DPT Research Day

Class of 2023

Abstracts for Platform and Poster Presentations

Thursday, July 13, 2023
1:30 – 5:00 pm
Hagar Auditorium
Cook-DeVos Center for Health Sciences
Grand Rapids, MI

PLATFORM PRESENTATIONS
TRACK A, SESSION 1

THE CLINICAL UTILITY OF HEART RATE VARIABILITY (HRV) IN IDENTIFYING OVERTRAINING AND RISK OF INJURY IN HIGH-LEVEL ATHLETES: A SYSTEMATIC REVIEW. Achterhof T, Bosch TA, Rozeveld T, Hoogenboom, BJ; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: Heart rate variability (HRV) is defined as the amount of fluctuation in the time between consecutive heart beats (in milliseconds) over a course of time. It has classically been measured in individuals with acute myocardial infarction and in those with chronic diseases as a prognostic indicator, and it is thought to be a measure of autonomic nervous system (ANS) balance. In recent years, measurement of HRV is becoming more prevalent in the athletic population with an emphasis on its potential ability to identify whether an athlete is "overtrained" and discern relative injury risk. The purpose of this systematic review was to investigate the clinical utility of HRV measurement(s) related to the identification of overtraining and risk of injury in high-level athletes. **METHODS:** A PRISMA guided systematic review was performed in conjunction with a university librarian by searching PubMed, CINAHL, Web of Science, and Sportdiscus using the search terms heart rate, return to sport, and overtraining. Inclusion criteria included: published in English, subject mean age of 13 to 40 years, athletes who competed in high-level sports, and HRV assessed via a wearable device. Exclusion criteria included: studies that assessed athletes with concussion, case reports, case series, literature reviews, and studies examining sedentary or recreationally active individuals. All results were screened by two authors first by title and abstract followed by full-text review, and all included articles were unanimously agreed upon by the research team. Risk of bias of the included articles was assessed using either the PEDro criteria or the Newcastle-Ottawa scale to assess the internal validity of the included research. Data regarding demographics, devices utilized, and outcomes were extracted and analyzed. **RESULTS:** Of the 1089 articles discovered, 10 articles fit the inclusion criteria and were included in the systematic review. The articles included nine cohort studies and one randomized controlled trial. These studies represented 372 male and female athletes from 18 different sports. All included studies were rated as good quality. Seven of the 10 articles found that reduced HRV (indicative of increased sympathetic response) could be indicative of overtraining, two articles found that overtrained athletes displayed an increase in HRV values (indicative of increased parasympathetic response), and the final article found that fluctuation of HRV values regardless of the direction could be indicative of overtraining. Only two studies explored the relationship between HRV and risk of injury. **DISCUSSION:** Fluctuations in HRV likely point to ANS imbalance. HRV is most accurate in indicating an athlete's status when measured in averages over a course of time as opposed to comparing single, daily measurements. The imbalance in the ANS represented by decreased HRV has the potential to create increased physiological stress or fatigue which could place an athlete at an increased risk for injury. However, this theory was only based on two articles. It is important to note that HRV is one of a variety of factors that may influence an athlete's ANS activity. **CONCLUSIONS:** The results of this systematic review indicate that decreased HRV may be related to an overtrained state in athletes which is believed to be indicative of increased sympathetic nervous system activity. It remains unclear whether HRV is associated with risk of injury.

LOWER FUNCTIONAL STATUS AND STERNAL PRECAUTION NONCOMPLIANCE MAY NOT BE RELATED TO DEHISCENCE POST-MEDIAN STERNOTOMY. Erickson KM, Gregory JA, Ureste GS, Shoemaker MJ, Van Dam A, Griswold A, Preston K; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: There is a paucity of literature on functional status and noncompliance with sternal precautions and their effect on sternal complications. The purpose of this study was to examine the relationship between functional status, compliance with sternal precautions, and post-operative aseptic osseous sternal complications. **METHODS:** A retrospective medical record review was performed on 113 patients with an incisional complication following median sternotomy. The Society of Thoracic Surgeons (STS) Risk Score was used to assess pre-operative morbidity, mortality, and infection risk based on numerous demographic and clinical risk factors. Functional status was assessed using the AM-PAC "6-Clicks" Basic Mobility Short Form and initial gait distance. Compliance to sternal precautions was assessed using clinical documentation to determine the percentage of therapy sessions requiring cues for precautions or other observations of noncompliance. Propensity score matching utilizing the nearest neighbor without caliper width restriction was performed to select matched comparator records to compare those with aseptic osseous dehiscence to those without. A descriptive, in-depth chart review was then performed to determine other possible contributing clinical factors. Kruskal-Wallis Nonparametric One-Way ANOVA, Mann-Whitney U Test (continuous variables), and Chi-Square Test (categorical variables) with an alpha level of 0.05 were used to examine the association between clinical characteristics and functional status with type of complication. **RESULTS:** Eight of 113 patients had aseptic osseous dehiscence. Initial AM-PAC "6-Clicks" score ($U=4.375$, $p=0.036$), initial gait distance ($U=7.252$, $p=0.007$), and number of ventilator days ($U=2.790$, $p=0.005$) were significantly different in the aseptic osseous group compared to other complication types. However, the number of ventilator days was the only variable that remained significant ($U=52.5$, $p=0.028$) between those with aseptic osseous dehiscence and the eight matched comparators. The descriptive, in-depth chart review revealed that the aseptic osseous dehiscence group had respiratory complications in five of eight records as compared to only two of the eight matched comparators. **DISCUSSION:** Initial AM-PAC "6-Clicks" score and initial gait distance were lower in the majority (five out of eight) of the patients with sternal aseptic osseous dehiscence as compared to their matched comparators. Although not statistically significant, five of the eight matched comparators had increased documentation of non-compliance during therapy sessions. There were no instances of documented non-compliance in patients with aseptic osseous dehiscence. This study also found that the number of ventilator days was significantly greater in those with sternal aseptic osseous dehiscence than all other complication types and the matched comparator group. This finding is consistent with previous research demonstrating prolonged ventilation as a risk factor for dehiscence. Overall, the results of the present study suggest that the aseptic osseous dehiscence was not due to lower functional status, excessive upper extremity use, or unwitnessed and/or undocumented sternal precaution noncompliance. **CONCLUSIONS:** The findings of this study suggest that clinical factors other than functional status and compliance to sternal precautions, such as post-operative respiratory complications, may play a greater role in aseptic osseous dehiscence. Therefore, the impact of non-compliance to traditional sternal precautions may be unclear and warrants additional research.

