THE UNIVERSITY OF
SCRANTON
A JESUIT UNIVERSITY

DPT Program
Annual Research Night

Saturday, November 8th, 2025
5:00 PM to 8:00 PM

- DeNaples Center, Moskovitz Theater -
& Live Webinar via Zoom

This course is approved for 3 general contact hours (CEUs). However, you must view the entire session to receive credit. The University of Scranton has pre-approved provider status with the PA State Board of Physical Therapy. The PA State Board of Physical Therapy has ultimate authority of the determination.

University of Scranton Physical Therapy:
http://www.scranton.edu/academics/pcps/physicaltherapy

Do you know anyone who is uninsured or underinsured and needs PT services?

Do know anyone who has exhausted their insurance coverage and would still benefit from skilled PT services?

LEAHY PT CLINIC

Student-Run ~ Pro Bono

The mission of the Leahy PT Clinic is to deliver patient-centered care grounded in the Jesuit tradition of educating students "for and with others" by providing pro bono physical therapy services to uninsured and underinsured residents of our local community through collaboration, peer-mentorship, and evidence-based practice. Our student administrative team manages all clinic operations with supervision and guidance from PT Faculty. Practice areas typically include orthopedics, neurology, geriatrics, and cardiopulmonary. Our peer-mentored DPT student groups provide skilled clinical management to address a wide range of issues including (but not limited to): musculoskeletal pain, post-surgical recovery, chronic conditions, balance and gait dysfunction, vestibular disorders, deconditioning, and post-COVID-19 complications.

For more information, please contact us and visit our website: www.scranton.edu/pcps/pt-leahy-clinic.

230 Kressler Court
Scranton, PA
18503

570-941-6112

ptclinic@scranton.edu

Open Tuesdays & Thursdays
3:00pm-6:00pm

Schedule

5:00pm

Introduction: Dr. Renée M Hakim, Chair/Program Director, Department of Physical Therapy

Group 1:
Title: Pelvic Floor Dysfunction in Women with and without Diastasis Recti Abdominis: A Systematic Review
Authors: Noelle Gonzalez, SPT, Katie Meale, SPT, Gianna Memo, SPT, Madison Ribeiro, SPT, Lori Walton, PT, DPT, PhD

Group 2:
Title: Standardized Patient Simulation and Clinical Confidence of PT Students in Acute Care: A Systematic Review
Authors: Britt Cunningham, SPT, Madison Langkamer, SPT, Michael Radzwilka, SPT, Megan Sommer, SPT, Janette Scardillo, PT, DPT

Group 3:
Title: Title: Fear Reduces Return to Sport in Adolescents after ACLR: A Systematic Review
Authors: Fiona Burke, SPT; Sarah Fitzpatrick, SPT; Sophie Johanson, SPT; Emily Kmak, SPT; Anthony Carusotto, PT, EdD; Michael Crowell, PT, DSc

Group 4:
Title: Impact of Balance Training on Children with Sensorineural Hearing Loss: A Systematic Review
Authors: Erin E. Campion, Moira C. Courtney, Erin E. Holler, Natalie E. Tiu, Dr. Nicholas J. Rodio

Group 5:
Title: Wearable Sensors for Measuring Fatigability in Adults with Multiple Sclerosis: A Systematic Review
Authors: Hannah Mellody Carr, SPT, Bella Czeck, SPT, Kaitlin Kremsky, SPT, Catherine Slevin, SPT, Renée M. Hakim, PT, PhD

Group 6:
Title: Relationship Between Oral Contraceptives and Cholesterol in Adolescent Females for Cardiovascular Screening: A Systematic Review
Authors: Cori Capar, SPT, Annie Duffy, SPT, Delaney Guard, SPT, Anthony Carusotto, PT, DPT, EdD

---------- **BREAK** (30 minutes) ----------

7:00pm

Group 7:
Title: Impact of Virtual Reality Rehabilitation on Depression in People with Parkinson's Disease: A Systematic Review
Authors: Francesca Melisi, SPT, Hanna Robinson, SPT, Samantha Sercia, SPT, Dana Maida, PT, DPT, Renée M. Hakim, PT, PhD

Group 8:
Title: Effects of Frontloading Home Health Visits on Hospital Readmissions in Older Adults: A Systematic Review
Authors: Ashley Benham, SPT, Tracey Collins, PT, PhD, MBA, Sophia McMullan, SPT, Cosette Talarico, SPT, Courtney Zaic, SPT

Group 9:
Title: Validity of Non-sagittal Hop Tests After ACL Reconstruction: A Systematic Review
Authors: Aaron Asiedu-Wiafe, SPT, Kyle Franek, SPT, Dylan Kummery, SPT, KM McCormack, Michael Crowell, PT, DPT, DSc

Group 10:
Title: The Optimal Rehabilitation Setting for Maximal Physical Recovery Post-TAVR in Older Adults: A Systematic Review
Authors: Kaitlin Kremsky, SPT, Dana Maida, PT, DPT, Janette Scardillo, PT, DPT

Components of Evidence-Based Practice

Adapted from: APTA Open Access; https://www.apta.org/patient-care/evidence-based-practice-resources/components-of-evidence-based-practice

Evidence-based practice includes the integration of best available evidence, clinical expertise, and patient values and circumstances related to patient and client management, practice management, and health policy decision-making.

All three elements are equally important.

Best Available Evidence

Decision-making is optimized by emphasizing the use of evidence from well-designed and well-conducted research. Although evidence-based practice encompasses more than just applying the best available evidence, many of the concerns and barriers to using evidence-based practice revolve around finding and applying research.

Clinical Expertise/Judgement

The physical therapist and physical therapist assistant's knowledge and skills are a key part of the evidence-based process. This personal scope of practice consists of activities undertaken by an individual physical therapist that are situated within a physical therapist's unique body of knowledge where the individual is educated, trained, and competent to perform that activity. Using clinical decision-making and judgment are critical.

Patient Values

The patient's wants and needs are a key part of evidence-based care. Incorporating a patient's cultural considerations, needs, and values are necessary to provide best practice services.

https://www.mcg.com/blog/2019/06/28/mcg-certification-and-the-commitment-to-evidence-based-practice/

All Evidence is Not Created Equal

Sackett Levels of Evidence / OCEBM (2009)

Level of Evidence	Description
1A	Systematic review of randomized controlled trials (RCTs).
1B	Individual RCT with narrow confidence intervals
1C	All or none
2A	Systematic review of cohort studies
2B	Individual Cohort study/ Low quality RCT
2C	Outcomes research, Ecological studies
3A	Systematic review of case-control studies
3B	Individual Case-Control study
4	Case series, poor quality cohort or case-control study
5	Expert opinion

Fletcher and Sackett, working for the Canadian Task Force on Periodic Health Examination in 1979, are credited as the first to develop a level of evidence scoring scale. Sackett continued to develop the scale based on his own research with the use of anti-thrombotic agents. http://www.physio-pedia.com/Grades_and_Levels_of_Evidence

Oxford CEBM Levels (2011) cover the entire range of clinical questions, in the order (from top row to bottom row) that the clinician requires. While most ranking schemes consider strength of evidence for therapeutic effects and harms, the OCEBM system allows clinicians and patients to appraise evidence for prevalence, accuracy of diagnostic tests, prognosis, therapeutic effects, rare harms, common harms, and usefulness of (early) screening.

Question	Step 1 (Level 1*)	Step 2 (Level 2*)	Step 3 (Level 3*)	Step 4 (Level 4*)	Step 5 (Level 5)
How common is the problem?	Local and current random sample surveys (or censuses)	Systematic review of surveys that allow matching to local circumstances**	Local non-random sample**	Case-series**	n/a
Is this diagnostic or monitoring test accurate? (Diagnosis)	Systematic review of cross sectional studies with consistently applied reference standard and blinding	Individual cross sectional studies with consistently applied reference standard and blinding	Non-consecutive studies, or studies without consistently applied reference standards**	Case-control studies, or "poor or non-independent reference standard**	Mechanism-based reasoning
What will happen if we do not add a therapy? (Prognosis)	Systematic review of inception cohort studies	Inception cohort studies	Cohort study or control arm of randomized trial*	Case-series or case-control studies, or poor quality prognostic cohort study**	n/a
Does this intervention help? (Treatment Benefits)	Systematic review of randomized trials or *n*-of-1 trials	Randomized trial or observational study with dramatic effect	Non-randomized controlled cohort/follow-up study**	Case-series, case-control studies, or historically controlled studies**	Mechanism-based reasoning
What are the COMMON harms? (Treatment Harms)	Systematic review of randomized trials, systematic review of nested case-control studies, *n*-of-1 trial with the patient you are raising the question about, or observational study with dramatic effect	Individual randomized trial or (exceptionally) observational study with dramatic effect	Non-randomized controlled cohort/follow-up study (post-marketing surveillance) provided there are sufficient numbers to rule out a common harm. (For long-term harms the duration of follow-up must be sufficient.)**	Case-series, case-control, or historically controlled studies**	Mechanism-based reasoning
What are the RARE harms? (Treatment Harms)	Systematic review of randomized trials or *n*-of-1 trial	Randomized trial or (exceptionally) observational study with dramatic effect			
Is this (early detection) test worthwhile? (Screening)	Systematic review of randomized trials	Randomized trial	Non -randomized controlled cohort/follow-up study**	Case-series, case-control, or historically controlled studies**	Mechanism-based reasoning

*** Level may be graded down on the basis of study quality, imprecision, indirectness (study PICO does not match questions PICO), because of inconsistency between studies, or because the absolute effect size is very small; Level may be graded up if there is a large or very large effect size.**

**** As always, a systematic review is generally better than an individual study.**

Physiotherapy Evidence Database (PEDro) Scale is a critical appraisal tool intended to identify methodological flaws in the physical therapy literature providing consumers of research evidence objective data regarding the strength of such evidence.

