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Annual
Doctor of Physical Therapy
Research Presentations

Friday, November 10, 2017, 5:30 PM to 9 PM, DeNaples Center 4th Floor
Moskovitz Theater

100% of the systematic reviews presented this year have been accepted by the APTA for presentation at the CSM in February 2018 in New Orleans, Louisiana

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 to the determination.

This course is approved for 3 general contact hours.
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University of Scranton Physical Therapy:
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Group 1

The Effectiveness of Virtual Reality as an Intervention to Decrease Chronic Low Back Pain in Adults as Compared to Standard Therapeutic Intervention: A Systematic Review

Amanda Kuptsow, Patrick McCarty, Elizabeth Tapia, David Wisowaty, Dr. Leininger

Platform

Group 2

Aquatic Interventions Compared With Conventional Land-Based Therapy to Improve Balance and Mobility in Persons with Parkinson's Disease: A Systematic Review

Shannon Cranmer, Margaret Mester, Elizabeth Palladino, Dr. Hakim

Platform

Group 3

Impact of Home Modifications on the Promotion of Aging in Place by Improving Physical Performance in Older Adults: A Systematic Review

Caitlin Counihan, Amanda Massar, Kaitlin Mulroy, Dr. Collins

Poster

Group 4

The effectiveness of Transcranial Direct Stimulation on Ambulation in Persons with Parkinson's Disease: A Systematic Review

Brian Esterle, Lindsay Fluehr, Caitlin Liberatore, Melissa McEnroe, Dr. Hakim

Poster

Group 5

Evaluating the Effects of a Cardiac Rehabilitation Program Gender-Tailored for Women with Coronary Artery Disease: A Systematic Review

Rachel Conniff, Alana Papa, Angela Parry, Dr. Sanko

Poster

Group 6

Telerehabilitation Compared to Conventional Physical Therapy in Improving Physical Functioning in Community-Dwelling Adults: A Systematic Review

Brian C Lavado, Margaret K Ortlieb, Megan R Rohleder, Dr. Wagner, Dr. Hakim

Poster

Group 7

Effectiveness of Aquatic Therapy on Increasing Range of Motion and Decreasing Pain in the Rehabilitation of Patients with Shoulder Pathologies: A Systematic Review

David Kearney, Ryan Lumia, Evan Siegel, Scott Szemenyei, Dr. Leininger

Poster

Group 8

The Impact of Using a Unilateral Microprocessor Prosthetic Knee for Individuals with Transfemoral Amputation on Functional Mobility: A Systematic Review

Heather Derenick, Christopher Falvo, Tyler Savakinas, Blaire Wilkie, Dr. Leininger, Dr. Hakim

Poster

Group 9

The Effect of Augmented Reality Visual Cues on Temporal-Distance Gait Parameters in Individuals with Parkinson's Disease: A Systematic Review

William Connell, Alexandra Crowley, Cassandra Fitzgerald, Samantha Marri, Dr. Hakim

Poster

Group 10

Feasibility, Safety, and Functional Impact of Physical Therapy During Hemodialysis: A Systematic Review

Kimberly Kirkpatrick, Nicholas Longobardi, Kyle Reavey, Dr. Maida, Dr. Wagner

Platform

Group 11

A Systematic Review of the Effects of Robotic Assisted Stepping to Increase Cardiovascular Fitness in Individuals with Incomplete Spinal Cord Injury

Ashley Dole, Corinne Engel, Emily Janusko, Dr. Sanko

Poster

Group 12

The Effect of Community-Based Rehabilitation on Adults with Traumatic Brain Injury: A Systematic Review

Kevin Guenther, Alexandra Nachtman, Sean Scully, Maureen Taylor, Dr. Hakim, Dr. Schwartz

Poster

Group 13

The Use of Topical Olive Oil as an Effective Preventative Measure for Pressure Ulcers: A Systematic Review

Lauren Krasucki, Jessica Pankey, Christina Serzan, Jennifer Vondercrone, Dr. Collins

Poster

All Evidence is not Created Equal

http://www.orthopaedicprotocols.com/wp-content/uploads/2011/03/EBPRACT.pdf

PEDro 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.

Criteria 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/

Sackett Levels of Evidence

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

MINORS Scale:

Table 2. The revised and validated version of MINORS

Methodological items for non-randomized studies	Score†
1. **A clearly stated aim:** the question addressed should be precise and relevant in the light of available literature 2. **Inclusion of consecutive patients**: all patients potentially fit for inclusion (satisfying the criteria for inclusion) have been included in the study during the study period (no exclusion or details about the reasons for exclusion) 3. **Prospective collection of data**: data were collected according to a protocol established before the beginning of the study 4. **Endpoints appropriate to the aim of the study**: unambiguous explanation of the criteria used to evaluate the main outcome which should be in accordance with the question addressed by the study. Also, the endpoints should be assessed on an intention-to-treat basis. 5. **Unbiased assessment of the study endpoint**: blind evaluation of objective endpoints and double-blind evaluation of subjective endpoints. Otherwise the reasons for not blinding should be stated 6. **Follow-up period appropriate to the aim of the study**: the follow-up should be sufficiently long to allow the assessment of the main endpoint and possible adverse events 7. **Loss to follow up less than 5%**: all patients should be included in the follow up. Otherwise, the proportion lost to follow up should not exceed the proportion experiencing the major endpoint 8. **Prospective calculation of the study size**: information of the size of detectable difference of interest with a calculation of 95% confidence interval, according to the expected incidence of the outcome event, and information about the level for statistical significance and estimates of power when comparing the outcomes *Additional criteria in the case of comparative study* 9. **An adequate control group**: having a gold standard diagnostic test or therapeutic intervention recognized as the optimal intervention according to the available published data 10. **Contemporary groups**: control and studied group should be managed during the same time period (no historical comparison) 11. **Baseline equivalence of groups**: the groups should be similar regarding the criteria other than the studied endpoints. Absence of confounding factors that could bias the interpretation of the results 12. **Adequate statistical analyses**: whether the statistics were in accordance with the type of study with calculation of confidence intervals or relative risk	

†The items are scored 0 (not reported), 1 (reported but inadequate) or 2 (reported and adequate). The global ideal score being 16 for non-comparative studies and 24 for comparative studies.

The items are scored 0 (not reported), 1 (reported but inadequate), or 2 (reported and adequate).

MINORS is a valid instrument designed to assess the methodological quality of non-randomized studies, whether comparative or non-comparative.

Stage	Hoehn and Yahr Scale	Modified Hoehn and Yahr Scale
1	Unilateral involvement only usually with minimal or no functional disability	Unilateral involvement only
1.5	-	Unilateral and axial involvement
2	Bilateral or midline involvement without impairment of balance	Bilateral involvement without impairment of balance
2.5	-	Mild bilateral disease with recovery on pull test
3	Bilateral disease: mild to moderate disability with impaired postural reflexes; physically independent	Mild to moderate bilateral disease; some postural instability; physically independent
4	Severely disabling disease; still able to walk or stand unassisted	Severe disability; still able to walk or stand unassisted
5	Confinement to bed or wheelchair unless aided	Wheelchair bound or bedridden unless aided

1

Amanda Kuptsow, Patrick McCarty, Elizabeth Tapia, David Wisowaty

TITLE: THE EFFECTIVENESS OF VIRTUAL REALITY AS AN INTERVENTION TO DECREASE CHRONIC LOW BACK PAIN IN ADULTS AS COMPARED TO STANDARD THERAPEUTIC INTERVENTION: A SYSTEMATIC REVIEW

Purpose/Hypothesis: To determine the effectiveness of virtual reality (VR) as an intervention to decrease chronic low back pain (LBP) in adults as compared to conventional physical therapy (PT) intervention.