STUDENTS' PERCEPTIONS OF FACTORS CONTRIBUTING TO DEI AWARENESS FOLLOWING COMPLETION OF A DPT PROGRAM: A RETROSPECTIVE QUALITATIVE STUDY. Keyes K, Misiak M, Reed K, Chesser B, Hoogenboom B; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: Qualitative literature related to physical therapy students' readiness to address situations of Diversity, Equity, and Inclusion (DEI) is scarce. The significance of this gap in the literature pertains to the fact that healthcare professionals must be comfortable in their abilities to handle DEI with the hopes of striving for a more patient-centered profession and overall health care system. The purpose of this phenomenological, retrospective qualitative study was to discover students' perceptions of contributing factors to their DEI awareness and ability to address issues of DEI following the completion of a doctoral physical therapy program at a public, midsized, midwestern university. **METHODS:** Doctor of physical therapy (DPT) students from the 2010 to 2020 cohorts participated in semi-structured group interviews with one to two faculty members at the completion of the DPT program. All interviews were transcribed verbatim and analyzed while referencing the Giorgi method for phenomenological research. **RESULTS:** Two major overarching themes emerged from the data: (1) exposure to diversity which had three subthemes including *targeted curricular content related to diversity, exposure to diversity through extracurricular experiential learning opportunities*, and *diversity of individuals within the DPT program*; and (2) personal characteristics which had two subthemes including *inherent beliefs* and *acquired beliefs*. **DISCUSSION:** Opportunities for purposeful exposure to diversity through didactic introduction, clinical immersion, structured discussions, and extracurricular events were perceived by the students as beneficial to their development of DEI awareness. Students also felt that their personal characteristics played a role in their development, or lack thereof. **CONCLUSIONS:** The current research suggests that student perceptions are essential to uncovering factors that influence student development of DEI awareness**.** Further research on student perceptions is needed to continue to promote DEI advancement efforts.

THE EFFECTS OF FOOTWEAR ON POSTURAL SWAY IN HEALTHY YOUNG ADULTS: A PILOT STUDY. Meindertsma CM, Perez J, Sobeck J, Goehring M, Clayton C; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: There is evidence to suggest different types of footwear can impact balance, but there is limited evidence to suggest which footwear is superior in reducing fall risk. The NeuroCom® Balance Master had been the standard for measuring balance but was discontinued in 2019. This discontinuation gave the Bertec® Computerized Dynamic Posturography (CDP) the opportunity to serve as the new gold standard. The purpose of this study was to determine if there were any differences in postural sway in healthy adults during a simulated loss of balance between barefoot, athletic shoes, and non-slip socks conditions using the Bertec® CDP. **METHODS:** Fifteen healthy young participants between the ages of 18 to 55 (mean age 24.75) were recruited. All participants completed three footwear conditions: barefoot, athletic shoes, and non-slip socks. Conditions were randomized to address potential learning effects. In each trial, participants were strapped into a harness and guarded for safety. Participants had three trials of 10 seconds with each different type of footwear. The administrator let each participant know when the trial was starting then the force plate beneath their feet quickly moved posteriorly. This perturbation occurred between 1 to 10 seconds after the start of the trial so participants were not able to anticipate when it would happen. After completing three trials with one footwear, participants got a break to change footwear and regroup as needed. In total, each participant completed nine trials between the three types of footwear. The Bertec® continuously collected postural sway and latency data. MATLAB R2019b was used to determine the maximum postural deviation from midline. Latency data was pulled directly from the Bertec®. A repeated measures ANOVA test was used to determine statistically significant differences in latency and sway data between groups. **RESULTS:** Findings revealed that there was a statistically significant difference in mean sway between the barefoot and athletic shoes conditions with the barefoot condition resulting in less sway (p=.000, 95% C.I. = -.015, -.0007). There was also a statistically significant difference in mean sway between the barefoot and non-slip socks conditions with the barefoot condition resulting in less sway (p=.002, 95% C.I. = -.016, -.005). Comparing athletic shoes and non-slip socks revealed that there was no significant difference in mean sway (p=.907, 95% C.I. = -.005, .006). A repeated measures ANOVA of latency data revealed that there was a statistically significant difference in mean sway between the barefoot and athletic shoes conditions with the barefoot condition resulting in a faster reaction time (p=.017, 95% C.I. = -8.955, -1.045). There was no statistically significant difference found between the barefoot and non-slip socks conditions (p=.057, 95% C.I. -6.651, .118) or between the athletic shoes and non-slip socks conditions (p=.397, 95% C.I. -5.984, 2.518). **DISCUSSION:** This study demonstrates an appropriate methodology for use of the Bertec® CDP in examining populations with greater balance impairments such as the elderly given the discontinuation of the NeuroCom® Balance Master device. **CONCLUSIONS:** These results provide evidence that the barefoot condition resulted in the least amount of postural sway and quickest latency, thus reducing fall risk in healthy young adults. Since the study population was healthy young adults, no conclusions can be made about those who are at a higher fall risk. However, this study does provide an effective and safe methodology that can be used for various populations and footwear interventions in future studies.

PLATFORM PRESENTATIONS
TRACK B, SESSION 1

"THE ULTIMATE GOAL IS INDEPENDENCE": CLINICIAN PRIORITIES FOR APPROACHING PEDIATRIC WHEELCHAIR SKILLS TRAINING. Sebesta M, Shenefield L, Thurow B, Kenyon L; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: There is a lack of research regarding pediatric wheelchair skills training and how clinicians approach it. Most of the published literature focuses on adult wheelchair users. Many factors are considered when providing pediatric wheelchair skills training, varying between clinicians. This study aimed to determine clinician approaches to providing pediatric wheelchair skills training. **METHODS:** This was a modified think-aloud qualitative research study. Twenty-eight participants consisting of physical therapists, occupational therapists, and non-clinician researchers from six continents were recruited through professional contacts and via the snowball method. Participants were asked to verbalize how they would approach specific wheelchair skills, to view a video of a child performing said skill, and to think aloud about what they were seeing followed by structured questions to engage the participant in the think-aloud process. Each interview was transcribed verbatim and coded by three physical therapy student researchers and a faculty researcher to identify themes that emerged throughout the data. **RESULTS:** Three themes emerged from the data. These included "Individualized, yet collaborative training approaches (child and family)", "The ultimate goal is independence", and "Learning thru active exploration". Quotes were identified from the coded transcripts that best encompassed each of these themes. **DISCUSSION:** The first theme, "Individualized, yet collaborative training approaches (child and family)", highlighted the idea of uniqueness such as diagnosis, skill level, goals, and specific participant and family factors. The second theme, "The ultimate goal is independence", revealed that the participants' desired end goal with pediatric wheelchair skills training is functional independence and highlighted the importance of safety awareness. The third theme, "Learning thru active exploration", emerged as participants discussed their approach to allowing each child to use their intrinsic motivation to gain experience and skill with their device and within their environment. **CONCLUSIONS:** Pediatric wheelchair skills training is multi-faceted and is unique for each child. Clinically, the results from this study demonstrate that clinicians must maintain awareness of multiple factors when approaching pediatric wheelchair skills training. The data that emerged from this study demonstrates that training is individualized for each child, should be fun, and must promote carryover into daily activities to increase the child's interaction with their environment in a meaningful way.