Study	1	2	3	4	5	6	7	8	9	10	11	Score
Grade												

1. Eligibility criteria were specified.
2. Subjects were randomly assigned to groups.
3. Allocation was concealed 4. Groups were similar at baseline.
5. Subjects were blinded.
6. Therapists who administered the treatment were blinded.
7. Assessors were blinded.
8. Measures of key outcomes were obtained from more than 85% of subjects.
9. Data were analyzed by intention to treat.
10. Statistical comparisons between groups were conducted.
11. Point measure and measures of variability were provided.

Criterion number 1 is not used to generate the total score. Therefore, the total maximum score is 10.

http://www.pedro.org.au/english/downloads/pedro-scale/

Mixed Methods Appraisal Tool (MMAT) - 2018

Category of study designs	Methodological quality criteria	Responses			
		Yes	No	Can't tell	Comments
Screening questions (for all types)	S1. Are there clear research questions?				
	S2. Do the collected data allow to address the research questions?				
	Further appraisal may not be feasible or appropriate when the answer is 'No' or 'Can't tell' to one or both screening questions.				
1. Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?				
	1.2. Are the qualitative data collection methods adequate to address the research question?				
	1.3. Are the findings adequately derived from the data?				
	1.4. Is the interpretation of results sufficiently substantiated by data?				
	1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?				
2. Quantitative randomized controlled trials	2.1. Is randomization appropriately performed?				
	2.2. Are the groups comparable at baseline?				
	2.3. Are there complete outcome data?				
	2.4. Are outcome assessors blinded to the intervention provided?				
	2.5 Did the participants adhere to the assigned intervention?				
3. Quantitative non-randomized	3.1. Are the participants representative of the target population?				
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?				
	3.3. Are there complete outcome data?				
	3.4. Are the confounders accounted for in the design and analysis?				
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?				
4. Quantitative descriptive	4.1. Is the sampling strategy relevant to address the research question?				
	4.2. Is the sample representative of the target population?				
	4.3. Are the measurements appropriate?				
	4.4. Is the risk of nonresponse bias low?				
	4.5. Is the statistical analysis appropriate to answer the research question?				
5. Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?				
	5.2. Are the different components of the study effectively integrated to answer the research question?				
	5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?				
	5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?				
	5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?				

Research Abstracts
and
Supplemental Material

Group 1

Title: Pelvic Floor Dysfunction in Women with and without Diastasis Recti Abdominis: A Systematic Review

Authors: Noelle Gonzalez, SPT, Katie Meale, SPT, Gianna Memo, SPT, Madison Ribeiro, SPT, Lori Walton, PT, DPT, PhD

Purpose/Hypothesis: The purpose of this systematic review was to determine the difference in pelvic floor outcomes for women with and without diastasis recti abdominis during the subacute and chronic postpartum period.

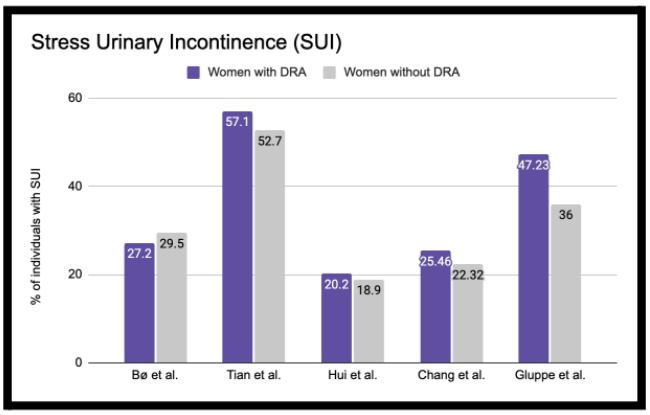
Number of Subjects: Total subjects included (N=8132), reviewed across 11 articles that met the criteria.

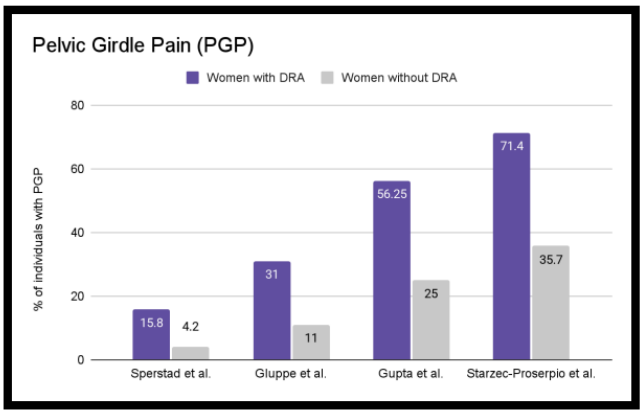
Materials and Methods: A literature search was conducted of PubMed, CINAHL, ProQuest, and Wiley using "pelvic floor dysfunction" terminology AND "diastasis recti abdominis (DRA)" OR "inter-recti distance (IRD)". Search limits: 2015-2025, peer-reviewed, human, English. Selection criteria: women, age 18+ with pelvic floor dysfunction (PFD), with measured Inter-Recti Distance (IRD), in the subacute or chronic postpartum period. Primary Outcomes: PFD outcomes, including one or more of the following: incontinence, prolapse (uterine, ureter, bladder, rectum), weakness, or pelvic pain. Three women's health physical therapist expert reviewers independently assessed each study for methodological quality and came to consensus using the NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies, and the NIH Quality Assessment Tool for Case Control Studies.

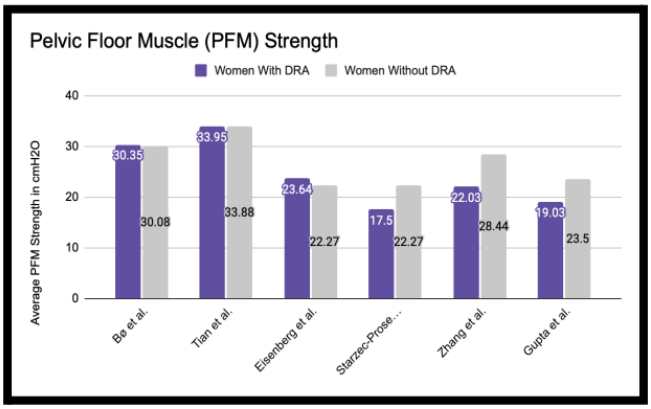
Results: A total of 48 articles were assessed for eligibility and eleven (N=11) articles met the selection criteria. Levels of evidence ranged from FAIR (35-71% scores) to GOOD (75-100% scores). Samples ranged from 36-6302 (N=8132) with a mean age of 43.7. Studies assessed Diastasis Recti Abdominis (DRA) using ultrasound (N=6), finger-width palpation (N=3), combination of both (N=1), or combination of palpation and calipers (N=1). Primary outcome measures for PFD included the PFDI-20, ICIQ-UI-SF. Within the GOOD evidence category, six (N=6) studies found significant PFD for women with DRA compared to women without DRA. Within the FAIR evidence category, five (N=5) studies reported no significant differences in PFD for women with or without DRA.

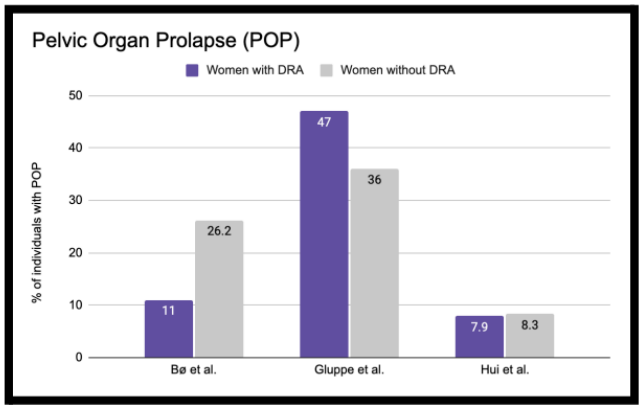
Conclusions: Current cohort studies show mixed results regarding the outcomes for pelvic floor outcomes for women with and without DRA in the subacute and postpartum period. However, stronger evidence studies reported a significantly higher PFD for women with DRA, including incontinence, weakness, and pain, when compared to women without DRA. Limitations included: Variation in the methods of DRA measurement and limitation of published RCTs. Future research should consider comparison of PFD outcomes by birth delivery mode, parity, and age for women with and without DRA, standardization, validity, and reliability of instruments for measuring IRD and strengthening of study design utilizing RCT protocols.