Number of Subjects: N/A

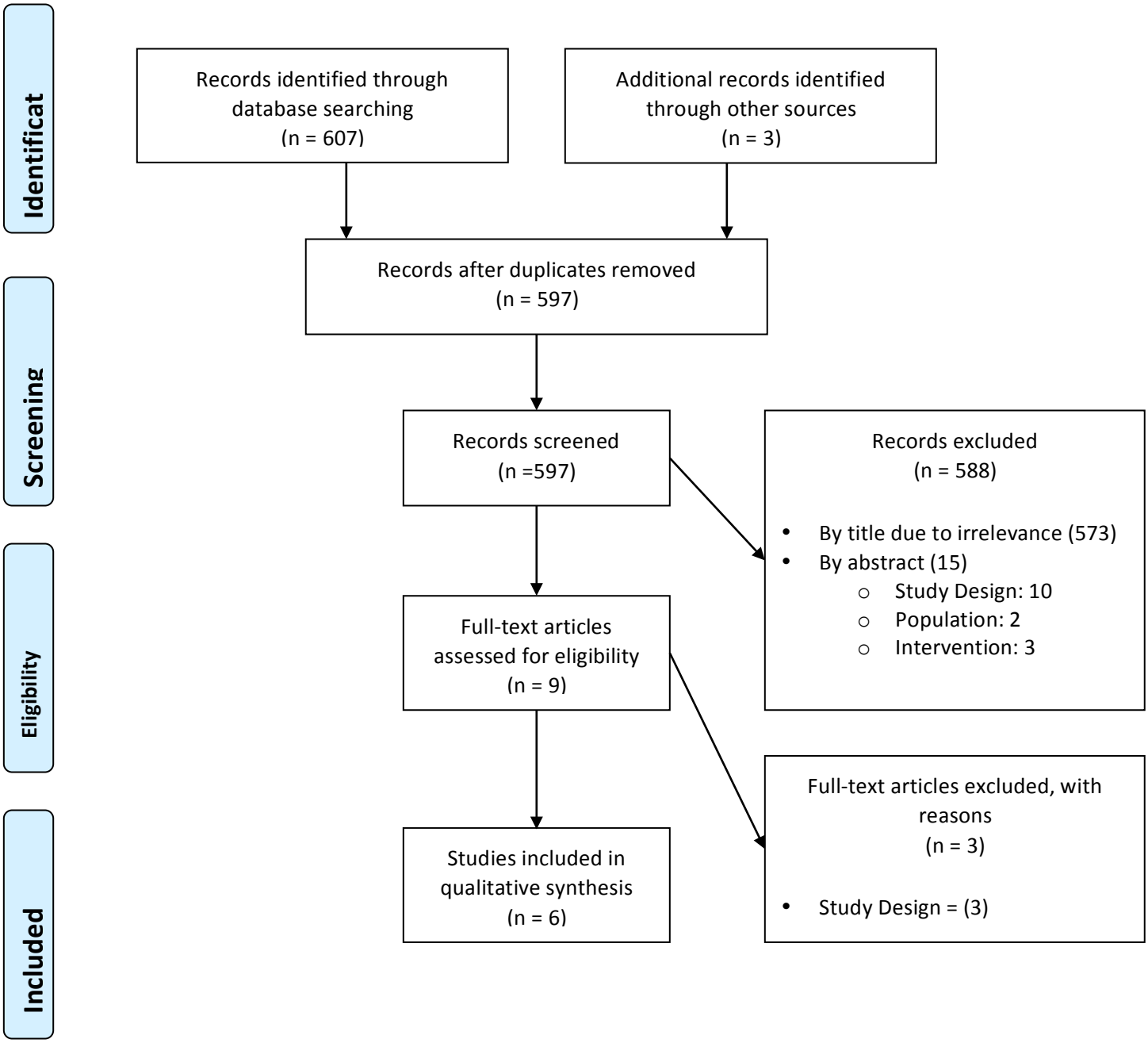
Materials/Methods: A literature search of MEDLINE/Pubmed, Proquest, CINAHL, Cochrane Library, and ScienceDirect was conducted using search terms: (virtual reality OR VR OR virtual reality gaming OR gaming) AND (back pain OR chronic back pain OR low back pain OR LBP). Search limits included: English language and human subjects. Selection criteria included: diagnosis of chronic low back pain (> 2 months), adults 18 years and older, randomized controlled trials (RCT), interventions including VR, and assessment using a valid pain scale. Two reviewers independently assessed each study for methodological quality and came to consensus based on PEDro guidelines.

Results: A total of 486 articles were screened for eligibility. After detailed screening, 6 RCTs fulfilled selection criteria. PEDro scores ranged from 5-10/10 (avg. = 6.7). Samples ranged from 21 to 52 subjects (207 total). Average age of subjects ranged from 24 to 68 years old. Five of 6 studies reported baseline average LBP ranging from 6-7 on a visual analog scale (VAS) (avg. = 6.56). Virtual reality intervention was performed for an average of 22.2 minutes per session (range: 8 to 30 minutes). Four of 6 studies reported 3-5 VR sessions (avg. = 3.5) per week for 2-8 weeks (avg. = 5.5). All 6 studies used non-immersive VR and reported significant within group differences in pain reduction for VR groups. Four of 6 studies also compared between group differences. Of these studies, 2 found statistically significant reductions in pain for groups receiving VR with conventional PT or VR alone, compared to conventional PT. Other clinically significant benefits of VR reported in the studies included: improved program adherence, well-being, motivation, and a decrease in fear avoidance behavior.

Conclusion: There is moderate to strong evidence to suggest that VR is an effective intervention for decreasing chronic LBP in adults when combined with conventional PT. There is limited evidence that VR alone, or in conjunction with conventional PT, is better than conventional PT alone for decreasing LBP. Limitations included variable treatment parameters and VR interventions, and a lack of between group comparisons in some studies. Future studies should examine pain reduction in VR only groups as compared to conventional PT groups.

Clinical Relevance: Virtual reality provides a novel opportunity for task-specific training in a stimulated, safe environment. Emerging evidence suggests that VR helps to increase adherence, motivation, and break the cycle of fear avoidance behaviors associated with chronic LBP. Virtual reality programs for 20-25 minutes per session, 3-5 times per week, for 5-6 weeks are recommended for pain reduction. Clinicians should consider VR as an adjunct to conventional PT to improve delivery of patient care.

PRISMA


Identificat
Screening
Eligibility
Included
Records identified through database searching (n = 607)
Additional records identified through other sources (n = 3)
Records after duplicates removed (n = 597)
Records screened (n =597)
Records excluded (n = 588)
By title due to irrelevance (573)
By abstract (15)
Study Design: 10
Population: 2
Intervention: 3
Full-text articles assessed for eligibility (n = 9)
Full-text articles excluded, with reasons (n = 3)
Study Design = (3)
Studies included in qualitative synthesis (n = 6)

2

Aquatic Interventions Compared with Conventional Land-Based Interventions to Improve Balance and Mobility in Persons with Parkinson's Disease: A Systematic Review

Purpose/Hypothesis: The purpose of this study was to determine the impact of aquatic intervention (AI) compared with conventional land-based interventions (LBI) on balance and mobility in persons with Parkinson's Disease (PD). Number of Subjects : N/A

Materials/Methods: A literature search of CINAHL, ProQuest, Pubmed/MEDLINE, Science Direct, and hand searching was conducted using search terms: (aquatic therapy OR aquatic exercise OR aquatherapy OR water based exercise) and (Parkinson* disease). Search limits: English, peer-reviewed (2007-2017).

Selection Criteria: ambulatory subjects at least age 18 with PD, comparison of AI to LBI intervention, and outcomes included balance and/or mobility. Two reviewers independently assessed each study for methodological quality and came to consensus based on PEDro guidelines.

Results: A total of 41 articles were screened for eligibility. Following detailed appraisals, 8 controlled studies met the criteria. PEDro scores ranged from 5-8 (mean=6.63). Maximum PEDro score was 8/10 due to inability to blind participants and providers of AI. Sample sizes ranged from 12-89 subjects (289 total) with average age ranging from 62-71 years (H&Y stages 1-3). Therapy duration ranged widely from 4-16 weeks with 45-60 minute sessions, 1-6 times/week. Four studies compared LBI vs AI, 2 LBI vs LBI/AI, 1 AI vs AI/callisthenic exercises, and 1 AI vs 4 other groups. Varied outcome measures assessed balance (BBS, FR, TUG, ABC Scale, postural sway, falls diary, FES, SPPB), PD-specific function (UPDRS, PDQ-39), and gait (5MWT, kinetic/kinematic data, FOG). 4 of 5 studies found statistically significant improvements between groups in balance (BBS) for AI. 1 of 5 studies found statistically significant improvements between groups in mobility (TUG) for AI. 2 of 7 studies using the UPDRS and 1 of 2 studies using the PDQ-39 found statistically significant improvements between groups for AI. 1 of 2 studies found statistically significant improvements within groups in gait speed for AI. Overall, 7 of 8 studies found AI as beneficial as LBI in the treatment of PD. No adverse effects were noted in the studies.

Conclusions: There is moderate evidence in support of using AI as an adjunct treatment for individuals with PD to improve balance and mobility. Limitations included small sample sizes, varied protocols/measures, lack of long-term follow-up, and interventions impossible to blind to participants/providers. Future studies should focus on determining optimal training parameters and impact on quality of life.

Clinical Relevance: Introducing a treatment option that is both enjoyable and feasible for long-term care is important owing to the progressive nature of PD. AI can be performed individually, with a PT, or in a group exercise class with social benefits. Clinicians should consider implementation or referral, as AI is a safe and effective option to improve balance and mobility in persons with PD.

PEDro Classification

Study	1	2	3	4	5	6	7	8	9	10	11	Score/10
Vivas J et al ('11)	Y	Y	N	Y	N	N	N	Y	N	Y	Y	5
Cancela J et al ('15)	Y	N	N	Y	N	N	N	Y	Y	Y	Y	5
Ayan C et al ('14)	Y	N	Y	Y	N	N	N	Y	Y	Y	Y	6
Sage M et al ('11)	Y	N	N	Y	N	N	Y	Y	Y	Y	Y	6
Kurt EE et al ('17)	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	7
Palamara G et al ('17)	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	8
Volpe D et al ('14)	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	8
Perez-de la Cruz S ('17)	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	8
												Mean = **6.625**

Hoehn-Yahr Classification of Disability for Persons with Parkinson's Disease

Stage	Character of Disability
I	Minimal or absent; unilateral if present.
II	Minimal bilateral or midline involvement. Balance not impaired.
III	Impaired righting reflexes Unsteadiness when turning or rising from chair. Some activities are restricted, but patient can live independently & continue some forms of employment
IV	All symptoms present & severe. Standing & walking possible only with assistance.
V	Confined to bed or wheelchair.