MANUAL WHEELCHAIR SKILLS TRAINING FOR CHILDREN: A PILOT STUDY.

Eding REG, Florian KJ, Heeringa KN, Schwartz LE, Kenyon LK; Grand Valley State University, Grand Rapids, MI.

BACKGROUND AND PURPOSE: There is a lack of research investigating the effectiveness of manual wheelchair skills in the pediatric population. Although many children with mobility impairments utilize a manual wheelchair, very few have been provided with the wheelchair skills training necessary to safely and effectively use a manual wheelchair. Additionally, there is limited evidence on the impact a manual wheelchair skills training program has on a child's confidence in their ability to manipulate a manual wheelchair within their home and community environments. Therefore, the purpose of this case series was to assess the feasibility of implementing a home-based manual wheelchair skills training program for children who use a manual wheelchair. **CASE DESCRIPTION:** Each child participant and their parent completed pre-intervention and post-intervention questionnaires and semi-structured qualitative interviews. The questionnaires used included the Wheelchair Skills Test Questionnaire (WST-Q) and the Canadian Occupational Performance Measure (COPM). Based on these questionnaires, a four-week intervention program for manual wheelchair skills training was created and tailored to meet the individual needs of each participant. Intervention sessions were one-hour in length and were led by two student physical therapists with a licensed physical therapist present. Upon conclusion of the intervention sessions, post-intervention questionnaires and interviews were completed by the participant and their parent. **OUTCOMES:** Three children and their parents participated in this ongoing case series. Changes in pre- and post-intervention WST-Q scores and COPM ratings revealed that both parent and child participants perceived improvements in performance and satisfaction with manual wheelchair skills. Pre- and post-intervention qualitative interviews with both parent and child participants also revealed perceived improvements in the children's manual wheelchair skills and in the participants' perceptions of the benefits of manual wheelchair skills training for the pediatric population. **DISCUSSION:** The objective of this case series was to investigate the effectiveness and feasibility of implementing a manual wheelchair skills training program in the pediatric population who utilize a manual wheelchair. There is no formal method for teaching children how to perform these skills. A play-based approach was used for the children based on their personal goals to enhance their interest in and retention of wheelchair skills. The strengths of this study included utilizing the participants' home environment and personalizing the goals for each participant for saliency. Some of the limitations included the COVID-19 pandemic which altered the approach to this project, varying Communication Function Classification System (CFCS) levels of each participant that may have influenced their responses to questionnaires and interview questions, and certain personal or environmental factors including the children's fatigue based on the time of day sessions were conducted and the weather conditions at the time of the sessions.

ACKNOWLEDGEMENTS: This project was supported by a grant from the Center for Scholarly and Creative Excellence at Grand Valley State University.

PEDIATRIC POWERED WHEELCHAIR STANDING DEVICES: AN EXPLORATORY STUDY. Behl S, Kleinheksel S, McDonagh E, Kenyon LK, Aldrich N; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: Current literature available on the use of power wheelchair standing devices (PWSDs) primarily focuses on its effects on body structure and function for pediatric populations with neuromuscular disorders, primarily with diagnosis of Duchenne's muscular dystrophy (DMD). The effects of PWSDs span many facets of the International Classification of Functioning, Disability and Health (ICF) including body structure and function, participation, environment, activities, and personal factors. However, little is known about these effects in children with diagnoses other than DMD. The purpose of this study was to investigate how the use of the PWSD affects activities and participation in children who have neurodevelopmental conditions other than DMD. **METHODS:** A single-subject research design was repeated across participants. The A-B-A withdrawal design was divided into three phases including a 4-week baseline phase, a 12-week intervention phase, and a 4-week withdrawal phase. Inclusion criteria included child participants 5 to 17 years of age and a diagnosis of a neurodevelopmental condition resulting in an inability to functionally ambulate. Exclusion criteria were a diagnosis of DMD or any reason it would be unsafe for a child to use a PWSD. The target behavior was changes in activities and participation as defined in the ICF and measured by the Canadian Occupational Performance Measure (COPM). Parents and children identified five occupational performance issues in a semi-structured interview with the primary investigator, and these issues became the COPM goals. Parents reported COPM scores (performance and satisfaction) twice weekly across all phases of the study. Other secondary measures included the children's completion of the COPM (as appropriate based on their age and communication abilities), EQ-5D-Y (parents and children), and My Permobil App data. Parent COPM data was analyzed for significance with a split celeration line at $p<0.05$. **RESULTS:** Four participants completed the study. All participants had statistically significant increases ($p<0.05$) from baseline to the end of intervention and statistically significant decreases ($p<0.05$) from the end of intervention to withdrawal on all parent-identified COPM goals. All participants attained clinically significant improvements in performance (increase of 2 points) from baseline to end of intervention in all five parent- and child-identified COPM goals. **DISCUSSION:** Interactions between the PWSD and the participants' activities, participation, quality of life, and environment may have influenced outcomes. **CONCLUSIONS:** For the participants in this study, use of the PWSD appeared to positively influence the children's activities and participation.

