomes, including good motivation and persistent patellar maltracking. Further research is needed to help determine the best treatment approach for dancer patients with similar presentations.
Key words: Lateral Patellar Dislocation, Physical Therapy, Knee, Dance Rehabilitation
Selected References:

1. Johnson DS, Turner PG. Management of the first-time lateral patellar dislocation. *Knee*. 2019;26(6):1161-1165. doi:10.1016/j.knee.2019.10.015
2. Fithian DC, Paxton EW, Stone ML, et al. Epidemiology and natural history of acute patellar dislocation. *Am J Sports Med*. 2004;32(5):1114-1121. doi:10.1177/0363546503260788
3. Loeb AE, Tanaka MJ. The medial patellofemoral complex. *Curr Rev Musculoskelet Med*. 2018;11(2):201-208. doi:10.1007/s12178-018-9475-2
4. Watson R, Sullivan B, Stone AV, et al. Lateral Patellar Dislocation: A Critical Review and Update of Evidence-Based Rehabilitation Practice Guidelines and Expected Outcomes. *JBJS Rev*. 2022;10(5):10.2106/JBJS.RVW.21.00159. Published 2022 May 5. doi:10.2106/JBJS.RVW.21.00159
5. Ho KY, Epstein R, Garcia R, Riley N, Lee SP. Effects of Patellofemoral Taping on Patellofemoral Joint Alignment and Contact Area During Weight Bearing. *J Orthop Sports Phys Ther*. 2017;47(2):115-123. doi:10.2519/jospt.2017.6936