3

TITLE: IMPACT OF HOME MODIFICATIONS ON THE PROMOTION OF AGING IN PLACE BY IMPROVING PHYSICAL PERFORMANCE IN OLDER ADULTS: A SYSTEMATIC REVIEW

Caitlin Counihan, Amanda Massar, Kaitlin Mulroy, Dr. Collins

ABSTRACT BODY

Purpose/Hypothesis: The purpose of this systematic review was to determine the impact of home modifications (HM) on aging in place by improving physical performance in older adults.

Number of Subjects: N/A

Materials/Methods: A literature search (2007-2017) of ProQuest (Health and Medical Complete, Nursing and Allied Health Source, Research Library), PubMed, ScienceDirect and Google Scholar was conducted using search terms ("home modification" OR "home modifications") AND "aging in place" AND "physical performance." Search limits: English, peer-reviewed, scholarly journals. Selection criteria: Older adults (age≥65), HM intervention, home setting, physical performance outcome. Two reviewers independently assessed each article for methodological quality and came to a consensus using the MINORS scale guidelines.

Results: A total of 53 articles were screened for eligibility. Following detailed appraisals, 4 articles met the criteria (3 cohort studies: 2 pre- and post-test, 1 cross-sectional; and 1 RCT). MINORS scores for 3 articles ranged from 7 to 15/16 (mean=12/16); the RCT scored 21/24. Sample size ranged from 12 to 234 (total=373). Three studies implemented HM to improve performance of activities of daily living (ADL) and satisfaction in the home. One study provided anecdotal information on behaviors and HM older adults use to accommodate for functional limitations. HM included reachers, grab bars, railings, night lights and adaptive bathroom equipment. Perceived barriers in the home included high shelving, stairs, lack of handrails and accessibility to the shower and toilet. Following HM, one study reported 75% of participants reduced the number of ADL they had difficulty completing, from 3.9 ADL to 2. Another study reported a statistically significant increase in ADL performance following HM (p<.0001). One study found 49% of participants improved physical function and in another, average FIM scores increased by 7 points. No significant changes in FIM scores were reported in another study, possibly due to ceiling effect. Three studies reported improvement in quality of life (QoL) and satisfaction. One article stated 77.6% of participants reduced home hazards, from an average of 3.3 hazards to 1.4.

Conclusions: Moderate preliminary evidence exists supporting HM for promoting aging in place and improving physical performance in older adults. HM have been shown to improve ADL performance, patient QoL, satisfaction and safety in the home. Limitations included study design, small sample size, lack of long-term follow-up and short study durations. Further research is needed to examine the long-term effects of HM and aging in place.

Clinical Relevance: Aging in place allows older adults to age comfortably in their home by improving QoL, environmental safety and independence. Clinicians should consider HM to promote aging in place and provide referrals when necessary (e.g. CAPABLE model, Occupational Therapy). HM are a feasible method to increase physical performance in older adults and may prolong admission to higher levels of care.

KEYWORDS: home modifications, aging in place, functional performance

Definitions:

1. **Aging in Place:** A phenomenon and preference for older adults to remain living in the community for as long as possible, and with some level of independence. Aging in place enables the maintenance of independence, autonomy, and connection to social support while providing meaning and security via familiarity with a space and social connections
2. **Home Modifications:** Include interventions and adaptations to the physical environment to support independent living among older adults. Home modifications commonly include: elimination of slip and trip hazards (e.g. throw rugs), installation of grab bars or handrails, night lights, and adaptive bathroom equipment
3. **Physical Performance:** Performance of activities of daily living (ADL), such as bathing, dressing, toileting, transferring, walking, and stairs.

MINORS Scores

(Articles)	Sheffield C Smith C Becker M	Stark S Landsbaum A Palmer J Somerville E Morris J	Lien LL Steggell CD Iwarsonn S	Szanton SL Leff B Wolff JL Roberts L Gitlin LN
1. Clearly Stated Aim	2	2	2	2
2. Inclusion of Consecutive Patients	2	2	2	2
3. Prospective Collection of Data	2	2	2	2
4. Appropriate Endpoints to Study Aim	2	2	1	2
5. Unbiased Evaluation of Endpoints	2	1	0	2
6. Appropriate Follow-Up Period	2	2	0	2
7. Loss to Follow Up Less than 5%	1	1	0	2
8. Prospective Calculation of Sample Size	1	2	0	1
Additional Criteria for Comparative Studies				
9. Adequate Control Group	2	N/A	N/A	N/A
10. Contemporary Groups	2	N/A	N/A	N/A
11. Baseline Equivalence of Groups	2	N/A	N/A	N/A
12. Adequate Statistical Analysis	1	N/A	N/A	N/A
Total:	**21/24**	**14/16**	**7/16**	**15/16**

4

TITLE: The effectiveness of transcranial direct stimulation on gait in persons with Parkinson's Disease: A systematic review

AUTHORS: Brian Esterle. Lindsay Fluehr, Caitlin Liberatore, Melissa McEnroe, Dr. Hakim

Abstract

Purpose/Hypothesis : The purpose of this study was to determine the effectiveness of transcranial direct current stimulation (tDCS) on gait for persons with Parkinson's Disease (PD).
Number of Subjects: N/A
Materials/Methods : A literature search of Proquest Central, MEDLINE/PubMed, CINAHL, and Cochrane Library was conducted using search terms: (Parkinson* OR PD) AND (Transcranial direct current stimulation OR tDCS OR tDC) AND (Gait OR mobility OR ambulation OR gait velocity) NOT (transcranial magnetic stimulation OR TMS). Search limits: English, human subjects, peer-reviewed, RCTs. Selection criteria: adults with PD, intervention included tDCS and an outcome measure of temporal-distance and/or complex gait. Two reviewers independently assessed studies for methodological quality and came to a consensus based on PEDro guidelines.
Results: A total of 52 articles were screened for eligibility. Following detailed appraisals, 7 RCTs met the criteria. PEDro scores ranged from 7 to 10(mean=9.14). Samples ranged from 10-25 subjects (128 total) with mild to moderate PD (H&Y I-IV; age range 40-80 yrs). Treatment parameters included 2 mA of tDCS applied to various brain areas (anterior to central zone or left dorsolateral prefrontal cortex) for treatment time ranging 13 to 20 min (during "on" phase), 3Xweek, for 2.5-4 weeks. 5 studies applied tDCS at rest, while 4 studies applied tDCS with gait training. Primary outcomes included: 10 m Walk Test, 6 min Walk Test, Timed Up and Go (TUG, TUGcog), Dynamic Gait Index (DGI). 2 studies showed statistically significant improvements in gait speed (+0.19 m/s) when combining tDCS with gait training or dual task conditions. 2 studies showed statistically significant improvements in TUG scores (-1.24 s) following tDCS combined with gait training. 1 study showed statistically significant improvements in TUG (29.18 +/- 24.17 to 24.35 +/- 18.97) and DGI (13.88 +/- 8.31 to 16.18 +/- 7.48) scores when evaluating gait immediately post-tDCS. Secondary outcomes that showed statistically significant improvements included cadence, bradykinesia, BBS, stride length and QOL. No adverse events were reported requiring drop-outs.
Conclusions: There is strong evidence (6 RCTs) to support the effectiveness of tDCS on improving gait in patients with PD. When combined with gait training, patients receiving tDCS showed accelerated and prolonged maintenance of effects of treatment compared to those with gait training alone. Limitations included small sample sizes, lack of follow-up on long-term effects, and treatment during "on" phases only. Further research is needed to determine optimal training parameters with long-term follow-up.
Clinical Relevance: Overall, there were greater improvements in gait when combining gait training with tDCS in patients with PD. All studies concluded that tDCS was a safe and feasible intervention to use when managing patients with PD. Based on resources and availability, clinicians should consider combining non-invasive tDCS with gait training for patients with mild to moderate PD in a rehab setting.

KEYWORDS: Parkinson's Disease, Transcranial Direct Current Stimulation, Gait

PEDro Scores

Study	1	2	3	4	5	6	7	8	9	10	**Total Score**
Schabrun et al	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10
Benninger et al	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10
Kaski et al	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	9/10
Cost-Ribeiro et al	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10
Lattari et al	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10
Swank et al	Y	N	Y	Y	N	N	Y	Y	Y	Y	7/10
Costa-Ribeiro et al (2)	Y	Y	Y	Y	N	N	Y	Y	Y	Y	8/10
Average Score: 9.14/10 **Strong Level of Evidence**											

5

Title: Evaluating the effects of a cardiac rehabilitation program gender-tailored for women with coronary artery disease: a systematic review

Authors: Rachel Conniff, SPT, Alana Papa, SPT, Angela Parry, SPT, John Sanko, PT, EdD

Purpose/Hypothesis: The purpose of this systematic review was to evaluate the effectiveness of gender-tailored cardiac rehabilitation for women (GTCR) vs. traditional cardiac rehabilitation (TCR) in women with coronary artery disease (CAD).