EXPLORING THE USE OF GAMIFIED POWER MOBILITY TRAINING IN CHILDREN: AN NIH FUNDED CLINICAL TRIAL. Harrington K, Jenkinson J, Montgomery A, Kenyon LK; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: The IndieTrainer system, consisting of a power mobility device and gamified video training modules, is a tool developed to assist children in attaining power mobility skills. The aim of this study was to explore: (1) use of the IndieTrainer system in children ages 3 to 21 with cerebral palsy (CP) or similar conditions; and (2) parent satisfaction with the IndieTrainer system. **METHODS:** This study was an open-arm, single-label clinical trial consisting of a baseline session, six 60-minute power mobility training intervention sessions over 3 weeks, and a follow-up session 4 weeks after the final intervention. Outcomes were assessed at baseline (T0), immediately post-intervention (T1), and at follow-up (T2). Children eligible to participate in this study were between the ages of 3 and 21 years of age and had a diagnosis of CP or other similar condition resulting in changes to muscle tone, posture, and an inability to functionally ambulate. Power mobility skill execution was measured via the Assessment of Learning Powered mobility use (ALP) and the Wheelchair Skills Checklist (WSC). Parental perception of their children's performance of parent-identified power mobility goals was measured with the Canadian Occupational Performance Measure (COPM). Parent satisfaction with the IndieTrainer system was measured via the Client Satisfaction Questionnaire-8 (CSQ-8). **RESULTS:** This presentation reports the results for the first 11 child-parent dyads in this on-going clinical trial. All 11 children improved by one ALP from T0 to T1, thereby achieving a clinically significant difference. ALP phases were at minimum maintained from T1 to T2 for all participants. Eleven out of 11 children made improvements in their WSC score from T0 to T1. All 11 parent participants reported an increase of two or more points on performance of each parent identified COPM goal with all participants achieving clinically significant increases on all COPM goals. Responses on the CSQ-8 indicated good to excellent parent satisfaction with the IndieTrainer system based on individual item responses. **DISCUSSION:** Similar to other studies conducted by the Grand Valley Power Mobility Project, these 11 child participants appeared to show clinically significant improvements in power mobility skills. Improvements in COPM performance scores suggest that parent participants perceived their child made improvements towards their individualized goals. Additionally, each participant minimally maintained their ALP phase between T1 and T2 suggesting that these children were able to maintain their understanding and execution of their power mobility skills over the follow-up period. **CONCLUSIONS:** These first 11 child participants appeared to make improvements in power mobility skills acquisition and were able to retain these skills over the 4-week follow-up session. **ACKNOWLEDGEMENTS:** This study is funded by the National Institute of Child Health and Human Development (NIH-R44HD103522). The Clinical Trial is registered on clinicaltrials.gov (NCT05473182).

POSTER PRESENTATIONS

COMPARING STANDARD AXILLARY CRUTCHES WITH MOBILEGS® CRUTCHES IN HEALTHY ADULTS. Bird K, Esch C, Sneller A, Goehring M, Lee Y; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: An assistive device is required when normal walking is compromised because a lower extremity loses its ability to withstand the stresses of conventional gait either due to a mechanical or neurological disability. The energy expenditure is greatly increased from 33% to 75% with the use of standard axillary crutches during partial weightbearing gait when compared to normal walking. Martin et al. stated that the use of crutches results in twice as much oxygen consumption when compared to baseline and that it doubles the participants' heart rate. The purpose of this study was to determine if there is a significant difference in the physiological response to the 6-minute walk test (6MWT) when using standard axillary crutches or Mobilegs® crutches. The 6MWT measures submaximal functional exercise capacity and reflects activities of daily living. **METHODS:** The Grand Valley State University Institutional Review Board approved the study protocol. Twenty-six subjects (21 females, 5 males; 24.15±1.1 years; 65.81±11.3 kg; 165.8±3.0 cm) between 18 and 55 years of age were recruited and completed the study. The protocol was split into an initial fitting session and two treatment phases using the 6MWT with each crutch type. At the initial session, subjects were screened and fit for both pairs of crutches by the same two individuals. The treatment phase consisted of a 5-minute practice period with the randomized crutch type and a 10-minute cool down before the 6MWT. A 6MWT with a randomly chosen crutch type using a 3-point gait pattern was administered while heart rate (HR) via a Polar Heart Rate monitor, systolic blood pressure (SBP) taken by an automated machine, Modified Borg rating of perceived exertion (RPE), and distance were measured. Participants then were instructed to come back after one hour to complete the same protocol with the second pair of crutches. Subjects' preferred crutch type was documented. The change in HR, the change in SBP, and the change in RPE were compared between the two pairs of crutches. A matched pairs t-test was used to statistically analyze the data. A significance level of $p < 0.05$ was used for all statistical analyses using SAS JMP Pro16. **RESULTS:** The change in SBP during the 6MWT between the two pairs of crutches was statistically significant (33.1±3.4 vs. 25.8±3.3, p=0.0339). However, there was no significant difference between the change in HR (75.8±3.9 vs. 72.9±4.0, p=0.3679) or RPE (p=0.8696) between the two crutches. **DISCUSSION:** Participants often preferred the standard crutches to the Mobilegs® crutches as 61% (16 participants) preferred standard crutches, 31% (8 participants) preferred Mobilegs®, and 8% (2 participants) had no preference. Participants crutched a further distance with standard crutches (291.43±48.72m vs. 275.46±74.43m) compared to Mobilegs®. **CONCLUSIONS:** This study provides evidence that Mobilegs® are no more ergonomic than standard axillary crutches. Further research is needed to fully assess the ergonomics of Mobilegs®.

DYNAMIC POSTURAL CONTROL WITH COGNITIVE TASK TEST IN FEMALE ATHLETES AND NON-ATHLETES. Klump AJ, Moorthy AA, Pfau R, Lee Y, Parker TM; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: Balance and postural control are key skills for athletic performance. Athletic competition requires different levels of dynamic balance depending on sport type, competition level, and playing conditions. Currently, there is a lack of studies examining balance and dynamic postural control in female athletes and female non-athletes. The purpose of this study was to quantify dynamic postural control in female collegiate athletes and compare these findings to postural control in healthy non-athlete counterparts. **METHODS:** Female athletes and non-athletes were recruited from Grand Valley State University and the surrounding Grand Rapids area via flyers and word of mouth. Thirty-two female athletes and non-athlete controls, aged 18 to 30 years, were included. Each participant completed dynamic balance tasks with single-task and dual-task conditions while wearing 17 XSENS sensors at key anatomical landmarks. Participants walked either normally over force plates (normal gait) or heel to toe along a piece of tape on the ground (tandem gait). Data was collected using force plates for center of pressure (COP), XSENS sensors for center of mass (CoM), and a combination to calculate margin of stability (MOS) in the anterior/posterior (AP) and medial/lateral (ML) directions. A two-way repeated ANOVA was performed with a p-value > 0.05. **RESULTS:** The time to complete tandem gait for athletes was significantly faster than for non-athletes. The difference in time to complete single-task vs. dual-task tandem gait showed that all subjects took longer to complete tandem walking while performing a cognitive task. With regards to normal gait, all subjects showed a slightly larger MOS during their performance in the dual-task condition than in the single-task condition in the AP direction. However, there was only a significant difference in the ML direction. When comparing single-task vs. dual-task, significant differences were found in the ML direction with dual-tasking requiring a greater MOS than with a single task. Group vs. task analysis was not significant. However, there was a trend toward athletes having a greater MOS for both single and dual tasks compared to non-athletes. **DISCUSSION:** Comparing groups, athletes performed faster completion times during tandem gait demonstrating that athletes had greater postural control during tandem walking. All subjects had an increase in time when performing tandem walking and performing a dual task. Athletes demonstrated statistically significant greater MOS in the AP and ML directions. This result demonstrates that athletes have better postural control with a larger MOS. All participants had a greater MOS in the ML direction when performing a dual task. **CONCLUSION:** These results support the hypothesis that female athletes will demonstrate greater dynamic balance as evidenced by faster completion times during tandem gait as well as greater MOS with dynamic gait and dual tasks. These results are an important starting point for creating a dataset of balance abilities and trends in female athletes under various conditions. These results also highlight that the addition of a dual-task activity to a dynamic gait task increases balance demands and leads to balance adaptation by participants.