Clinical Relevance: DRA is prevalent for women in the subacute and chronic postpartum period and may have negative pelvic floor dysfunction outcomes, particularly in women post caesarean section delivery and with greater parity. This information informs physical therapists regarding the importance of screening for DRA and PFD for women in the subacute and chronic postpartum period.









NIH Quality Assessment Tool

Article	Score (%)
Eisenberg VH, Sela L, Weisman A, Masharawi Y.	82.40%
Chang XX, Ling L, Gao HJ, et al.	82.20%
Tian P, Liu DM, Wang C, Gu Y, Du GQ, Tian JW	81.30%
Starzec-Proserpio M, Rejano-Campo M, Szymańska A, et al.	81.20%
Zhang S, Fu F, Li W, Ding T, Gu Y, Xie Z.	77.09%
Gupta GK, Kumari D, Choudhary R.	75%
Gluppe S, Engh ME, Bø K, et al.	72.08%
Sperstad JB, Tennfjord MK, Hilde G, Ellström-Engh M, Bø K.	71.50%
Bø K, Hilde G, Tennfjord MK, Sperstad JB, Engh ME.	70.50%
Braga A, Caccia G, Nasi I et al.	67.20%
Hui F, Liu Y, Li M et al.	59.50%

Group 2

Title: Standardized Patient Simulation and Clinical Confidence of PT Students in Acute Care: A Systematic Review*

Authors: Britt Cunningham, SPT, Madison Langkamer, SPT, Michael Radzwilka, SPT, Megan Sommer, SPT, Janette Scardillo, PT, DPT

Background: Standardized patient (SP) simulations offer healthcare students realistic opportunities with human subjects to build clinical skills.[1,2] Due to sparse resources, 75% of inpatient site coordinators of clinical education report they cannot accept more physical therapy (PT) students, prompting an ACAPT task force to advise exploring secondary preparation methods. SP simulations may enhance student readiness for acute care (AC).[3] This systematic review evaluates the effectiveness of SP AC simulations on PT student confidence in clinical settings.

Methods: A literature search (2009-2025) of ProQuest, CINHAL, APTA EBSCO, ScienceDirect was conducted. Search terms: ("Simulation") AND ("standardized patient") AND ("acute care" OR hospital) AND (physiotherapy or "physical therapy") AND (confidence OR "self-efficacy"). Search limits: Human participants, English, and peer-reviewed. Selection criteria: graduate PT students and adults ≥18, interventions of SP simulations, and outcome of student confidence. Two reviewers used the Mixed Methods Appraisal Tool (MMAT) to assess each study's methodological quality and reached consensus.

Results: 653 studies were screened for eligibility and 10 met selection criteria. MMAT levels ranged from 40-100% (avg 78%). Study designs included mixed methods (N=5)[5,6,9,12,13], case report (1)[4], quantitative non-randomized (3)[7,8,11], and quantitative randomized (1)[10]. Samples ranged from 8-376 participants (N=772). Simulation design varied in goals and SP portrayal. Goals were improved clinical decision making[4,6-10,12], communication[6-8,11,12], and clinical development[5,9,10,12,13]. Scenarios covered orthopedics[4,7,8-11,13], cardiopulmonary[4-6,9,10], general medicine[4,7], neurological[4,5,7,11], and pediatric[4] patient populations. SPs were portrayed by students[7,10,11], faculty[9,12], actors[5,6], AC clinical instructors[13], and unknown[4,8]. Self-confidence data collection varied using self-developed methods[4-7,9,11,13], AC Confidence Survey[10,12], Self-Efficacy for Interprofessional Experiential Learning[7], and Interprofessional Education Collaborative[8] tools. Data was collected pre- and post-simulation[5-9,11,12], pre, mid, and post semester[10], one year into clinical practice[4], during clinical experience[12], and post-simulation only[13]. Confidence increases were statistically significant for all pre-post studies[5-12]. Studies with post-simulation only design showed no significance[13]. Focus group students identified increased confidence for clinical decision making[5,9,12], skills[9,12], understanding of PT roles[12], affective skills[12], and greater regard for post-simulation debrief [2]. Students recognized authenticity[5,9] and enjoyed peer-learning in the experience.[5]

Conclusions: Moderate evidence supports SP simulation in healthcare curricula to boost confidence, clinical skills, clinical decision making, and communication. Limitations include small samples, convenience sampling, inconsistent measurement tools, limited comparative studies and limited follow-up. Future studies should use the same validated measures to assess impact of SPs on clinical confidence in diverse settings and compare simulation methods.

Clinical Relevance: Limited AC clinical capacity challenges PT programs in providing student exposure. Incorporating AC clinical SP scenarios into curricula offers an alternative to build confidence and reinforce knowledge that would otherwise be gained through direct experience. Per the research, confidence increased most when students had early simulation exposure, practiced complex skills, and learned with peers or interprofessional teams. Simulations should feature realistic scenarios with human SPs and structured debriefing, and are implemented early and repeatedly to maximize readiness for clinical practice.

* Accepted for poster presentation at APTA Combined Sections Meeting (CSM), Anaheim, CA, February 2026; Acute Care Section

Summary of Standardized Patient Simulation Outcomes

Citation	Study Design and Rating (MMAT)	Simulation detail	Confidence measure	Quantitative findings	Qualitative Findings
Bishop et al. (2017)	MMAT: 80% Case report	In-person Human and Manikin SP	Self-developed 5-point Likert Scale	Students reported increased confidence in clinical decision making and communication skills	N/A
Blackford et al. (2023)	MMAT: 80% Mixed Methods	In-person Human SP	Validated Self-developed 4-point Likert Scale	No differences were observed in clinical skills performance between groups on the mid-course or end-of-course assessments. The simulation group (SCG) reported significantly higher confidence prior to the start of their first day of clinical experience compared to the control group (CG).	Students reported greater confidence for clin ed because of: -practice with standardized patients -tutor feedback -authentic learning -improved clinical/affective skills -theory–practice integration -post-simulation debrief -peer learning
Bradway et al. (2018)	MMAT: 80% Mixed Methods	In-person Human SP	Self-developed 5-point Likert Scale	Students rated themselves significantly more confident in interprofessional teamwork, application of clinical knowledge, communicaiton, and leadership skills	No confidence theme noted
Brewer et al. (2023)	MMAT: 80% Single group pretest posttest design	In-person Human SP	Validated measure (Self-efficacy for Interprofessional Experiential Learning (SEIEL)	Statistically significant improvement in interdisciplinary communication, collaboration and coordination	No confidence theme noted
Brown et al. (2024)	MMAT: 100% Pre-post comparison non-random	Virtual Human SP	Validated measure (IPEC)	Statistically significant improvements in interdisciplinary communication, interprofessional clinical decison making, interdisciplinary collaboration for all disciplines except physician assistant and social work students	No confidence theme noted
Cunningham et al. (2020)	MMAT: 40% Mixed Methods	In-person Human SP	Validated Self-developed 4-point Likert Scale	Statistically significant improvements were observed in clinical decision making (specifically termination criteria for early mobility) and clinical skills (cardiopulmonary assessment, glucose monitoring, early rehabilitation with catheters and ventilation)	-Students were somewhat comfortable with 7 skills (5 related to ventilator care) and very comfortable assessing resting HR -focus group noted improved application of class skills in simulation and distinguishing knowledge from performance -key themes included authenticity, clinical decision making, and skill application
Dale et al. (2022)	MMAT: 80% Quantitative randomized control	In-person Human SP	Validated measure (Acute Care Confidence Survey (ACCS))	Statistically significant improvements were observed in clinical decision-making and clinical skills at mid-term assessment but not at final assessment.	N/A
Neely et al. (2022)	MMAT: 100% Quantitative non-randomized	In-person and Virtual Human SP	Self-developed 5-point Likert scale	All participants whether F2F or virtual had statistically significant increases in perceived confidence scores in all dependent varibales (abilities to treat safely, identify medical equipment, interpret physiologic info and make clinical decisions, respond to changes in patient status, and intrest). The F2F cohort had a greater increased confidence in the ability to respond to changes in the patient status compared to the virtual cohort.	N/A
Silberman et al. (2020)	MMAT: 80% Mixed Methods	In-person Human SP	Validated measure (Acute Care Confidence Survey (ACCS))	Both simulation groups showed significant improvements in total ACCS scores over the course, with gains in clinical skills (manual performance, mobility, instruction), clinical decision-making (judgment), and communication (instruction/documentation).	Students reported increased confidence in clinical decision making, greater comfort with affective skills, and improved understanding of the PT professional role.
Silberman et al. (2013)	MMAT: 60% Mixed Methods	In-person Manikin SP	Self-developed 5-point Likert Scale	There was no statistically significant difference between those who participated in the simulation and those who had not.	No confidence theme noted

Table Key
MMAT = Mixed Method Appraisal Tool
SP = Standardized patient
F2F = Face to face delivery mode
PT = Physical therapist

Group 3

Title: Fear Reduces Return to Sport in Adolescents after ACLR: A Systematic Review*

Authors: Fiona Burke, SPT; Sarah Fitzpatrick, SPT; Sophie Johanson, SPT; Emily Kmak, SPT; Anthony Carusotto, PT, EdD; Michael Crowell, PT, DSc

Purpose/Hypothesis: Physical performance tests are commonly used to assess readiness to return to sport (RTS) in adolescents after anterior cruciate ligament reconstruction (ACLR), but limited research has examined psychological factors.[1,2] This systematic review aimed to evaluate the influence of psychological factors on RTS outcomes in adolescent patients post-ACLR.