Number of Subjects: N/A

Materials/Methods: A literature search of Cinahl, ScienceDirect, PubMed, Academic Search Elite, Ovid, and Cochrane Library was conducted using search terms: (Cardiac rehab* OR cardiac rehabilitation) AND (gender tailored OR gender specific OR sex tailored OR women tailored). Search limits: 2007-2017, English, human subjects, peer-reviewed/scholarly journals, women/female, and RCTs. Selection criteria: adult women (>18 years) with CAD attending CR, intervention included GTCR vs. TCR measuring psychosocial and physiological outcomes. Two reviewers independently assessed each study for methodological quality and came to a consensus based on PEDro guidelines.

Results: A total of 91 articles were screened for eligibility. Following detailed appraisals, 10 RCTs met the selection criteria. PEDro scores ranged from 6 to 8/10 (avg= 7.2). Sample sizes ranged from 91-256 women (1726 total; avg. age 62.8) with CAD. Treatment parameters varied at 1-2 sessions/wk (60-150 min) with 12 wks average duration (range 12-26 wks). Exercises included stationary bicycle, treadmill, and walking at target HR. GTCR was targeted for women only and included motivational counseling based on the transtheoretical model (TTM) and educational sessions on co-morbidities commonly seen among women. Primary outcomes included psychosocial measures: depression, anxiety, perception of health, adherence, and QOL. Secondary outcomes included physiological measures: FCE (METS, Treadmill walking time (TWT)), BP, and fasting lipid profile. Statistically significant improvements of GTCR included adherence (5 studies), anxiety and depression (1 study), perceptions of health (1 study), QOL (2 studies), and diastolic BP (1 study). Statistically significant benefits found in both GTCR and TCR included triglyceride levels and systolic BP (1 study) and FCE (2 studies). METS improved an average of 26% and TWT improved 14%.

Conclusions: There is moderate to strong evidence supporting GTCR to improve psychosocial outcomes and exercise adherence among women with CAD. Both CR programs yielded improvements in physiological outcomes. Limitations include lack of diversity among women and all having access to health insurance. Future RCTs are needed to determine the effects of psychosocial outcomes and adherence in women from different ethnicities and socioeconomic status.

Clinical Significance: Physiological outcomes for GTCR were comparable to TCR for 12 weeks at 1-2 sessions/wk (60-150 min) of moderate-intensity exercise. The implementation of motivational strategies using the TTM and educational sessions about co-morbidities is feasible and easily implemented in CR to increase psychosocial outcomes and adherence among women with CAD. Clinicians should consider a more gender-tailored approach to further improve outcomes for women in CR.

Keywords: gender-tailored, cardiac rehab, transtheoretical model

TABLE 1

THE FOUR PROCESSES OF MOTIVATIONAL INTERVIEWING

Phase	Description
Engaging	The provider and patient establish a working relationship. The provider makes it clear that he or she is not there to tell the client what to do.
Focusing	The patient–provider dyad settles on an agenda. The provider maintains patient autonomy by focusing on the patient's most pressing concern.
Evoking	The provider elicits the patient's personal reasons for change. When done successfully, the patient will be voicing the arguments for change.
Planning	This phase is marked by the shift from the "why" of change, to the "when" and "how." The provider guides the patient to come up with the best options for him- or herself.

6

Title: Telerehabilitation compared to conventional physical therapy in improving physical functioning in community-dwelling adults: A systematic review.

Authors: Brian C Lavado, SPT; Margaret K Ortlieb, SPT; Megan R Rohleder, SPT; Barbara R Wagner, PT, DPT, MHA; Renée M Hakim, PT, PhD, NCS

Purpose/Hypothesis: The purpose of this systematic review is to determine if remote telerehabilitation (RTR) is comparable to conventional physical therapy (PT) to improve physical functioning in community-dwelling adults.

Subjects: N/A

Materials & Methods: A literature search of PubMed, ProQuest Central, Google Scholar, and ScienceDirect was conducted. Search terms included: (Telerehabilitation) AND ("Physical Therapy" OR Physiotherapy) AND (Adults) AND (Monitor or support or aftercare or follow up) AND (efficacy OR effectiveness) NOT Virtual reality. Selection criteria included: RCTs, adults over 18, cognitively intact, and must include RTR. Search limits: English, peer-reviewed. Two reviewers independently assessed each study for methodological quality and came to consensus based on PEDro guidelines.

Results: A total of 239 articles were screened for eligibility. Following detailed appraisals, 6 RCTs fulfilled the criteria. PEDro scores ranged from 5 to 8/10 (avg=6.5). Samples ranged from 30 - 2256 subjects (2590 total) comprised of adults (aged 18-90) with diagnoses including CVA, COPD, SCI, TKA, and various musculoskeletal pathologies. Interventions were performed remotely by a PT for 0.5 to 4 times weekly for 45 to 60 minute sessions for duration of 4 to 24 weeks (avg=9.33 weeks) Outcomes included: measures of physical function (FIM, WOMAC, SCIM-II, SF-36v2, IKHOAM, steps/day). All 6 studies showed no statistical difference ($p > 0.05$) between the the primary outcome of physical functioning gained through RTR compared to conventional PT. Secondary outcomes including: satisfaction of care, quality of life, cost, and clinical complications were not significantly different when comparing RTR to conventional PT, indicating comparable effectiveness. Three studies reported that the systems were user-friendly. Two studies used RTR from initial examination/evaluation through intervention, while the other 4 were intervention only. One study reported increased caregiver confidence in daily management. One study reported higher compliance in RTR group.

Conclusions: There is moderate preliminary evidence to support the use of RTR to provide PT that is comparable to conventional, in-person services. Limitations included a wide variety of outcome measures, limited clarity of protocols, and many definitions and types of RTR. Further research is needed to assess the full potential of RTR and define optimal protocols for specific diagnoses.

Clinical Relevance: Telerehabilitation is a viable, user friendly option when in-person therapy is not feasible. RTR is a valuable tool to use for intervention implementation and initial assessment in a wide variety of diagnoses. RTR provides an additional method for patients to improve physical functioning and increase independence. There is potential for RTR to expand into common practice. Clinicians should consider use of RTR for patients who are homebound, in rural areas, or for patients with decreased independence or compliance depending on resources and availability.

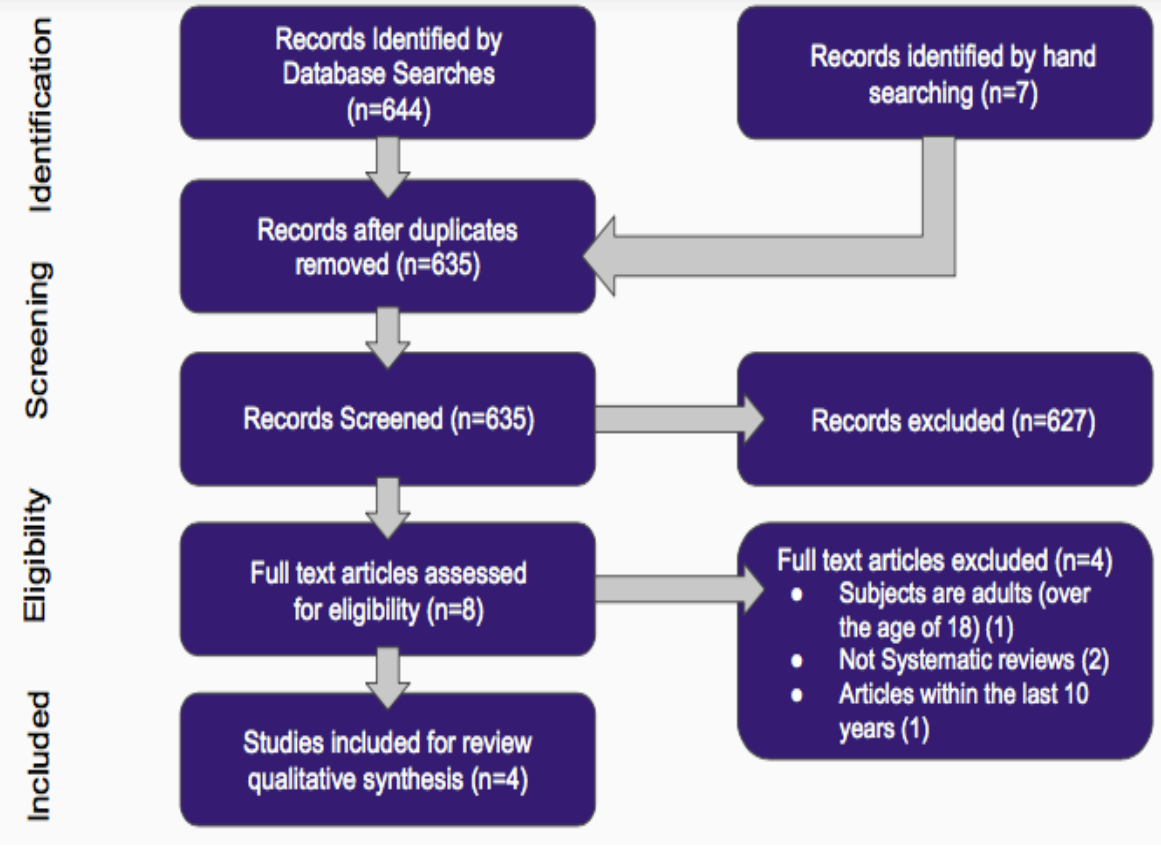
PedRO Scoring Chart

Article by Author	1	2	3	4	5	6	7	8	9	10	11	Total score
Chumbler[1]	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	**9**
Russel[2]	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	**9**
Dallolio[3]	Y	Y	N	Y	N	N	Y	N	Y	Y	Y	**7**
Salisbury[4]	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y	**8**
Odole[5]	Y	Y	N	Y	N	N	N	N	Y	Y	Y	**6**
Tabak[6]	Y	Y	Y	Y	N	N	N	N	N	Y	Y	**6**