INVESTIGATION OF PHYSICAL THERAPISTS' SELECTION AND INTERPRETATION OF OBJECTIVE TESTS AND MEASURES IN A SCAPULO-THORACIC AND SHOULDER ORTHOPEDIC EXAMINATION: A DESCRIPTIVE STUDY. Foco L, Grathoff L, Mittelbrun J, Sobeck C; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: Shoulder pain is the third most common musculoskeletal complaint presenting to orthopedic physical therapy practice; and shoulder pain includes pathologies like rotator cuff tendinopathy, subacromial impingement syndrome, glenohumeral instability, adhesive capsulitis, and labral tears. The literature has not found a consistent causative factor between the scapulothoracic joint and upper extremity pathology. However, there are examination techniques specific to the scapula used in clinical practice. The purpose of this research study was to determine how currently practicing physical therapists perceive value and utilize tests and measures of the scapulothoracic joint during examination. **METHODS:** This study utilized survey research. A survey was conducted via Qualtrics XM Survey Management Software. This survey included 24 possible questions that pertained to scapulothoracic examination including demographic and Likert scale questions. The population consisted of currently practicing outpatient physical therapists. The survey was distributed to professional organizations, GVSU alumni, and public contacts. The data was analyzed using both descriptive and inferential statistics. One-sampled proportion tests and chi-squared tests were used with an alpha level of .05. **RESULTS:** One hundred fifteen responses were analyzed out of 156 responses after 6 weeks of survey distribution. The examination components physical therapists perceived the most valuable were glenohumeral joint mobility (94.8%), shoulder external rotation strength (93.9%), visual observation of upper extremity motion (93.9%), and thoracic mobility (93%). Additionally, physical therapists with 20 years or more of experience valued the Lateral Scapular Slide ($p=0.015$) and Scapular Load ($p=0.005$) tests significantly more than did those with 1 to 20 years of experience. **DISCUSSION:** Participants valued special tests the least, whereas joint mobility, visual observation, and strength assessment were regarded as the most valuable. Many physical therapists utilize these special tests to assess muscle strength when examining the scapulothoracic joint regardless of intended outcome. **CONCLUSIONS:** Physical therapists can utilize the results of this study in their examination of a patient with scapulothoracic related impairments. The concluding findings indicated a high value for using visual observation, joint mobility, and muscle strength testing during examination. The majority of special tests selected were perceived as non-valuable.

THE EFFECTIVENESS OF PHYSIOTHERAPY SCOLIOSIS-SPECIFIC EXERCISES ON THE TREATMENT OF ADULT IDIOPATHIC SCOLIOSIS: A SYSTEMATIC REVIEW. Nespodzany N, Wieber M, Sobeck C; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: The purpose of this systematic review was to identify the effectiveness of physiotherapy scoliosis-specific exercises (PSSEs) in treating adult idiopathic scoliosis. **METHODS:** The PubMed, Web of Science Core Collection, and CINAHL Complete databases were searched on September 14, 2022. Articles were included if they were written in English, the participants were greater than or equal to 18 years of age, the primary intervention included exercises addressing scoliosis (to include exercises concurrent with bracing). Studies were excluded if the diagnosis was non-idiopathic scoliosis or if prior surgery was used to address the scoliotic curve. **RESULTS:** Eleven articles were included following a search of the three databases mentioned above. The articles included four case reports, three cohort studies, three randomized controlled trials, and one qualitative survey. No automation tools were used in article screening or synthesis. Article data was extracted into a table individually by the researchers. Based upon the article synthesis, intervention frequency and duration ranged with an average of 3.5 sessions per week lasting approximately 65 minutes for 8 weeks. **DISCUSSION:** Intervention factors that influenced the effect of PSSEs in treating adult idiopathic scoliosis included overall treatment duration, supervision of an exercise intervention, and home exercise program compliance. These factors need to be considered and modified to maximize the benefits for an individual in treatment. **CONCLUSIONS:** PSSEs were favorable in decreasing Cobb angle and angle of trunk rotation and in improving vital capacity in adults with idiopathic scoliosis.

THE IMPACT OF STUDENT DEBT LOAD ON THE PHYSICAL THERAPY PROFESSION: A SURVEY STUDY. Garvey S, Morrison M, Plaehn J, Green M; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: Although physical therapy is a rewarding career, the cost of education has become a significant barrier to entering the career and a challenge to overcome for both current students and graduates. The debt-to-income ratio for physical therapists has been found to be disproportionate, creating hurdles to personal and professional growth. The adoption of an institutional debt profile combined with national data would collectively inform possible options to decrease the debt-to-income ratio of future physical therapists. The purpose of this study was to create an institutional profile regarding the impact of student debt on recent graduates of the Grand Valley State University (GVSU) DPT program (Grand Rapids, MI) and the effect it has had on their professional and personal decisions. **METHODS:** This descriptive, cross-sectional study consisted of a 25-question online survey that contained qualitative and quantitative questions created on Qualtrics; and this survey was sent to a convenience sample of GVSU DPT program graduates from the years 2019 through 2022 via email database. The survey was open March 30 – April 10, 2023. Demographic information and questions pertinent to educational debt such as amount, income, choice of practice setting, and personal characteristics were included. Graduates who participated in the survey were also inclusive of those practicing outside the state of Michigan. Data analysis was generated through Qualtrics software and imported into Microsoft Excel to create figures and tables for data analysis. **RESULTS:** Forty recent graduates of the GVSU DPT program from the years 2019 through 2022 responded to the survey. GVSU DPT graduates from the past four years averaged a total PT education debt of $127,383 which is above the national average of $116,183, and 60% of the full-time PTs had an income in the $75,000 to $99,999 range. The calculated average debt to income ratio was 2:1 ($149,384 to $76,518). The survey revealed that student debt was severely impactful on life milestones and future educational plans including the postponement or decision to not buy a house, the postponement or decision to not contribute to retirement savings, and the postponement or decision to not take a vacation. Of the participants, 51% reported if they could go back in time, they would have changed their career path based on their current student debt. **DISCUSSION:** An average total PT education debt of $127,383 was found among the participants. This exceeds the national average of PT education debt by over $10,000. Total educational debt averaged $149,384. The American Physical Therapy Association quoted the average salary of a physical therapist up to 10 years following graduation to not surpass $80,000. Reported incomes from this study averaged $75,000 to $99,000. **CONCLUSIONS:** This study's survey results, along with data from previous studies, question the financial investment of a doctoral education in physical therapy. Increasing debt-to-income ratios in the PT career have caused delayed life milestones, additional professional decisions, and questioning of one's choice of career. By creating an institutional profile regarding student debt at the program level, changes in the local GVSU DPT program may pave the way for physical therapy programs across the state and country to work collaboratively toward realistic solutions to address this problem.