Methods: Four databases—PubMed, Wiley, Sage Journals, and SpringerLink—were searched from using the following terms: ("psychological" OR "stress" OR "fear" OR "kinesiophobia" OR "self-efficacy") AND ("return to sport") AND ("ACL reconstruction") AND ("athletes") AND ("adolescent" OR "pediatric" OR "youth"). Search limits included human studies, peer-reviewed, and quantitative research. Studies were included if they were primary research involving adolescent athletes (ages 10–19) who had undergone ACL reconstruction, used at least one psychological outcome, and evaluated RTS. Study quality was assessed using the National Institutes of Health Study Quality Assessment Tool (2021).

Results: A total of 380 articles were screened, and four met inclusion criteria: three Level IV studies and one Level II study, all rated as good quality. Overall, 304 participants were included (range: 53–115), with mean ages that ranged from 14-16 years. Psychological factors were assessed using the Anterior Cruciate Ligament – Return to Sport Index (ACL-RSI) in two studies[3,4] and the Athletic Coping Skills Inventory-28 (ACSI-28) in one study.[3] Two studies used non-validated questions about fear of reinjury and confidence.[5,6] Three studies found that elevated fear or emotional response regarding RTS was associated with lower RTS rates.[4–6] Webster et al reported significantly lower ACL-RSI emotional subscale scores among those who did not RTS compared to those who did (41.4 vs. 54.7).[4] Rauck et al and McCullough et al identified fear as the primary barrier to RTS in 33% and 53% of patients, respectively.[5,6] Rauck et al also found that athletes confident in their ability to perform had seven times greater odds of RTS.[5] Ellis et al observed a significant correlation between psychological coping skills (ACSI-28) and RTS ($r = -0.29$, $p = .04$), though ACL-RSI scores were not predictive.[3]

Conclusion: There is low-quality evidence that fear of reinjury, and poor psychological coping skills are associated with reduced RTS in adolescent athletes after ACLR. Key limitations include the small number of studies, heterogeneity in outcome measures, and unclear definitions of RTS level. Future research should investigate links between psychological readiness, RTS, and reinjury, as well as the effectiveness of psychological interventions.

Clinical Relevance: Clinicians may assess psychological factors when evaluating RTS readiness in adolescents after ACLR. In the absence of evidence on effective psychological interventions, strategies such as incorporating sport-specific movements and activities during late-stage rehabilitation may help reduce fear and build confidence.

* Accepted for poster presentation at APTA Combined Sections Meeting (CSM), Anaheim, CA, February 2026, Academy of Orthopedic Physical Therapy Section

Research Article	***Key Findings***
McCullough et al. 2012	Identified fear as primary barrier to RTS in 53% of patients
Ellis et al. 2020	Significant correlation between self-efficacy and RTS
Rauck et al. 2021	Identified fear as primary barrier to RTS in 33% of patients • 7x greater odds of RTS with athletes who demonstrated confidence in ability to perform
Webster et al. 2022	ACL-RSI was a predictor in RTS for adolescent athletes • Emotional component appeared to be more influential than confidence component or appraisal of risk

ACL-RSI

Name_____ **Date**_____

Instructions: Place a mark on the line, which best describes you in relation to the descriptors.

1. Are you confident that you can perform at your previous level of sport participation?

Not at all confident — Fully confident

☐ 0 ☐ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100

2. Do you think you are likely to re-injury your knee by participating in your sport?

Extremely likely — Not likely at all

☐ 0 ☐ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100

3. Are you nervous about playing your sport?

Extremely nervous — Not nervous at all

☐ 0 ☐ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100

4. Are you confident that your knee will not give way by playing your sport?

Not at all confident — Fully confident

☐ 0 ☐ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100

5. Are you confident that you could play your sport without concern for your knee?

Not at all confident — Fully confident

☐ 0 ☐ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100

6. Do you find it frustrating to have to consider your knee with respect to your sport?

Extremely frustrating — Not at all frustrating

☐ 0 ☐ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100

7. Are you fearful of re-injuring your knee by playing your sport?

Extremely fearful — No fear at all

☐ 0 ☐ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100

8. Are you confident about your knee holding up under pressure?

Not at all confident — Fully confident

☐ 0 ☐ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100

9. Are you afraid of accidentally injuring your knee by playing your sport?

Extremely afraid — Not at all afraid

☐ 0 ☐ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100

10. Do thoughts of having to go through surgery and rehabilitation prevent you from playing your sport?

All of the time — None of the time

☐ 0 ☐ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100

11. Are you confident about your ability to perform well at your sport?

Not at all confident — Fully confident

☐ 0 ☐ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100

12. Do you feel relaxed about playing your sport?

Not at all relaxed — Fully relaxed

☐ 0 ☐ 10 ☐ 20 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100

Group 4

Title: Impact of Balance Training on Children with Sensorineural Hearing Loss: A Systematic Review

Authors: Erin E. Campion, Moira C. Courtney, Erin E. Holler, Natalie E. Tiu, Dr. Nicholas J. Rodio

Purpose: Sensorineural hearing loss (SNHL) affects ~6 in 1000 by age 18. Children with SNHL may have impaired vestibular function and postural stability, which may impair functional balance. The purpose of this systematic review was to evaluate the impact of balance training on outcome measures in children with SNHL.

Methods: A literature search of Allied Health ProQuest, PubMed, Cochrane and CINAHL was conducted (2014-2025) using search terms: (child* OR pedi*) AND (sensorineural hearing loss) AND (balance intervention). Search limits included: English, human subjects, and peer-reviewed. Selection criteria included: RCT, children (<18 years old) with SNHL, and any form of balance and/or vestibular intervention with balance outcome measurement. Four reviewers independently assessed the methodological quality of evidence of each study and reached consensus using PEDro guidelines.

Results: 549 studies were screened for eligibility and 6 RCTs met selection criteria. All articles had a PEDro score of 8/10. Sample sizes ranged from 24-180 (N=347) children aged 7 to 18 with SNHL. Interventions included: Tai Chi, conventional training, balance exercises, fine motor exercise, vestibular rehabilitation, Latin Dance training, and core stabilization. Intervention periods ranged from 8-12 weeks, 1-5x weekly for 30-60 min/session. Each study included at least 1 balance outcome measure and reported statistically significant differences on an outcome. 3 studies used varied subsets from BOT-2. Significant between-group differences favored balance exercises (+2.69 pts) vs. controls (+0.27 pts) on Subset 5. Significant between-group differences favored Tai Chi (+4.3 pts) vs. conventional training (+3.53 pts) on PBS. 2 studies reported statistically significant within-group improvements on FRT with Tai Chi (+3.65") and Latin dance (+10.67"). LoS test scores significantly improved in all directions with core stabilization program (+11.327") and balance exercise program (+13.72").

Conclusions: There is a low number of high-quality studies supporting various balance training options, such as Tai Chi, Latin dance, conventional balance training, and vestibular therapy, to improve balance outcomes in children with SNHL. Limitations included: convenience samples, small sample sizes, restricted age ranges, lack of blinding, lack of long-term outcome measures, widely varied balance outcomes and protocols. Further research is needed to consider the impact of cochlear implants, school-based programming, and long-term outcome measures.

Clinical Relevance: Multiple interventions are beneficial to improve balance measures in children with SNHL. A clinically relevant difference was found following balance exercises with improvements from above average (20-25 pts) to well above average (25-35pts) on BOT-2 subset 5. Tai Chi and conventional training also resulted in clinically relevant improvements that met/exceeded the cut-off score (55.2±1.74 pts) for typically developing children on PBS. Clinicians should consider interests, motivations, and other impairments to select an evidence-based balance intervention to increase compliance and promote patient-centered care.