7

Title: Effectiveness of aquatic therapy on increasing range of motion and decreasing pain in the rehabilitation of patients with shoulder pathologies: A Systematic Review
PRESENTATION TYPE: Poster
CURRENT SECTION: Aquatics
Author Details
AUTHORS: Kearney, David P.; Lumia, Ryan J.; Siegel, Evan F.; Szemenyei, Scott P.; Leininger, Peter M.
INSTITUTIONS:
Physical Therapy, University of Scranton, Scranton, PA. United States.
SPONSOR NAME: None
Student Category – Research Report: Not a Student
Abstract
ABSTRACT BODY:
Purpose/ Hypothesis: The purpose of this systematic review is to determine the effectiveness of aquatic therapy (AT) on increasing range of motion (ROM) and decreasing pain in adults with shoulder pathologies.
Materials/ Methods: Literature search of Google Scholar, MEDLINE/PubMed, Science Direct, Proquest Central, and PT NOW was conducted (2007-2017) using search terms (aquatic therapy OR hydrotherapy OR aquatic exercise OR water exercise) AND (rotator cuff OR shoulder injury) AND (Physical therapy OR Physiotherapy). Search Limits: English, human subjects, peer-reviewed. Selection criteria: adults 18 years or older, diagnosis of shoulder injury including rotator cuff repair (RCR) or shoulder impingement syndrome (SIS), intervention including AT and a measure of ROM outcomes. Two reviewers independently assessed each article for methodological quality using the Sackett Level of evidence (1B,1B, 2B, 3B). Each study employed a control group except for the case study (3B).
Results: A total of 651 articles were screened for eligibility. After careful appraisal, 4 articles met selection criteria. Sample sizes ranged from 1 to 57 subjects (90 total) ages (26-73), all with full thickness RCR or SIS, with AT beginning at 2 weeks (2B,3B) or 4 weeks (1B) post-op, and 10 days post start of treatment for SIS**.** Treatment for RCR varied from 2-3x/week with duration of 6 weeks (2B) and 12 weeks (3B). The (1B) study continued until subjects returned to prior level of function (PLOF), and follow up continued over a 2-year span (pre-op, 6 months, 1 and 2 years post-op). The SIS study (1B) consisted of 20 days of continuous therapy with AT beginning at day 10. Outcome measures included: ROM, VAS, Pain Disability Questionnaire (PDQ), QuickDASH, SPADI, Penn Shoulder Score (PSS), Perceived Wellness Survey (PWS), Western Ontario Rotator Cuff Index (WORC) and Patient Satisfaction using a Likert Scale. Increases in ROM and decreases in pain were significantly seen in all studies with early AT.
Conclusions: There is moderate to strong preliminary evidence suggesting use of AT as an adjunct to improve ROM and decrease pain in patients with SIS and s/p RCR. In addition, AT was found to improve both sleep quality and function. Limitations include small sample size, varied outcome measures, and lack of larger RCTs. Future research is required to determine the optimal protocol in the use of AT to increase shoulder ROM.
Clinical Relevance: Clinicians should consider AT as a complementary treatment to a standard land-based protocol for the rehabilitation of patients with SIS and s/p RCR. Use of an early-administered water-based exercise program allows for patients to achieve greater ROM by unweighting the arm using the buoyancy property of water. This allows for early increases in ROM and greater functionality. Implementing this program depends upon resources and availability of the clinic. Evidence demonstrates increased ROM and decreased pain with complementary AT, allowing quicker return to PLOF.
KEYWORDS: Aquatics, Range of Motion, Pain, Rotator Cuff, Shoulder Pathology

Author (Year)	Sackett Level of Evidence	Study Design
Subasi[1] (2012)	1B	RCT
Klintberg[2] (2009)	1B	RCT
Brady[3] (2008)	2B	Non-randomized cohort study
Burmaster[4] (2016)	3B	Case-controlled study



8

TITLE: THE IMPACT OF USING A UNILATERAL MICROPROCESSOR PROSTHETIC KNEE FOR INDIVIDUALS WITH TRANSFEMORAL AMPUTATION ON FUNCTIONAL MOBILITY: A SYSTEMATIC REVIEW

AUTHORS: Derenick, Heather[1]; Falvo, Christopher[1]; Savakinas, Tyler J.[1]; Wilkie, Blaire[1]; Leininger, Peter[1]; Hakim, Renee[2]; Bowers, Thomas [3]

INSTITUTIONS:
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3. Keystone Prosthetics & Orthotics, Scranton, PA, United States.

ABSTRACT BODY:
Purpose/Hypothesis : To investigate the impact of using a microprocessor knee (MPK) prostheses for individuals with a unilateral transfemoral amputation (TFA) on functional mobility.

Number of Subjects : N/A

Materials/Methods : A literature search included: CINAHL, PubMed, ProQuest, ScienceDirect, and Cochrane Library using search terms (transfemoral amputation) AND (microprocessor OR C-leg OR Genium).

Selection criteria: adults >18, unilateral TFA, MPK, and outcome measures related to functional mobility. Powered prosthetic knees excluded Genium when performing ADLs. One study examined physical performance (CS-PFP10) and found the Genium was not significantly different from non-amputee controls, while the C-leg users showed significantly lower function. Three of 7 studies showed improved outcomes with the use of a MPK, specifically stair and ramp negotiation, and a decrease in fall frequency when compared to non-MPK users.
Conclusions : There is moderate evidence to support the use of a MPK over a non-MPK in individuals with unilateral TFA when examining functional mobility. When comparing MPKs, Genium resulted in improved safety and better performance on uneven terrain vs C-leg as well as non-MPK devices, decreasing fall risk. Future research is needed on different age groups and activity levels using both MPK and non-MPK prostheses with long-term follow-up to determine optimal outcome measures and training parameters to maximize functional mobility in this population.

Clinical Relevance : The use of a MPK can significantly impact independence with ADLs and participation in work/leisure activities in individuals with unilateral TFA. The Genium appears to be the best option compared to C-leg and non-MPK to promote the highest level of functional mobility and patient satisfaction. Clinicians should consider the patient's current and potential functional mobility (K level 3-4), work/play/leisure activities, cost (Genium 3x cost of Cleg) and insurance coverage when providing input on a prosthetic prescription in patients with TFA.

KEYWORDS: unilateral transfemoral amputation, microprocessor prosthetic, ambulation.

CLASSIFICATION (K) LEVELS:	
Level 0: Non-ambulatory	No ability/potential to ambulate or transfer safely with our without assistance; prosthesis will not increase QOL
Level 1: Limited or unlimited household ambulator	Has ability/potential to use a prosthesis for transfers or ambulation on level surfaces at a fixed cadence
Level 2: Limited community ambulator	Has ability/potential for ambulation with ability to transverse low level environmental barriers (curbs, stairs, and uneven surfaces)
Level 3: Moderate community ambulator	Has ability/potential for ambulation with variable cadence and able to navigate most environmental barriers and have vocational, therapeutic or exercise activities that demand prosthetic use beyond locomotion
Level 4: Child, active adult, or athlete	Has ability/potential for prosthetic ambulation that exceeds basic ambulation skills exhibiting high impact, stress, or energy levels.

9

TITLE: THE EFFECT OF AUGMENTED REALITY VISUAL CUES ON TEMPORAL-DISTANCE GAIT PARAMETERS IN INDIVIDUALS WITH PARKINSON'S DISEASE: A SYSTEMATIC REVIEW

AUTHORS: William Connell, Alexandra Crowley, Cassandra Fitzgerald, Samantha Marri, and Dr. Renee Hakim

ABSTRACT BODY:

Purpose/Hypothesis: The purpose of this systematic review was to determine if augmented reality visual cueing (ARVC) improves temporal-distance gait parameters (TDGP) in individuals with Parkinson's Disease (PD).

Number of Subjects: N/A

Materials/Methods: A literature search (2007-2017) of PubMed, CINAHL, Google Scholar, and ProQuest was conducted using search terms: (Augmented reality OR wearable computing OR wearable gait aid OR assistive technology OR visual gait cue*) AND Parkinson's Disease AND (Physical therapy OR physiotherapy OR Rehab*) NOT Auditory Feedback. Search limits: English, human subjects, peer-reviewed. Selection criteria: adults diagnosed with PD, intervention included ARVC during gait (defined as virtual visual cues projected into the environment/visual field to enhance gait) and outcomes included TDGP. Two reviewers independently assessed each study for methodological quality and came to consensus using Sackett Levels of Evidence.