STUDENT PERCEPTIONS OF NON-ACADEMIC FACTORS IMPACTING FIRST-YEAR DOCTOR OF PHYSICAL THERAPY PROGRAM SUCCESS. Auer R, Degener D, McPharlin E, Sander TC, Stickler L; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: Student attrition from Doctor of Physical Therapy (DPT) programs negatively impacts students and programs emotionally, mentally, and financially. Current admissions methods are heavily weighted on objective criteria including graduate record examination scores and undergraduate grade point average. It is unclear if these objective measures predict student program completion, and they may unfairly add bias to admissions decisions or ignore other factors that may contribute to success. To better understand these subjective factors more clearly, the purpose of this study was to assess student perspectives of factors that influenced their first year DPT performance and strategies used to cope and overcome identified factors. **METHODS:** Members of one DPT cohort were invited to participate in focus groups. Interviews were recorded and audio transcripts were transcribed verbatim. Using a general inductive approach, three researchers analyzed the data and negotiated themes and subthemes. **RESULTS:** Eighteen DPT students participated in one of four one-hour long focus group interviews. Six themes emerged from the data: *Personal Elements, Undergraduate Experiences, Health, Study Approach, Balance*, and *Support*. **DISCUSSION:** First-year success was impacted by prior experiences, ability to maintain individual wellbeing when faced with inevitable program-related and external stressors, and overall individual adaptability. These interrelated factors demonstrate that a disruption to any dimension could impact academic performance. Students described an ongoing, deeply personal process that developed during the first year of the program. Implications for programs and students can be made based on knowledge of common stressors that DPT students face and from advice from current students on how to combat them. **CONCLUSIONS:** The ability to be successful within a DPT program goes beyond the ability to perform well academically. It also relies on personal factors. Both students and program faculty have a role in promoting student well-being in a way that may help optimize success.

PLATFORM PRESENTATIONS
TRACK A, SESSION 2

IDENTIFICATION OF MYOFASCIAL TRIGGER POINTS: A METHOD COMPARISON STUDY TO DETERMINE AGREEMENT BETWEEN PALPATION AND ULTRASOUND IMAGING. Boerst ME, Cressman SG, Slayton JL, Rose JM, Stephenson PL, Teft MP; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: Myofascial trigger points (MTrPs), defined as hyperirritable spots within a taut band of skeletal muscle, are typically identified via palpation. MTrP palpation inter- and intra-rater agreement reliability is variable and operator dependent. A more objective diagnostic method for MTrP diagnosis is desirable. Guided ultrasound imaging (USI) has been used to identify potential MTrPs in muscle with mixed results. The purpose of this study was to determine the agreement between non-guided USI and manual palpation MTrP identification in the gastrocnemius muscle. **METHODS:** This was a method-comparison study. Fifty healthy participants between the ages of 18 and 30 consented to participate. Following screening, a 10 cm x 12.5 cm hydrofilm grid with thirty 2 cm x 2 cm cells was placed over the medial gastrocnemius. An experienced sonographer sequentially imaged each cell with B-mode USI identifying cells consistent with previous MTrP description (uMTrP). Stiffness of all uMTrPs and two control cells was assessed via shear wave elastography. An experienced physical therapist, blinded to the USI results, then sequentially palpated each cell identifying cells consistent with palpatory MTrP criteria (pMTrP). Pain pressure threshold (PPT) of all pMTrPs and two control cells was assessed. Fuzzy Kappa spatial autocorrelation analysis was completed to determine agreement between methods related to MTrP specific cell location. Two-way ANOVA with random effects was used to assess differences in stiffness values between uMTrPs and control cells and in PPT values between pMTrPs and control cells (α=0.05). **RESULTS:** Of the 49 participants who completed the study, 49 (100%) had at least one uMTrP and 34 (69%) had at least one pMTrP. There was no agreement (K=0.007) between methods in identifying cells with MTrPs. uMTrP sites demonstrated greater relative stiffness than controls ($p<.0001$). pMTrP sites demonstrated lower mean PPT values than controls ($p<.0001$). **DISCUSSION:** The findings suggest that unguided USI does not identify hyperirritable taut bands of muscle identified via manual palpation. Consistent with previous findings, uMTrPs had significantly greater stiffness than control areas and pMTrPs had significantly lower PPT than control areas. These findings indicate that each method found some form of unrelated connective tissue lesion. Potential explanations for discrepancy include lack of standard MTrP USI criteria and lack of standard MTrP palpation criteria. Further research is needed to determine if unguided USI can be used to independently detect MTrPs. **CONCLUSIONS:** USI did not identify hyperirritable taut bands identified via manual palpation, the current evaluation standard. Although both methods found areas of muscle differing from surrounding tissue, inter-method agreement was not found.

THE REVERSE LUNGE: A DESCRIPTIVE ELECTROMYOGRAPHIC STUDY.