* Accepted for poster presentation at APTA Combined Sections Meeting (CSM), Anaheim, CA, February 2026; Pediatrics Section

Summary of Interventions

Article	Intervention/ Control	Length of Intervention	Balance Outcome Measures	Key Findings
Cetin et al. (2020)	*Intervention:* 1: Tai Chi 2: Conventional Exercise *Control:* Not defined	1 hour sessions (15 min warm up, 15 minutes cool down) 2 times per week for 10 weeks	Functional Reach Test BOT-2 balance subset Pediatric Balance Scale	Functional Reach Test: favor Tai Chi group BOT-2: *favor conventional group vs control PBS: *favor conventional group vs control, favor Tai Chi vs control group
Kamel et al. (2024)	*Intervention:* Balance Exercise Program *Control:* Practiced daily ADLs	3 times per week for 10 weeks	BOT-2 subset 5 MSBB SSBB LOSSBB MCTSIB	Significant difference pretreatment vs post-treatment for all tests with study group No significant difference pretreatment vs post-treatment for all tests with control group
Mehrem et al. (2022)	*Intervention:* 1: Fine Motor Exercises 2: Fine Motor and Balance Exercise *Control:* Practiced daily ADLs	30 minute sessions 3 times per week for 12 weeks	BOT-2 fine motor precision and fine motor integration - subset 1 and 2 **not specifically measuring balance	Statistically significant difference between fine motor exercises group and control group Statistically significant difference between fine motor and balance exercises group and control group No statistically significant difference between fine motor exercises group and fine motor and balance exercises group
Ebrahimi et al. (2017)	*Intervention:* 1: Vestibular Rehabilitation Therapy 2: Progressive Exercise Group *Control:* Completed exercise intervention following post-test	45 minute sessions 3 times per week for 8 weeks	Sensory Organization Test Limits of Stability Test	Significant difference for exercise group pre vs. post test for LOS condition 5 and 6, areas of LOS, vestibular ratio and global score
Hu et al. (2024)	*Intervention:* Latin Dance training *focus on Cha-cha dance *Control:* Not defined	45 minute sessions with 5 minute break 5 times per week for 12 weeks	Deviation Angle of Vertical Writing Test ECS Functional Reach Test	Significant improvements in vestibular function, static balance ability (L and R feet) and dynamic balance ability before and after Latin dance training
Tuncer et al. (2023)	Core stabilization Program *Control:* no training	1 time per week for 8 weeks	Postural Stability Test Stability Limits Test MCTSIB BESS Test	Significant improvements in all parameters of Biodex Balance System No between group effect score for BESS Test

Group 5

Title: Wearable Sensors for Measuring Fatigability in Adults with Multiple Sclerosis: A Systematic Review*

Authors: Hannah Mellody Carr, SPT, Bella Czeck, SPT, Kaitlin Kremsky, SPT, Catherine Slevin, SPT, Renée M. Hakim, PT, PhD

Purpose/Hypothesis: Three-fourths of persons with multiple sclerosis (PWMS) self-report fatigue which may cause performance decrement (fatigability) during daily activities and decreased quality of life.[1,2] The purpose of this systematic review was to describe the clinical applications of wearable sensors to objectively measure fatigability in PWMS.

Methods: A literature search of CINHAL, ProQuest, PubMed and Science Direct was conducted. Search terms: ("Multiple Sclerosis") AND ("wearable sensors" OR "wearable technology" OR "cell phones" OR smartphones) AND (fatigue OR fatigability). Search limits: English language, peer-reviewed/research, and human subjects. Selection criteria: PWMS, adults age 18+, and use of a wearable sensor defined as any device (attached to the body or carried) that provides non-invasive monitoring of performance fatigability (physiological or physical). Two researchers independently assessed each study for methodological quality and came to consensus using OCEBM Levels of Evidence (2011).

Results: A total of 1,384 articles were screened and 15 articles (Level 3) met selection criteria. Sample sizes ranged from 9 to 154 PWMS (N=816) aged 18-66 years (EDSS levels 0-7). Wearable sensors [body worn (extremities, torso); smartphones] were used to gather data on physiological and physical performance to measure fatiguability in PWMS. Sensor data were collected during daily activities and/or clinical performance tests. Several studies reported significant correlations between sensor data for fatigability (temporal-distance gait metrics, RR, HR, HRV), instrumented clinical test scores (2MWT, 5UTT, 6MWT,TUG-DT, 30CST, ABC) and self-reported fatigue (FSS, FSMC, MFIS, VAS/Borg Scale, MSWS-12/D) in PWMS. A few studies also reported descriptive associations between sensor data for physical activity level (step count), fine motor (finger tapping), weather (temperature/humidity), and self-reported fatigue and/or fatiguability. Sensor data as a fatigue biomarker was reported using change in stride length,[4] and as a predictor of state fatigue using the 25WT or 6MWT and somatic fatigue using gait speed, stance/stride time and stride length.

Conclusions: Moderate level evidence supports wearable sensor use to measure fatigability in PWMS, particularly for capturing temporal-distance gait parameters and physiological measures. Limitations included small convenience samples and widely varied sensor applications. Future research should compare sensor types using standardized metrics in more diverse populations of PWMS to improve fatigue/fatigability management.

Clinical Relevance: Wearable sensors provide an objective, non-invasive approach to measure fatigability in PWMS. Many sensors today are widely available and user-friendly, allowing for seamless integration into clinical practice. Quantitative data captured by sensors detect subtle changes in fatigability levels in real-time, both in clinical settings and daily life. This can improve clinical management of PWMS by understanding fatigability dynamics, expanding objective data combined with clinical outcome measures, facilitating personalized interventions and providing remote monitoring.

* Accepted for poster presentation at APTA Combined Sections Meeting (CSM), Anaheim, CA, February 2026; Academy of Neurologic Physical Therapy Section

Gait Performance and Velocity			
Authors (Publication Year)	**Device**	**Device Location**	**Key Findings**
Cheng et al. (2021)	Inertial sensor (Samsung Galaxy S7) Tri-axial accelerometer and gyroscope	Waist	Median U-Turn speed during 5UTT correlated to physical fatigue.
Ibrahim et al. (2022)	Tri-axial accelerometer and gyroscope (SHIMMER 3 sensor, Shimmer)	Foot	Gait parameters obtained from short walking tests may predict perceived state fatigue as accurately as those derived from long gait tests
Schonherr et al. (2025)	Smartphone (Nokia 8)	Leg	Higher Fatigue Scale for Motor and Cognitive Function (FSMC) scores correlated with lower step count, cadence, and velocity in PwMS.
Tulipani et al. (2020)	Triaxial accelerometer data from inertial sensors (Biostamp, MC10)	Chest and Leg	Decreased acceleration and inertia was correlated to increased fatigue levels.
Gait Parameter Correlations with Fatigue			
Ibrahim et al. (2020)	Tri-axial accelerometer and gyroscope (IMU)	Foot	Normalized stride time, maximum toe clearance, heel strike angle, and stride length show a strong correlation to fatigue.
Kontaxis et al. (2023)	Tri-axial accelerometer (Bittium Faros)	Chest	Gait parameter data recorded during 2MWD exhibits moderate to strong correlation with Fatigue Severity Scores.
Müller et al. (2025)	Inertial sensors (MTw2, Xsens Technologies B.V)	Foot	Linear trend of walking speed, stride length, stride time, and stance phase showed significant correlations with fatigue.
Gait Variability and Asymmetry			
Shema-Shiratzky et al. (2020)	A triaxial accelerometer (Opal, APDM) Body-fixed sensor (Axivity AX3	Back	Fewer steps, longer duration, greater asymmetry, and larger stride-to-stride variability, present in PwMS, were correlated to fatigue levels.
Taborri et al. (2023)	Tri-axial linear accelerometer, a tri-axial gyroscope, and a tri-axial magnetometer (Xsens)	Leg and Foot	Walking-related fatigue leads to variable gait kinematics in MS, in terms of changes in ROM and increases in variability and asymmetry.
Physical Activity (PA) and Daily Function			
Abbadessa et al. (2021)	Accelerometer (Samsung Gear S2 smartwatch)	Hand	A moderate negative correlation exists between maximum number of daily steps and Fatigue Severity Scale.
Pau et al. (2020)	Tri-axial accelerometer (Actigraph GT3X)	Hand	Women, but not men, with MS exhibit reduced step counts and vector magnitude counts, correlated with decrements in PA due to fatigue.
Schonherr et al. (2025)	Smartphone (Nokia 8)	Leg	Higher FSMC scores correlated with lower step count, cadence, and velocity in PwMS.
Physiological Measures			
Galperin et al. (2024)	HR Sensor (H10 Polar Chest Strap) Inertial Sensors (OPALs)	Chest, Back, and Foot	Trait and state physical fatigue can be estimated using gait and heart rate measures.
Moebus et al. (2020)	Sensors for weather and vitals, Accelerometer (Everion, Biofourmis AG) Smartphone (brand not specified)	Arm and Smartphone (unspecified location)	Electrodermal activity is significantly correlated to VAS fatigue ratings.
Gait and Physiological Measures			
Galperin et al. (2024)	HR Sensor (H10 Polar Chest Strap) Inertial Sensor (OPALs)	Chest, Back, and Foot	Trait and state physical fatigue can be estimated using gait and heart rate measures.
Gashi et al. (2024)	Vitals Sensor, Accelerometer (Everion, Biofurmis) Smartphone (brand not specified)	Arm	At least one feature related to HR, HRV, blood pulse wave (BPW), phone usage, and performance test is significantly correlated to the FSMC (mostly negative).
Olmo et al. (2020)	Smartphone (Samsung S5 mini)	Waist	Simple gait measures alongside motor evoked potentials and subjective scales correlate to fatigue.