Results: A total of 960 articles were screened for eligibility. After detailed appraisals, 8 studies met the selection criteria. Sackett Levels ranged from 2B-3B. Sample size ranged from 7-26 subjects (130 total). Subjects with PD (120) ranged from age 53-85 (H&Y stages I-IV) Treatment parameters ranged from 1 session to 2 wks (60 min/day) in clinical settings (4 studies during "on" meds, 2 "off", 2 both). Primary TDGP outcomes included: gait speed, cadence, stride length. There were statistically significant gait speed improvements in 7 of 8 studies (2B-3B): average improvement of 14.68% (avg. pre-post range, 0.79-0.85 m/s). Four of 8 studies (3B) had statistically significant cadence improvements (average change of 8.82%; 99.23-103.12 steps/min). Four of 8 studies (2B-3B) had statistically significant stride length improvement (average gain of 13.55%; 81.28-88.90 cm). Positive user reviews included self-reported gait improvement (4 of 8 studies) and lasting improvement after device removal (1 of 8). Negative user reviews included technophobia (1 of 8) and bulkiness of the device (2 of 8). Secondary outcomes also included statistically improvements in freezing of gait, UPDRS scores, and TUG times while wearing device.

Conclusions: There is low to moderate strength preliminary evidence (Grade C) in support of ARVC to improve TDGP in individuals with PD. Binocular, transparent smart glasses (Epson) appeared most effective in improving TDGP. Limitations included small samples, widely varied devices and training parameters, lack of control groups and long-term follow up. Future research should determine optimal training protocols using ARVC with long term follow-up.

Clinical Relevance: Many ARVC devices are readily available and relatively inexpensive. Clinicians should consider ARVC technology when recommending assistive devices for patients with PD to promote immediate benefits in TDGP (exceeding gait speed MDC values of 0.18-0.25 m/sec; Steffen & Seney, 2008). ARVC may also provide positive effects after device removal, including improvements in FOG, UPDRS scores, and TUG times.

KEYWORDS: Parkinson's Disease, Augmented reality, visual cues.

Summary of Interventions				
Study	**Type of Device**	**Intervention**	**Frequency**	**Sackett Level**
McAuley J et al. (2009)	LED visual cue glasses creates a virtual horizontal cue line below the field of vision	Real life 30-m corridor course: (1) Unaided (2) Wearing glasses with fixed cue lines	1 session, practiced with glasses for several minutes, 'on' medication	3B
Espay A et al. (2009)	Virtual reality smart goggles: displays a life-size virtual checkerboard-tiled floor	10-m path: (1) No device, baseline (2) Device positioned: visual-only feedback	Baseline (visit 1) & after 2 weeks of at-home use (visit 2), 'off' medication	3B
Bryant M et al. (2010)	Canes that project red, green, or no light beams	Each cane was used: (1) Walking on an electronic walkway (2) Walking 25ft, turn, walk back 25ft (3) Turning 360°	1 session, after 'off' testing, medications were taken, waited ~45 min for 'on' testing	3B
Ahn D et al. (2016)	Epson's Moverio BT-200 smart glasses: projects visual patterns on glasses as if the patterns were actually on the floor	Performed TUG and 10-m walk test: (1) Baseline (no glasses) (2) Simplified scenario: step with horizontal line (3) Proposed scenario: step over horizontal line	1 session in afternoon after >12 hrs have passed after last PD medication	3B
Badarny S et al. (2014)	Eyeglasses with micro display unit: provides a virtual tiled floor in a checkerboard pattern	Walk a straight track of 10-m: (1) Baseline (2) Online display turned on	1 session in afternoon, 'on' medication	2B
Ferrarin M et al. (2008)	Optical Stimulating Glasses: stimulation of the peripheral field of view with continuous horizontal red LED vertical lighting	Stand up from chair, walk 5-m, turn around target, return to chair and sit down: (1) Device switched off (2) Bilateral continuous backward optic flow (3) Bilateral continuous forward optic flow	1 session with 10-30 min practice time, 'on' medication	3B
Griffin H et al. (2011)	Virtual reality glasses: plastic spectacles, colourless lenses with a video display mounted in R lens below the line of sight, allowing uninterrupted vision directly ahead	Rise from chair, walk 11-m, turn 90° L, walk into narrow section delimited by fabric-tape barriers and surrounded by dark screens, walk through doorway and 'chicane', turn 180°, repeat course in reverse: (1) Baseline (2) Visual Flow	1 session with 5-10 min to familiarize self with equipment and walking course, tested 'on' and 'off' medication	3B
Zhao Y et al. (2016)	Google Glass Smartglasses: a transparent prism mounted on the top R of the frame displaying vertically oriented lines on both sides of the screen	(1) 10m, wide 180° turn around chair, 10m (2) 10m, narrow 180° turn around chair, 10m (3) 10m, 180° turn around chair, 5m, 360° turn, 5m (4) 2m, turn 90°, walk through doorway, 2m, turn 180°, head back	1 session over ~2.5 hrs with 1 hr allotted for gait measurement, 'on' medication	2B

Hoehn and Yahr Staging of Parkinson's Disease	
Stage 1	Unilateral involvement only, usually with minimal or functional disability
Stage 2	Bilateral or midline involvement without impairment of balance
Stage 3	Bilateral disease: mild to moderate disability with impaired postural reflexes; physically independent
Stage 4	Severely disabling disease; still able to walk or stand unassisted
Stage 5	Confinement to bed or wheelchair unless aided

10

TITLE: FEASIBILITY, SAFETY, AND FUNCTIONAL IMPACT OF PHYSICAL THERAPY DURING HEMODIALYSIS: A SYSTEMATIC REVIEW

PRESENTATION TYPE: Platform

CURRENT SECTION: Acute Care

Author Details

AUTHORS: Maida, Dana[1]; Kirkpatrick, Kimberly[1]; Longobardi, Nicholas[1]; Reavey, Kyle [1]; Wagner, Barbara R.[1]

INSTITUTION: Physical Therapy, University of Scranton, Scranton, PA, United States.

SPONSOR NAME: Dana Maida

Abstract

ABSTRACT BODY:

Purpose/Hypothesis: Patients (pt) receiving hemodialysis (HD) experience fatigue and impaired mobility. Especially in acute care, physical therapy (PT) treatment is often withheld during HD, resulting in forced sedentary time. The purpose of this systematic review was to determine the feasibility, safety, and functional impact of PT during HD to improve mobility.

Number of Subjects: N/A

Materials/Methods: A literature search of ProQuest Central, Medline/PubMed, and CINAHL Complete was conducted using search terms: physical therapy, during dialysis OR intradialytic, physical performance OR mobility OR (walking or ambulation or gait) OR (fatigue or endurance) OR balance, AND acute OR hospital OR inpatient OR outpatient. Search limits: English, humans, and peer reviewed (2006-2016). Selection criteria: adults 18+ years, functional outcome measures, and randomized control trial (RCT) or quasi-experimental (QE) design. Two reviewers independently assessed each study for methodological quality and consensus based on MINORS criteria.

Results: 404 articles were screened for eligibility, yielding 8 RCT and 4 QE studies. MINORS scores ranged from 1621/24 (mean=19). Sample sizes ranged from 18-71 outpatients (n=475) with a HD history of 3-48 months. PT interventions during HD included: cycle ergometer (upper or lower extremity), walking, resistance exercise, and neuromuscular electrical stimulation during the first 1-2 hours of dialysis (9 studies), hours 2-3 (1 study), or unspecified time (2 studies) at intensity of 7-17 on Borg scale for 30-60 minutes. Significant functional gains were reported via multiple functional outcome measures including: 6 minute walk test, variants of the sit to stand test, incremental shuttle walk test, and the short physical performance battery. One article reported significant decrease in fatigue using the Hemodialysis Patient Fatigue Scale. Four adverse events were reported indirectly related to intervention.

Conclusions: Moderate to strong evidence suggests that PT during outpatient HD is feasible, safe, and improves functional outcomes. A variety of interventions significantly improved mobility, increased endurance, and decreased fatigue. Limitations include lack of any studies in acute care, pt medical complexity, and diversity of interventions and outcome measures. Future research should focus on the feasibility and safety of monitored PT during HD in acute care, using standardized interventions and outcome measures.