Ferguson M, Krauss Z, Tran S, Hoogenboom B; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: Despite there being existing studies of variations of the lunge (forward and side), there are limited studies examining the reverse lunge. To our knowledge, this is the first descriptive study of the reverse lunge movement to date. Therefore, the purpose of this study was to describe electromyography (EMG) activation of the rectus femoris, biceps femoris, gluteus medius, and gluteus maximus of the stationary and lead limbs during a complete reverse lunge movement. A secondary purpose was to describe the phases of the stationary and lead limbs during the reverse lunge. **METHODS:** Twenty-one healthy, active subjects were recruited to participate in this study; and data from 19 subjects were included in final analysis. Surface electrodes were placed on the target muscles of each limb using standard SENIAM placements. Before completing the reverse lunge, maximum voluntary isometric contractions were performed for use in normalizing the EMG data. Each participant was allowed to practice the reverse lunge prior to data collection. Verbal cues and a metronome were utilized to normalize the movement across all subjects. EMG data was collected bilaterally for the following muscles: rectus femoris, biceps femoris, gluteus medius, and gluteus maximus. Four discrete reverse lunges were conducted on each side. However, only the left leg lunges were analyzed. Root mean squared values for mean maximum percent activation and average muscle activation throughout the movement were reported. Descriptive terminology was also created to describe the phases of the lunge for both limbs. **RESULTS**: All values were reported as a percentage of the MVIC. Mean peak muscle activation in the lead limb during the reverse lunge movement was biceps femoris (36.6%), rectus femoris (105.67%), gluteus medius (34.29%) and gluteus maximus (34.88%). The stationary limb mean peak muscle activation was biceps femoris (17.11%), rectus femoris (36.16%), gluteus medius (49.2%) and gluteus maximus (36.61%). Average muscle activity throughout the entire reverse lunge movement in the lead limb was rectus femoris (32.41%), biceps femoris (10.72%), gluteus medius (11.73%), and gluteus maximus (12.68%). Stationary limb average muscle activity throughout the entire reverse lunge was rectus femoris (13.55%), biceps femoris (7.04%), gluteus medius (15.35%), and gluteus maximus (14.51%).
DISCUSSION: The two muscles which achieved a strengthening stimulus in their mean maximum contraction were the lead limb rectus femoris (105.67% MVIC) and the stationary limb gluteus medius (49.2% MVIC). When analyzing where the peak muscle activity occurred, the data suggested that all four muscles of the stationary limb and the lead limb rectus femoris displayed consistent peak muscle activations in the rising half of the lunge. This was likely due to the concentric nature of the rising half. When comparing mean peak muscle activation and average muscle activation throughout the movement, the data suggests that overall average activation throughout the movement was less than peak activations. There was difficulty making direct comparisons to the literature due to the limited EMG research related to the reverse lunge.
CONCLUSIONS: Peak muscle activity was consistently greater than average muscle activity. Additionally, only the lead limb rectus femoris and stationary limb gluteus medius reached a strengthening stimulus in maximum mean % MVIC measurements. These results may be used both in clinical prescription of the movement and in further research. Clinically, it may be important to consider when each muscle is activating maximally and at what percentage of its MVIC to properly prescribe this exercise in a safe manner.

PERSPECTIVES OF HEALTH AND EATING BEHAVIORS IN MARATHONERS AND HALF-MARATHONERS. Harding IJ, Koetje MN, Minder HM, Stickler LG; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: Marathon and half-marathon runners are a growing population of athletes who have unique training and nutritional demands that put them at risk for low energy availability, relative energy deficiency syndrome, and other health and injury concerns. Understanding the perspectives of health and nutrition choices in this population is imperative to addressing these health risks. Therefore, the purpose of this study was to investigate the perspectives regarding sport-related health and the factors impacting eating behaviors in adult marathoners and half-marathoners. **METHODS:** This was a cross-sectional survey. The Runners Health Choice Questionnaire (RHCQ), a survey originally designed for collegiate runners and adapted for adult runners, was used. Runners were included if they had completed a marathon or half-marathon in the previous three years and if planned to participate in another marathon or half-marathon in the next 24 months. Runners were excluded if they were college athletes or if were below the age of 18. The RHCQ was deployed online via Qualtrics and distributed using a snowball sampling approach via coaches, race directors, flyers, social media, etc. In addition to descriptive statistics, statistical tests used included chi-square analyses and ordinal logistic regression ($p < 0.05$). **RESULTS:** Five hundred male and female marathon and half-marathon runners ages 18 to 79 met the inclusion criteria and completed the survey. The top running motivation was *to stay healthy* for females (25.74%), and there was a tie between *to stay healthy* and *enjoyment* for males (22.8%). The relationship between sex and diet classification was significant (χ^2 [1, 500] = 7.2194, $p = 0.0072$) as males were significantly more likely to select an atypical diet (37.28%) when compared to females (26.10%). Among runners, 83.40% reported *time to prepare meals* had a moderate to high impact on their daily meal decisions followed by *training run/race that day* (81.00%). *Internet sources* was the most frequently utilized source of nutritional information, while 50.8% of runners reported never utilizing a registered dietician. If provided with new nutrition education, 77.24% of runners reported being *very likely* or *somewhat likely* to change their diet. **DISCUSSION:** Adult marathoners and half-marathoners are motivated by a desire *to stay healthy* and are willing to make changes with new nutritional information. Therefore, this population may be open to being educated by healthcare professionals. Healthcare providers should be aware that both male and female runners have atypical diets, and they may require education or proper referral to adequately meet nutritional needs and decrease risk of injury. Health and eating behaviors and decisions are complex and are impacted by several variables including time, family, cost, and an athlete's age and sex. These factors should be taken into account to create individualized education and nutritional guidance for these athletes. **CONCLUSIONS:** Healthcare providers should utilize the knowledge that marathon and half-marathon runners' perspectives differ depending on age and sex but that runners have a shared desire to be healthy and a willingness to make changes with new nutritional information. **ACKNOWLEDGEMENTS:** Thank you to the Grand Valley State University Statistical Consulting Center for their statistical expertise and assistance with the project. We would also like to extend special thanks to Barb Hoogenboom for her additional assistance throughout the research process.

PLATFORM PRESENTATIONS
TRACK B, SESSION 2

PHYSICAL REHABILITATION POST BILATERAL NEUROLYSIS OF SUPERFICIAL DEEP PERONEAL NERVES AND MIDFOOT EXTENSOR TENOTOMY OF A 17-YEAR-OLD FEMALE: A CASE REPORT. Martell, MK, Green M; Grand Valley State University, Grand Rapids, MI.

BACKGROUD AND PURPOSE: This case report follows the physical rehabilitation of a high school athlete with a rare artery entrapment syndrome after surgical intervention to improve blood flow to her ankles and feet. The purpose of this case report was to add to the small pool of knowledge in the literature about the main impairments and the effective interventions for those impairments following surgical intervention for a rare artery entrapment syndrome of the bilateral feet. **CASE DESCRIPTION:** The patient was a 17-year-old female athlete with an artery entrapment syndrome of her bilateral feet and ankles. She was otherwise healthy, active, and motivated to return to her previous level of independence in activities of daily living, driving, and participation in soccer. Physical therapy interventions focused on the return of full ankle active range of motion, lower extremity strength, and sport specific agility and skills. **OUTCOMES:** By the 19th visit, the patient was able to drive without limitations, had achieved full ankle plantarflexion active range of motion and strength, and had achieved ankle dorsiflexion strength within the available range of motion. By the 24th visit, the patient was still unable to reach 10 degrees of ankle dorsiflexion active range of motion, and she reported 30% ability to participate in soccer activities. **DISCUSSION:** The outcomes of this case report suggested that the main impairments to be expected include return of full ankle dorsiflexion range of motion, return of full ankle plantarflexion strength, and delayed healing of the incisions that impact scar management. **ACKOWLEDGEMENTS:** Thank you to my clinical instructor Katie Collins PT, DPT, OCS and to my faculty advisor Mary Green PT, JD for their guidance, expertise, and dedication to this case report.