Group 6

Title: Relationship Between Oral Contraceptives and Cholesterol in Adolescent Females for Cardiovascular Screening: A Systematic Review

Authors: Cori Capar, SPT, Annie Duffy, SPT, Delaney Guard, SPT, Anthony Carusotto, PT, DPT, EdD

Purpose/Hypothesis: To determine the relationship between oral contraceptives (OC) and cholesterol levels in adolescent females in relation to cardiovascular (CV) health screening.

Materials and Methods: Literature search from 1990 to the present was conducted in EBSCO, Proquest, Pubmed, Science Direct, Wiley, and by hand, using search terms: ("oral contraceptives") AND ("cholesterol level" OR "cholesterol" OR "serum cholesterol") AND ("adolescent female" OR "young woman" OR "young women"). Search limits: Human subjects, peer-reviewed, English language. Selection criteria: adolescent females, as defined by WHO, (ages 10-19) with OC use. Each study was independently assessed for methodological quality by two reviewers who reached consensus using the Oxford Centre for Evidence-Based Medicine (OCEBM) Levels of Evidence (2011).

Results: Of 3,858 articles screened, 7 met selection criteria. All were scored OCEBM level 3. Sample sizes ranged from 33 to 22,682 participants from ages 12-19, with a total of 25,550 oral contraceptive (OC) users. Three articles found higher total cholesterol (TC) levels in OC users compared to non-users (148.06±23.78 to 184.15±36.35 mg/dL),[1] (4.33 mmol/l to 4.43 mmol/l),[2] (0.4 mmol/l higher than non-users.).[3] One found increases in high-density lipoprotein (HDL) with OC use (40.24±10.07 mg/dL to 53.94±14.59 mg/dL.[1] One found decreases in HDL with OC use (1.54 mmol/l to 1.40 mmol/l).[2] Three found increases in low-density lipoprotein (LDL) with OC use (91.7±19.15 mg/dL to 111.39±37.5 mg/dL),[1] (15.4 mg/dl increase from baseline to followup),[4] (2.79 mmol/l to 3.03 mmol/l).[2] Three found higher triglyceride (TG) levels in OC users compared to non-users (80.52±32.34 mg/dL to 99.45±44.74 mg/dL),[1] (19.6 mg/dl increase from baseline to followup)[5], (0.38 mmol/l higher than non-users).[3] One found higher odds of hypertriglyceridemia in OC users than non-OC users (OR 3.45, 95% CI:(2.56-4.65)) after adjusting for existing risk factors.[5] One found increased prevalence of dyslipidemia with OC use (31.6%).[6] One found no associations between OC use and TC, HDL, LDL, or TGs.[7]

Conclusions: There is moderate level of mixed evidence that relates OC use and cholesterol in adolescent females to CV health. Limitations include a natural accumulation of CV risk factors from genetics and socioeconomics, lack of differentiation between various OC formulations, and self-selection bias. Future research should include long term effects of OC use on cholesterol and other metabolic parameters, and investigate mechanisms by which specific formulations and doses of OC impact lipid metabolism with larger sample sizes and longer duration.

Clinical Relevance: Healthcare providers, including physical therapists (PTs), should educate young females on links between OC use and CV risk factors, given that OCs are now available over the counter. Cholesterol screening could aid early detection of cardiometabolic risk factors and prompt discussion about preventative measures and implementation of lifestyle interventions in which physical therapy plays an important role. Exercise is crucial for PTs working with adolescent females as it has been shown to reduce cholesterol levels, promoting long-term CV health.[8]

* Accepted for poster presentation at APTA Combined Sections Meeting (CSM), Anaheim, CA, February 2026; Cardiovascular Section

Article	OCEBM Level	Age Group	Key Findings	Study Type
Barros et al. (2022) n = 22,682	3	12-17 years old	Statistically significant relationship between OC use and hypertriglyceridemia, with a 2.95-fold increase. Increased odds of higher TC and HDL in OC users without a statistically significant relationship.	Cross-sectional Study
Creatsas et al. (1991) n = 50	3	15-18 years old	No statistically significant relationship between OC use and levels of TC, HDL, LDL, or TG levels in female adolescents after three and six months of use.	Cohort Study
de Araújo et al. (2024) n = 2076	3	14-17 years old	Adolescent women who use OCs had increased prevalence of dyslipidemia. Adolescent OC users had higher prevalence of these risk factors occurring together: high blood pressure, dyslipidemia, and insulin resistance.	Cross-sectional, Retrospective Cohort Study
Guazzelli et al. (2005) n =33	3	14-19 years old	OC use is associated with elevations in TC, HDL, LDL, and TG levels. Statistically significant elevation in TC, HDL, LDL, and TG levels after T1, T2, and T3 years. Findings suggest that prolonged use of OCs may induce the beginnings of atherogenesis. In the T2 and T3 years, cholesterol, HDL, LDL, and TG levels did not differ substantially from those obtained in T1.	Longitudinal/Prospective Cohort Study
Staudt et al. (2024) n = 317	3	14-19 years old	OC use in females is associated with elevated LDL and TG levels.	Prospective Cohort Study
Truthmann et al. (2024) n = 343	3	6-8 years old at baseline **AND** At least 18 years old at follow-up	OC use in females is associated with elevated TC, elevated LDL levels, and decreased HDL in young adulthood.	Longitudinal Study
Nawrot et al. (2003) n = 120	3	Average age 17.4 years old	OC use in female adolescents is associated with elevated serum TG and TC levels.	Cross-sectional Study

OC = oral contraceptive
TC = total cholesterol
HDL = high-density lipoprotein
LDL = low-density lipoprotein
TG = triglycerides

Group 7

Title: Impact of Virtual Reality Rehabilitation on Depression in People with Parkinson's Disease: A Systematic Review*

Authors: Francesca Melisi, SPT, Hanna Robinson, SPT, Samantha Sercia, SPT, Dana Maida, PT, DPT, Renée M. Hakim, PT, PhD

Purpose/Hypothesis: Persons with Parkinson's Disease (PwPD) often demonstrate increased depression levels which may impact rehabilitation progress. The purpose of this systematic review was to synthesize current literature regarding the effects of virtual reality (VR) on depression in PwPD.

Methods: A literature search of ScienceDirect, PubMed, Wiley, and Sage, was conducted using search terms: "Parkinson's disease" AND "depression" AND "virtual reality." Search limits: English language, human subjects and peer reviewed. Selection criteria: PwPD, virtual reality (VR) and use of a standardized outcome measure for depression. Methodological quality was assessed by two independent reviewers who came to consensus using OCEBM Levels of Evidence (2011).

Results: Total search yield included 909 studies. After detailed appraisals, 7 studies were selected: 5 randomized controlled trials (Level 2) and 2 single group pre/posttest studies (Level 3). Samples ranged from 10-90 PwPD (Total=250; age range 48-74 years, H&Y 2-3). Both immersive (IVR; n=3; headset, interactive room) and non-immersive (NIVR; n=4; Wii, Kinect, cycle with screen) VR systems were used for 15-90 minutes, 1-5x per week for 4-12 weeks. Overall, 5 of 7 studies found statistically significant reductions in depression following VR. Two studies found statistically significant between-group differences in favor of NIVR (Wii: post BDI=18.2pts, Kinect: post HADS= 9.0pts) vs. control (post BDI=20.6pts; post HADS=10.8pts). Statistically significant within-group reductions were found with Wii (BDI=-2.2pts; PDQ-39=-2.4pts) and headset (BDI=11.87pts), but not for Kinect (HADS=-0.4pts) or with Wii on one outcome (HAM-D=-6.5pts). One study using IVR found statistically significant between-group reduction (BDI=-10.5pts). No adverse effects were reported across all studies.

Conclusions: There is moderate level evidence with mixed findings regarding the impact of VR on depression in PwPD, with some favorable outcomes using NIVR & IVR. Limitations included small sample sizes, no follow up periods, COVID-19, time period, and widely variable protocols. Further research with standardized VR protocols/outcomes are needed considering factors such as type of depression, medications, comorbidities, and stage of PD.

Clinical Relevance: Although VR did not have a consistent impact on depression, it may enhance adherence and enjoyment of therapy which could support mental well-being and improve outcomes. Two instances of clinically significant reduction in depression were reported with Wii NIVR (HAM-D; MCID=3-5pts) and IVR (BDI; MCID=5pts). Clinicians may consider incorporating low cost and commercially available VR systems to potentially enhance participation. Use of VR as part of a holistic treatment plan based on patient-centered goals may provide a motivating and engaging supplement to traditional PT interventions for PwPD experiencing depression.