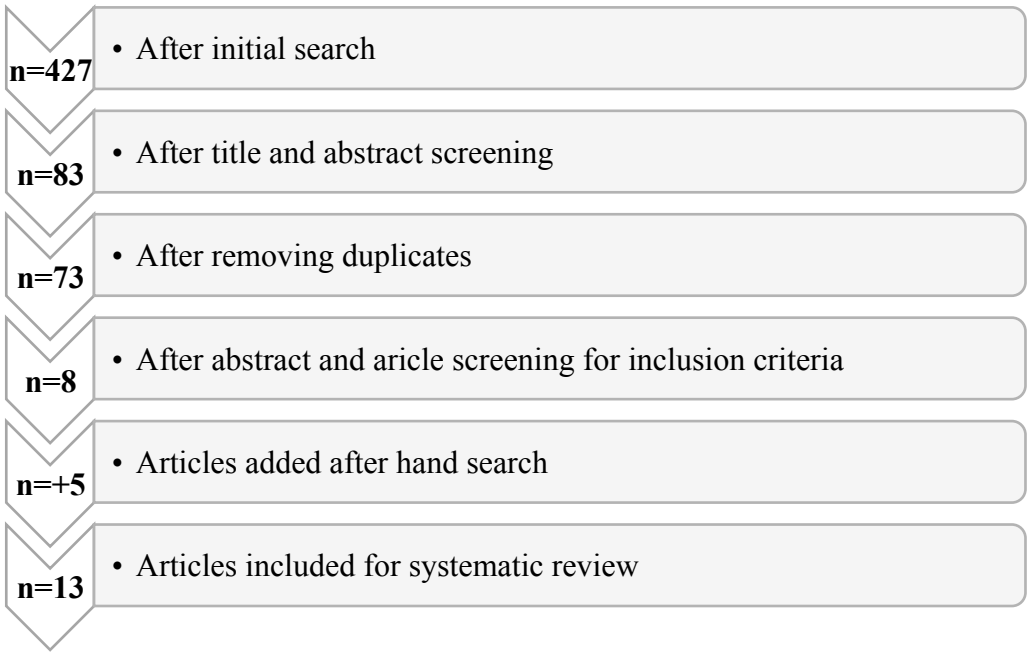
Clinical Relevance: PT sessions are often missed in acute care due to HD treatments and subsequent pt fatigue. Evidence supports the use of PT in the first 1-2 hours of HD, without significant adverse events in pt with an established HD regimen. Some of the reported interventions used in studies could be applied to the acute care setting. Clinicians should consider collaborating with a nephrologist to allow PT with pts who have established HD programs and are hemodynamically and medically stable. Clinicians should monitor pt vital signs closely throughout treatment and provide individualized interventions based on pt abilities.

KEYWORDS: hemodialysis, mobility, acute care.

MINORS Scale

Article	Score 1	Score 2	Average
Groussard et al[3]	20	20	20
Liao et al[5]	23	19	21
Bohm et al[6]	16	20	18
Orcy et al[7]	16	18	17
Cheema et al[8]	18	19	18.5
Chen et al[9]	17	21	19
Bulckaen et al[10]	14	18	16
Segura-Orti et al[14]	21	20	20.5
Chang et al[17]	20	19	19.5
Dobsak et al[18]	20	20	20
Simo et al[19]	20	19	19.5
Simo et al[20]	18	20	19
Wilund et al[21]	18	22	20
Average	18.5	19.5	19
Average Score = 19			

PRISMA



11

TITLE: A SYSTEMATIC REVIEW OF THE EFFECTS OF ROBOTIC ASSISTED STEPPING TO INCREASE CARDIOVASCULAR FITNESS IN INDIVIDUALS WITH INCOMPLETE SPINAL CORD INJURY

AUTHORS: Dole, Ashley; Engel, Corinne M.; Janusko, Emily; Sanko, John P.

ABSTRACT BODY:

Purpose/Hypothesis : The purpose of this systematic review was to determine the effects of robotic stepping in increasing cardiovascular (CV) fitness in individuals with incomplete spinal cord injury (iSCI).

Number of Subjects : N/A

Materials/Methods : A literature search of ProQuest, CINAHL, and PubMed using search terms: Robot* assisted AND spinal cord injury OR SCI AND cardiovascular fitness. Search limits include English language, human subjects, and a date range from 2007-2017. Selection criteria: Subjects at least age 18 with iSCI (ASIA level of C or D), and an outcome measure of peak oxygen uptake (VO2peak) and/or MET. Three reviewers independently assessed each study for methodological quality and came to consensus based on Sackett Level guidelines.

Results : A total of 363 articles were screened for eligibility. Following detailed appraisals, 5 articles fulfilled criteria. Sackett levels ranged IB to IV. Samples ranged from 3 to 62 subjects (100 total) with iSCI.One study found statistically significant long-term improvements in VO2peak following robotically assisted step training (IB). There were statistically significant immediate results of optimal (enough for a positive change) VO2peak achievement in one study (IV), and sub-optimal (not enough for a positive change) VO2peak achievement in one study (IV, III). A study (IB) concluded that robotic assisted body weight support treadmill training significantly improves VO2peak. Another study (IV) that examined immediate effects on VO2peak showed adequate achievement of moderate intensity physical activity levels supporting future cardiorespiratory improvement with training continuation.

Conclusions : There is evidence of strength IIb in support of VO_{2peak} improvements with robotic assisted step training in patients with iSCI. Studies suggest CV training for patients with iSCI should focus on oxygen uptake MET equivalent as opposed to step speed during training to prescribe an appropriate training dose and assure CV improvement. Limitations included small samples, varied outcome measures and a lack of long-term follow up. Future RCT's should focus on determining the optimal training dose and MET level for improvement in VO2 and amount of remaining muscle activation necessary.

Clinical Relevance : The outcome measures of VO2peak and MET were most effective in predicting improvements in CV fitness. Ideal VO2peak levels were between 5.3 and 11.0 mL/kg/min, which is a MET equivalent of approximately 1.5 to 3.1. Clinicians should note that amount of muscle activation should be considered, possibly via electromyography, when selecting robotics as a treatment option. Two studies (IB, IV) showed no changes in VO2peak between the first and last training sessions, but this may be due to the dosage and intensity of exercise. The study (III) that examined immediate effects on VO2peak demonstrated achievement of a suboptimal MET level that does not support cardiorespiratory improvement with training continuation, which shows that a higher level of training is needed to improve peak VO2..

KEYWORDS: Incomplete Spinal Cord Injury, VO2/MET Level, Robotic Assisted.

American Spinal Injury Association (ASIA) Classification of Spinal Cord Injury:

A	Complete	No sensory or motor function is preserved in the sacral segments S4-S5
B	Incomplete	Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-S5
C	Incomplete	Motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a muscle grade less than 3
D	Incomplete	Motor function is preserved below the neurological level, and at least half of key muscles below the neurological level have a muscle grade greater than or equal to 3
E	Normal	Sensory and motor function is normal

Sackett Levels of Evidence:

Gorman PH et al.	1B
Hoekstra F et al.	4
Kressler J et al.	1B
Craven CTD et al.	4
Fenuta AM et al.	3

12

Title: THE EFFECT OF COMMUNITY-BASED REHABILITATION ON ADULTS WITH TRAUMATIC BRAIN INJURY: A SYSTEMATIC REVIEW

Authors: Kevin Guenther, SPT, Alexandra Nachtman, SPT, Sean Scully, SPT, Maureen Taylor, SPT, Jennifer Schwartz, PT, DPT, NCS; Renee Hakim, PT, Ph.D, NCS

Abstract:

Purpose:The purpose of this systematic review is to determine the effectiveness of community-based rehabilitation (CBR) methods on adults following traumatic brain injury (TBI).

Methods: Electronic databases (CINAHL, PubMed/Medline, Science Direct, Google Scholar) were searched using search terms: (community based*) AND (traumatic brain injury) AND (rehabilitation). Selection criteria: 18< y/o; dx of TBI; CBR (defined as "rehabilitation, equalization of opportunities, and social inclusion of all people with disabilities...implemented through the combined efforts of people with disabilities themselves, their families and communities, and the appropriate health, education, vocational, and social services"; ILO, UNESCO, & WHO, 2004) with health professional(s). Search limits included English, 2007-2017, human subjects. Two reviewers independently assessed each study for methodological quality and came to consensus based on MINORS guidelines.

Results: A total of 333 articles were screened for eligibility. Following a detailed appraisal 6 research articles fulfilled the criteria. MINORS scores ranged from 19/24 to 23/24 (avg. 21/24) and 2 nonrandomized studies scored 13/16. Sample sizes ranged from 20 to 81 participants (total= 293) with mild to severe TBI with ages ranging from 18-65 (avg. 40.5). CBR programs included:Tai Chi, cognitive rehabilitation, group-based psychoeducation/metacognitive skills, in-home psychosocial and functional training, life skills/ cognitive retraining, goal setting, and individualized programs such as physical fitness, accessibility, and psychosocial adjustment. Health care providers included: Cognitive Therapist, Neuropsychologist, Psychologist, Interdisciplinary Team. Treatment parameters widely varied from 1-3x/week for 1- 3 hours/session, with durations ranging from 8 weeks to 2 years. Two studies reported statistically significant improvements in community reintegration and participation among subjects of varying TBI severity levels in comparison to typical rehabilitative care. There were trends toward improvement utilizing all treatment options that did not reach statistical significance for outcomes including: patient competency(4/6), mood(2/6), perceived self-efficacy(4/6), emotional adjustment/functional ability(3/6), quality/satisfaction with life(2/6).