A CASE REPORT OF CLINICAL MANAGEMENT OF CONGENITAL TORTICOLLIS WITH THE USE OF SOFT TISSUE MOBILIZATION. Parker S, Shoemaker M; Grand Valley State University, Grand Rapids, MI.

BACKGROUND AND PURPOSE: The currently available research lacks specific home programming and examination of the individual effect of soft tissue mobilization (STM) in treating congenital muscular torticollis (CMT). Current research identified new level one evidence regarding STM's safety and effectiveness in treating CMT in infants. Prior research has identified a more rapid return to function with no superior outcome compared to traditional care. In addition, current research has identified areas for improvement in pediatric clinical practice regarding provider communication. It has been found that caregivers feel they need more information from the providers managing their child's care. Specifically, prior research lacked best-practice interventions to provide excellent family-centered care (FCC). The primary purpose of this case report was to give an example of how STM was implemented at the onset of care on a 48-day-old male with stage 1 mild CMT. The secondary purpose of this case report was to highlight the critical involvement of caregivers in the development and progression of the infant's plan of care (POC). **CASE DESCRIPTION:** A previously healthy 48-day-old male patient was diagnosed with a CMT grade 1 early mild level due to the passive cervical rotation difference between sides. Relevant medical history included a high palate that contributed to difficulty breastfeeding. There was no pertinent gestational or birth history to report. The infant was cared for by two active parents involved in the POC through the FCC model. A Muscle Function Scale (MFS) was performed with a non-age-appropriate score of 0. The patient presented with a significant lack of acknowledgment of the left side of his environment, poor tolerance to tummy time, brachycephaly, and impaired tolerance to activities of daily living (ADL). The caregiver's primary concern was how the condition could affect the infant's development. The POC was completed over four weeks with a frequency of twice a week. The FCC was utilized throughout the case to ensure accurate follow-through and progression of the home exercise plan (HEP). Functional improvements in this case report were measured via the MFS, range of motion (ROM), tolerance to tummy time, verbal caregiver reports, and the infant's interaction with his environment. Sessions included therapist-led stretching, caregiver positioning and hold education, tummy time, cervical ROM, and kinesthetic massage. During all sessions, the caregivers were interviewed regarding the success of the FCC model; and the infant was assessed for any aversive signs of implementation of STM post-treatment. **OUTCOMES:** This case report found that FCC was an effective communication method and that STM was a safe and effective treatment for CMT. In comparison to previous research, STM accelerated the infant's recovery in a shorter period. However, it did not result in superior outcomes. The patient was discharged with a maintenance home program, ROM within functional limits in all planes, the family's quality of life improved per the caregiver's verbal report, the condition no longer impacting the infant's daily function, and a referral to an orthotist regarding the potential need for an orthotic helmet because brachycephaly was found upon examination. **DISCUSSION:** In infants with CMT, STM may be utilized to improve their access to the environment and to promote normal development. Further research is required to determine if the treatment method is safe and effective in all infants with CMT and with other comorbidities. In addition, further research is necessary to explore best practice interventions to promote parent-provider communication and information sharing within the FCC.

EFFECTIVENESS OF FORCED PROLONGED POSITION FOR GEOTROPIC HORIZONTAL CANAL BPPV: A SYSTEMATIC REVIEW. Anderson HJ, Cremerius BC, Staltmanis SM, Kinne BL; Grand Valley State University, Grand Rapids, MI.

INTRODUCTION: Geotropic horizontal canal benign paroxysmal positional vertigo (BPPV) may be treated using roll maneuvers or side-lying maneuvers. Forced prolonged position (FPP) may be used alone or in conjunction with these maneuvers in the treatment of this type of BPPV. FPP involves maintaining a side-lying position with the affected ear up for approximately 12 hours. The purpose of this systematic review was to determine the effectiveness of FPP for the treatment of geotropic horizontal canal BPPV. **METHODS:** A literature search was conducted using CINAHL Complete, ProQuest Medical Database, PubMed, Web of Science, and Wiley Online Library as the databases. The search terms applied were geotropic AND (horizontal OR lateral) AND vertigo AND ("forced prolonged position" OR "forced prolonged positioning"). The inclusion criteria utilized in this systematic review were as follows: (1) individuals experiencing geotropic horizontal canal BPPV; (2) FPP as the intervention; (3) a geotropic horizontal canal BPPV maneuver or a sham treatment or no treatment as the comparative intervention if the study was a randomized controlled trial; (4) an outcome measure of the cessation of vertigo and/or nystagmus; and (5) studies with a level of evidence of 2 or 3. Evidence level was assessed by using the Oxford Centre for Evidence-Based Medicine 2011 Levels of Evidence. Methodological rigor was assessed by using a 10-item tool derived from Medlicott and Harris. **RESULTS:** Seventy-three records were identified via five online databases, and an additional two records were identified via other methods. Based on the inclusion and exclusion criteria, six studies were included in this systematic review. It was found that the efficacy of FPP ranged between 73.0% and 100.0% for the resolution of vertigo and/or nystagmus associated with geotropic horizontal canal BPPV. FPP appears to be a more suitable intervention than roll maneuvers for individuals with physical impairments such as age-related limitations, obesity, neck pain, back pain, and/or other musculoskeletal disorders. Although the Gufoni maneuver requires much less time to perform than FPP and it may be more appropriate for those individuals who are unable to maintain a side-lying position for a prolonged period of time, the quick movements required for the performance of this intervention may elicit severe neuro-vegetative symptoms. **DISCUSSION:** Horizontal canal BPPV generally resolves on its own more quickly than does posterior canal BPPV or anterior canal BPPV. However, horizontal canal BPPV generally causes worse impairments than do the other two types of BPPV. Therefore, interventions for horizontal canal BPPV are critical to address the vertigo, balance problems, and functional limitations associated with this vestibular disorder. **CONCLUSIONS:** Therapists should consider using FPP with individuals who present with geotropic horizontal canal BPPV. FPP might be effective if used independently or in combination with another intervention, such as the Gufoni maneuver.