* Accepted for poster presentation at APTA Combined Sections Meeting (CSM), Anaheim, CA, February 2026; Academy of Neurologic PT section, Degenerative Diseases Special Interest Group (SIG)

Table 1. Summary of Virtual Reality (VR) Training Parameters

Search Yield	909 studies screened → 7 included
Study Design	5 RCTs (Level 2 evidence) 2 Single-group pre/post (Level 3 evidence)
Sample	Total n = 250 (10–90 per study)
Age	Age: 48–74
H&Y	Stages: 2–3
VR systems	Immersive VR (n=3): headset, interactive room Non-immersive VR (n=4): Wii, cycle with screen
Dosage/FITT parameters	30–60 minutes per session 2–5x per week Duration: 4–10 weeks

Table 2. Results of VR Training Programs on Depression Outcomes

Outcome Measures	VR types	Pre-Test Scores	Post-Test Scores	P values	Minimal Clinically Important Differences (MCID)
HAM-D	Wii (NIVR)	9.7 +/- 8.1	3.2 +/- 4.8	p=0.063	27.1% +/- 25.7%^
PDQ-39*	Wii (NIVR)	13.5 +/- 6.9	11.1 +/- 4.2	p<0.05*	–
BDI*	Wii (NIVR)	20.4 +/- 0.9	18.2 +/- 2.0	p<0.05*	5
BDI	Headset (IVR)	24.32	12.45	p<0.05*	5^
BDI	Headset (IVR)	10.45 +/- 11.08	11.0 +/- 11.1	p=0.671	5
GDS	Interactive room (IVR)	11	10	p=0.99	0.93
GDS-SF	Cycling (NIVR)	3.33	2.0	p=0.16	5
PROMIS-29	Cycling (NIVR)	48.94	46.76	p=0.37	3-5
HADS	Kinect (NIVR)	9.4	9.0	p=0.046	3.3-3.8

* Denotes statistical significance; BDI(n=3) = Beck Depression Inventory; HAMD (n=1) = Hamilton Depression Scale,PDQ-39 (n= 1); GDS (n=1)= Geriatric Depression Scale; GDS-SF(n=1) = Geriatric Depression Scale Short Form; PROMIS- 29 (n=1) = Patient-Reported Outcome Measurement Information ; HADS (n=1) = Hospital Anxiety and Depression Scale

Group 8

Title: Effects of Frontloading Home Health Visits on Hospital Readmissions in Older Adults: A Systematic Review*

Authors: Ashley Benham, SPT, Tracey Collins, PT, PhD, MBA, Sophia McMullan, SPT, Cosette Talarico, SPT, Courtney Zaic, SPT

Purpose/Hypothesis:
Value driven healthcare has sharpened focus on post-acute care and strategies to improve quality or reduce costly hospital readmissions. One strategy concentrates home health (HH) visits earlier in a home health episode, or frontloading.[1] The purpose of this systematic review was to analyze the effect of frontloading visits in HH on hospital readmissions in older adults.

Materials and Methods:
A literature search of ScienceDirect, EBSCOHost, Proquest, and PubMed was conducted with the following search terms: ("frontloading" OR "front load") AND ("home health" OR "home health care") AND ("hospital readmission") AND ("older adults"). Search limits: humans, last 5 years, peer reviewed, and English language. Selection criteria: individuals ≥ 65 years old and received frontloading in the home health care setting. Two researchers independently assessed each study for methodological quality using the MINORS scale and the JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies.

Results:
975 articles were screened for eligibility and 4 met the selection criteria: all were 4 analytical cross-sectional. All 4 studies were conducted in the United States. Sample sizes ranged from 1,344 - 786,734 (n=1,372,654). Participants were ≥ 65 years old and received frontloaded HH after hospital discharge. All 4 studies were rated as high quality of evidence on the JBI (3 with 6/8, 1 with 7/8). All 4 studies were rated as moderate quality of evidence on the MINORS scale (3 were 8/16, 1 was 16/24). Two articles used odds ratio (OR) to assess rate of readmission and found statistically significant evidence to support the use of frontloading HH visits to decrease risk of hospital readmission.[2,4] Both articles also found that HHC initiated more than a week after initial discharge was correlated with dramatically higher chances of readmission.[2,4] Two articles used risk/hazard of readmission and found a moderately strong correlation between frontloading of HH visits and readmission risk reduction when initiated within the first 14 days post-discharge.[3,5] Overall, 4 articles found that frontloading HH visits decreased the risk of readmission in older adults.[2-5]

Conclusions: Moderate to high quality of evidence from a limited number of studies supports that frontloading HH visits reduces the rate of hospital readmission in geriatric patient population. Limitations included data limited to Medicare fee-for-service (FFS) beneficiaries, and unmeasured socioeconomic/personal demographic factors, prior level of function, and reasoning for missed episodes of care. Future research should include the effects of frontloaded HH physical therapy on hospital readmission and address strategies to increase compliance with HHC treatment plans.

Clinical Relevance: HH professionals, including physical therapists, should consider frontloading their visits for geriatric patients to reduce the risk of hospital readmission. As hospital readmission is a quality-of-care measure, lower numbers of readmissions can help improve home health agency quality ratings and may limit care discrepancies reported across the US.

* Accepted for platform presentation at APTA Combined Sections Meeting (CSM), Anaheim, CA, February 2026; Home Health Section

MINORS Scale

Authors	1 Clearly Stated Aim	2 Inclusion of Consecutive Patients	3 Prospective Collection of Data	4 Endpoints Appropriate to Aim of Study	5 Unbiased Assessment of the Study Endpoint	6 Follow-up Period Appropriate to Aim of Study	7 Loss of Follow-up Less than 5%
McLaughlin et al, 2024	2	2	0	2	0	0	0
Smith et al, 2021	2	2	0	2	0	0	0
Wang et al, 2019	2	2	0	2	0	0	0
Tak et al, 2021	2	2	0	2	0	0	0

Authors	8 Prospective Calculation of Study Size	9 Adequate Control Group	10 Contemporary Groups	11 Baseline Equivalence of Groups	12 Adequate Statistical Analysis	Total
McLaughlin et al, 2024	2	N/A	N/A	N/A	N/A	8/16
Smith et al, 2021	2	2	2	2	2	16/24
Wang et al, 2019	2	N/A	N/A	N/A	N/A	8/16
Tak et al, 2021	2	N/A	N/A	N/A	N/A	8/16

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Group 9

Title: Validity of Non-sagittal Hop Tests After ACL Reconstruction: A Systematic Review*

Authors: Asiedu-Wiafe AA, Franek KJ, Kummery DC, McCormack KM, Crowell MS

Purpose/Hypothesis: Sagittal plane hop tests may overlook deficits in lower extremity function, particularly in the quadriceps. This systematic review assessed the criterion-related validity of non-sagittal hop tests after anterior cruciate ligament reconstruction (ACLR).

Materials and Methods: A literature search was conducted in EBSCO, ProQuest, PubMed, and SpringerLink using the terms: ('non sagittal' OR 'vertical jump' OR 'hop test') AND (ACL OR 'anterior cruciate ligament') AND (quadriceps OR reinjury OR asymmetry). The search was limited to English-language, human research articles from scholarly journals within the past 10 years. Studies were included if they assessed any non-sagittal hop test in patients post-ACLR and compared results with quadriceps strength, hop performance, reinjury risk, or return to sport (RTS). Two reviewers independently assessed methodological quality using the NIH Study Quality Assessment Tool (2021).

Results: Of 399 articles screened, 9 met selection criteria. There were two prospective cohort studies (one rated as good quality and one rated as fair quality)[1,2], six cross-sectional studies (three rated as good quality and three rated as fair quality)[3–8], and one retrospective cohort study (rated as poor quality).[9] The total sample size was 524 patients (range 16-236), 354 of whom were female, with ages ranging from 16-50 years. Statistically significant, strong positive correlations were found between knee extensor strength and the single leg lateral hop (SLLH) (r=0.52-0.65)[2,6], side hop test (SHT) (r=0.61-0.64)[7,9], the single leg vertical jump (SLVJ) (r=0.60-0.77),[3,5] single leg medial hop (SLMH) (r=0.55-0.59)[6] and the single leg medial rotation hop (r=0.68-0.83)[3]. One study also found a strong association between SLVJ jump height and rate of force development (RFD) (r=0.64).[8] In terms of RTS, athletes who successfully returned at a median of 13 months post-surgery demonstrated significantly greater limb symmetry in the SLVJ than those who were unsuccessful (92.5% vs 87.2%, p=.04)[4]. Additionally, the SHT showed a significant, weak positive correlation with the Tegner activity scale (TAS) (r=0.38).[2] Finally, one study found no significant association between SHT and risk of any new ACL injury (graft rupture or contralateral tear) after ACLR (RR=0.59).[1]

Conclusions: There is strong, moderate-quality evidence supporting the concurrent validity of non-sagittal hop tests with knee extensor strength and RFD after ACLR. There is low-strength, moderate-quality evidence supporting the SHT's predictive validity for RTS, but not reinjury risk. Limitations included small sample sizes, gender-specific cohorts, and limited ACLR graft diversity. Future research should further evaluate the predictive validity of non-sagittal hop tests in predicting RTS and reinjury.