Conclusion:
There is moderate evidence supporting CBR programs to improve community reintegration and participation for individuals with TBI. Limitations included widely varied outcome measures and treatment parameters, heterogeneous patient groups, and small sample sizes. Future research should assess the most optimal training parameters based on severity level, standardized outcome measures and mode of delivery for CBR.

Clinical Relevance:
The diagnosis of TBI is commonly characterized by persisting psychosocial dysfunction, including loss of independent living skills, relationship breakdown, and social isolation. Clinicians should consider referring patients with TBI to participate in CBR. CBR programs offer a variety of treatment options for both individual and group-centered development. CBR may be more beneficial for individuals with TBI suffering from decreased psychosocial functioning secondary to socialization and focus on reintegration.

MINORS SCALE						
Authors:	, Cicerone et al.	Winter et. al	Ownsworth et. al	Blake et. al	Wheeler et. al	Curran et. al
A clearly stated aim	2	2	2	2	2	2
Inclusion of consecutive patients	2	2	2	2	2	2
Prospective collection of data	2	2	2	2	2	2
Endpoints appropriate to the aim of the study	2	2	2	2	2	2
Unbiased assessment of the study endpoint	2	2	1	2	2	0
Follow-up period appropriate to the aim of the study	2	1	2	2	1	2
Loss to follow up less than 5%	2	1	2	2	2	1
Prospective calculation of the study side	2	0	2	1	0	2
Additional Criteria:						
An adequate control group	1	2	2	1	0	0
Contemporary groups	0	2	2	2	0	0
Baseline equivalence of groups	1	2	2	2	0	0
Adequate statistical analyses	2	2	2	2	0	0
Total:	20	20	23	22	13	13

Summary of Interventions				
Study	**Frequency**	**Outcome Measures**	**Time**	**Type of Therapy**
Cicerone et, al	3x/week 16 weeks	Community Integration Questionnaire (CIQ) Quality of Life, Self-efficacy, Higher cognitive functioning	11hrs/week- group 3hrs/week-individual	Intensive Cognitive Rehabilitation
Winter et. al	Up to 8x 4 months	Community Re-integration for Service Members (CRIS), Patient Competency Rating Scale (PCRS), Patient Competency in Functioning	1-2 hrs/session	Home based program focused on environmental changes and compensatory strategies for veteran and family
Ownsworth et.al	1x/week 8 weeks	Canadian Occupational Performance Measure (COMP), PCRS, Brain Injury Community Rehabilitation Outcome-39	3 hrs/ week	Group therapy focused on metacognitive skills, goal setting, and feedback
Blake et. al	1x/week 8 weeks	General Health Questionnaire-12, Physical Self-Description Questionnaire, Social Support for Exercise Habits Scale	1 hr/week	Tai Chi
Wheeler et. al	10 weeks-1 year	CIQ, Satisfaction with Life Scale	N/A	Intensive 1:1 life skills training, participation in a therapeutic community, daily process-oriented cognitive re-training group, weekly group-setting sessions
Curran et. al	2 years	Mayo-Portland Adaptability Inventory (MPAI-4), Depression, Anxiety, and Stress Scales (DASS-21), Service Obstacle Scale (SOS)	N/A	Comprehensive physical program extending into home, gym, and community environments

13

TITLE: THE USE OF TOPICAL OLIVE OIL AS AN EFFECTIVE PREVENTATIVE MEASURE FOR PRESSURE ULCERS: A SYSTEMATIC REVIEW

PRESENTATION TYPE: Poster
CURRENT SECTION: Wound Care

AUTHORS: Krasucki, Lauren E.; Pankey, Jessica A.; Serzan, Christina A.; Vondercrone Jennifer L.; Collins, Tracey.
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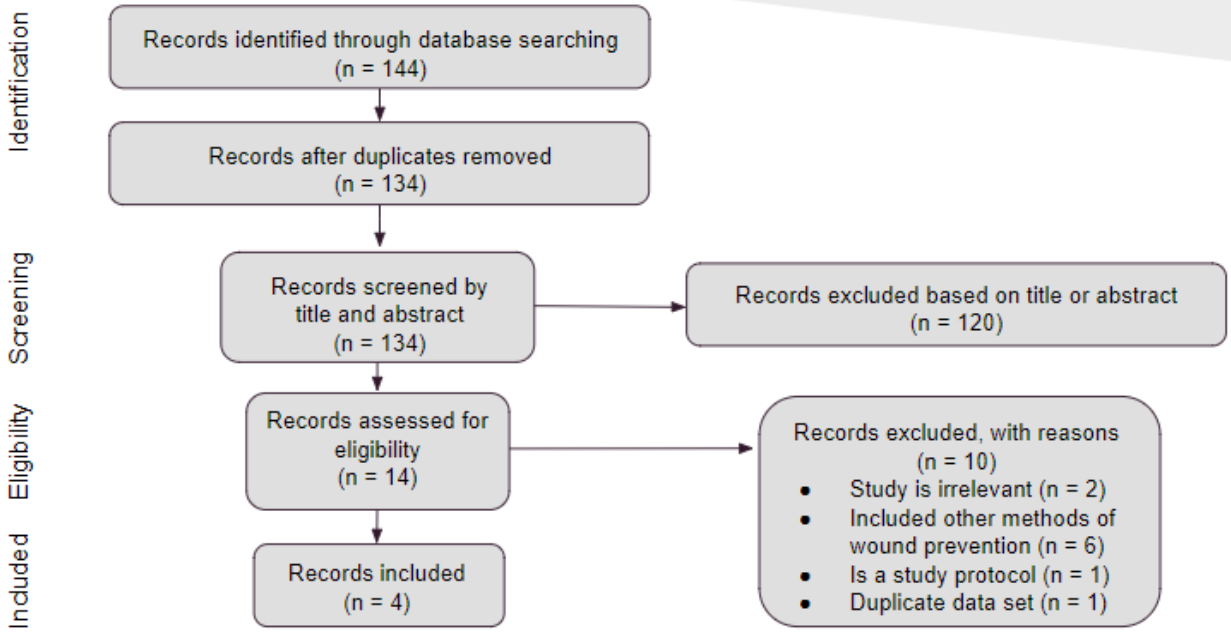
Student Category:
ABSTRACT STATUS: Abstract

ABSTRACT BODY:
Purpose/Hypothesis: The purpose of this systematic review was to determine if the supplementation of topical olive oil impacts the development of pressure ulcers (PU) in patients who are classified as increased risk.
Number of Subjects: N/A
Materials/Methods: A literature search of ProQuest, CINAHL, PubMed, and Google Scholar using search terms: (pressure ulcers OR bedsores OR wounds OR pressure sores) AND olive oil AND prevention. Search limits: English and Spanish, human subjects, peer reviewed. Selection criteria: Males and females, at least 18 years old, using topical olive oil for PU prevention, individuals at increased risk for pressure ulcers, as defined by bedridden, immobilized, wheelchair dependent, hospital or nursing home admission. Studies were excluded if they used additional methods of wound care prevention. Two reviewers independently assessed each study for methodological quality and came to a consensus based on PEDro guidelines.
Results: A total of 131 articles were screened for eligibility. Following detailed appraisals, 4 studies fulfilled the selection criteria. PEDro scores ranged from 5 to 10/10 (avg=7.75). Samples ranged from 40-831 subjects (1,160 total). Treatment parameters varied widely: durations ranged from 1 to 16 weeks in home-based, nursing home, and hospital settings. Frequency of application varied between 1 to 2 times per day. Location of application of oil included the sacrum, heels, ears, iliac crest, scapula, and ankles. Only 16.52% subjects developed pressure ulcers across all intervention groups. Primary outcome measures in 3 out of 4 studies included PU staging I-IV through observation by a trained professional. Three out of 4 studies showed significant effects using olive oil for PU prevention; the fourth study showed olive oil was as effective as hyperoxygenated fatty acids. No adverse events were reported as a result of the intervention.
Conclusions: There is moderate to strong evidence in support of using olive oil to prevent PU development in at risk patients in the hospital, nursing home, and home setting. Olive oil for PU prevention is effective when applied 1-2 times per day to high risk areas. Limitations included lack of long-term follow up and wide variation of mode, frequency, and duration of application. Future studies should focus on the use of olive oil based products among low risk subjects, provide more clear instructions (i.e time of application) regarding the intervention, and focus on determining the optimal parameters for using olive oil as wound care prevention.
Clinical Relevance: Olive oil is a safe, feasible, inexpensive, and widely available product. The application of topical olive oil does not require a trained professional, decreases caregiver burden and overall healthcare expenditure, and can be used in any setting.
KEYWORDS: Pressure ulcer, olive oil, prevention



Author, Year	1	2	3	4	5	6	7	8	9	10	11	Total
Lupianez-Perez et al. (2015)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	**10/10**
Diaz-Valenzuela et al. (2014)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	**10/10**
Madadi et al. (2015)	Y	Y	**N**	Y	**N**	**N**	**N**	Y	**N**	Y	Y	**5/10**
Hawaibam et al. (2016)	Y	**N**	**N**	Y	**N**	**N**	**N**	Y	**N**	Y	Y	**4/10**

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In Memoriam
Professor Emeritus Bonnie Oldham

Thank you!