Clinical Relevance: Clinicians may consider nonsagittal hop tests to assess lower extremity function, particularly knee extensor strength, after ACLR. The SHT may also help predict RTS. However, until further evidence supports their concurrent validity with strength measures, isokinetic and isometric testing should remain the gold standard when available.

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Study	Study Type	Study Quality	Results
Kuwik 2024	Cross Sectional	Good	Strong correlation between knee extensor strength and SLVJ
Ohji 2024	Cross Sectional	Good	Athletes who successfully RTS at a median of 13 months post-surgery demonstrated significantly greater limb symmetry in the SLVJ
Ohji 2021	Cross Sectional	Fair	Strong correlation between knee extensor strength and SLVJ
Aizawa 2021	Cross Sectional	Fair	Strong correlation between knee extensor strength and both SLLH and SLMH
Chatzilamprinos 2024	Cross Sectional	Fair	Strong correlation between knee extensor strength and SHT
Graham 2024	Cross Sectional	Good	Strong association between SLVJ jump height and rate of force development (RFD)
Legnani 2025	Prospective Cohort	Good	Strong correlation between knee extensor strength and SLLH
Fältström 2021	Prospective Cohort	Fair	No significant association between SHT and risk of new ACL injury after ACLR
Stitelmann 2024	Retrospective Cohort	Poor	Strong correlation between knee extensor strength and SHT

Group 10

Title: The Optimal Rehabilitation Setting for Maximal Physical Recovery Post-TAVR in Older Adults: A Systematic Review*

Authors: Kaitlin Kremsky, SPT, Dana Maida, PT, DPT, Janette Scardillo, PT, DPT

Purpose: Transcatheter aortic valve replacement (TAVR) is performed for symptomatic aortic stenosis in persons 65-85 years. 30–40% report poor post-procedure functional recovery. No universal rehab protocol exists post-TAVR, contributing to low cardiac rehab (CR) referral rates and participation across settings. The purpose of this systematic review was to determine the optimal rehab setting post-TAVR for older adults to facilitate maximal physical recovery.

Methods: A literature search of Pubmed, Wiley, Proquest, and ScienceDirect was conducted. Search terms: ("TAVR" OR "transcatheter aortic valve replacement") AND ("physical therapy" OR rehabilitation OR physiotherapy) AND ("older adult" OR geriatric OR elderly). Search limits: English, peer reviewed, 2015-2025, humans. Selection criteria: mean age >65 years, TAVR, rehab intervention, specific setting, all study designs. 3 reviewers independently assessed each study for methodological quality and came to consensus using OCEBM Levels of Evidence (2011).

Results: 1,234 articles were screened and 10 (Levels 2-3) met selection criteria. Samples ranged from 27-19,789 (n=20,474, avg. age 81.1 years). CR began 0-110 days post-TAVR. CR was provided by PTs, physicians, nurses, or unspecified. Settings were acute care, unspecified inpatient (IP), home-based (supervised, unsupervised, unspecified), and outpatient (OP). 4/10 studies compared settings. OP CR had statistically significant improvement vs. unsupervised home CR in cardiopulmonary exercise testing and strength (n=1). Unspecified IP CR had statistically significant improvement vs. unsupervised home-based CR in 5MWT at 30 days and both 6MWT and strength at 1 year (1). Barthel Index (BI) scores were significantly higher for persons receiving acute care CR vs. those who did not (1). Short-term within group changes in 6MWT were reported with unspecified IP CR (4); 1 year maintenance of results was mixed (2/4). Unspecified IP CR showed within group frailty improvements (2) and BI significantly improved within groups for both unspecified IP (2) and unspecified home (1). Unsupervised home-based CR showed statistically significant within group improvements for 6MWT, 5MWT, and handgrip strength (1). Adverse events were reported, but none were directly attributed to CR (2).

Conclusions: Moderate-high levels of evidence support IP or OP CR as the optimal rehab setting post-TAVR for older adults compared to home-based CR. All settings found within-group changes. Limitations include few comparative studies across settings, variability across countries, and insufficient consideration of the clinical course of TAVR on physical recovery. Future studies should examine the effectiveness of CR between settings in older adults post-TAVR to enhance recovery.

Clinical Relevance: Although findings did not consistently identify the optimal setting for CR, older adults s/p TAVR may benefit from participating in any type of rehab to promote maximal recovery. Clinicians may choose to advocate for inpatient options when possible to enhance quality of life, preserve functional independence, and minimize rehospitalizations.

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Table 1: Between Group Statistically Significant Changes for Cardiac Rehab (CR) Settings

Article	Setting	Objective Measures and Categories					
		Aerobic Capacity and Endurance		Functional Mobility	Strength	Frailty	Health Related Quality of Life
		6 Minute Walk Test	Cardiopulmonary Exercise Testing	5 Meter Walk Test	Muscular Strength	Frailty Index	SF-36 Physical Component Summary
Kleczynski et al.[1]	Unspecified IP vs. Unsupervised Home CR	Unspecified IP only Yes (p=0.01 at 30 days and 6 months, p=0.04 at 12 months)		Unspecified IP only Yes (p=0.03 at 30 days only)	Unspecified IP only Yes (p=0.02 at 30 days, p=0.001 at 6 months, p=0.03 at 12 months)		
Vitez et al.[2]	Outpatient vs. Unsupervised Home CR	No (p=0.886)	No (p>0.05)		No (p>0.05)		No (p>0.05)
Rogers et al.[3]	Outpatient vs. Unsupervised Home CR	No (p>0.05)				No (p>0.05)	
Pressler et al.[4]	Outpatient vs. Unsupervised Home CR	No (p=0.428)	Yes (VO2 peak p=0.007, VO2AT p<0.001, Test duration p=0.025)		Yes (bench press p=0.002, rowing p<0.001, pulldown p=0.001, shoulder press p=0.008, leg press p=0.005)		

Table 2: Within Group Statistically Significant Changes for CR Settings

Article	Setting	Objective Measures and Categories							
		Aerobic Capacity and Endurance		Functional Mobility	Strength	Frailty	Health Related Quality of Life		ADL and Functional Independence
		6 Minute Walk Test	Cardiopulmonary Exercise Testing	5 Meter Walk Test	Muscular Strength	Frailty Index	SF-36 Physical Component Summary	SF-12 Physical Component Summary	Barthel Index
Yu et al.[5]	Unspecified IP and Unspecified Home CR	Yes (p<0.001)				Yes (p<0.001)			Yes (p<0.001)
Vitez et al.[2]	Outpatient CR	No (p=0.886)	Yes (Exercise time p=0.01, Workload p=0.01, VO2 peak p=0.049)		No (p>0.05)		No (p>0.05)		
Vitez et al.[2]	Unsupervised Home CR	No (p=0.886)	No (Exercise time p>0.5, Workload p>0.5, VO2 peak p>0.5)		No (p>0.05)		No (p>0.05)		
Kleczynski et al.[1]	Unspecified IP CR	Yes (p<0.001)		Yes (p<0.001)	Yes (p<0.001)				
Kleczynski et al.[1]	Unsupervised Home CR	Yes (p<0.001)		Yes (p<0.001)	Yes (p<0.001)				
Eichler et al.[6]	Unspecified IP CR	Yes (p<0.001)	Yes (p<0.001)			Yes (p<0.001)		Yes (p=0.001)	
Zanettini et al.[7]	Unspecified IP CR	Yes (p<0.001) No (p>0.05 at 6-12 months and 18-24 month follow up)							Yes (p<0.001)
Katano et al.[8]	Acute care								Yes (p<0.001)
Pressler et al.[4]	Outpatient CR	Yes (p<0.05)	Yes (VO2 peak p<0.05, VO2AT p<0.05, Test duration p<0.05)		Yes (bench press p<0.05, rowing p<0.05, pulldown p<0.05, shoulder press p<0.05, leg press p<0.05)		**KEY:** ADL= Activities of daily living, CR= cardiac, IP=inpatient, rehabilitation, VO2= maximum oxygen consumption, VO2AT = oxygen consumption at the anaerobic threshold		**PLEASE SCAN FOR REFERENCES**
Pressler et al.[4]	Unsupervised Home CR	No (p>0.05)	No (VO2 peak p>0.05, VO2AT p>0.05, Test duration p>0.05)		No (bench press p>0.05, rowing p>0.05, pulldown p>0.05, shoulder press p>0.05, leg press p>0.05)				