

CONTROL ID: 2531443

Platform #23

TIME TO CENTRALIZATION AND OUTCOMES IN PEOPLE WITH NECK PAIN

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KEYWORDS: Centralization, Cervical Radiculopathy, NDI

Background & Purpose: Mechanical Diagnosis and Therapy (MDT), also known as the McKenzie Method, is an approach that utilizes the patient's response to therapeutic loading strategies and progressive end-range exercises in a patient's directional preference to address symptoms and movement limitations. Centralization is unique to the classification of derangement syndrome and has been shown in the literature to be a good predictor of positive outcomes for patients with mechanical lumbar pathology; however, evidence supporting its utility in the cervical spine is lacking. The purpose of this research is to determine if there is a relationship between the time required for symptoms to centralize and patient outcome. Methods: A retrospective chart review of 23 patients referred to physical therapy for neck pain was completed. Patients were seen by physical therapists credentialed or diplomaed in MDT. The patients were examined with the inclusion of repeated end range cervical spine movements to determine if their symptoms centralized. Outcomes

were assessed with the Neck Disability Index (NDI) and the number of treatment sessions required to centralization (if occurred) was recorded. Results: Patients were separated into two groups for analysis. Group 1 consisted of all patients who centralized within the first three treatment sessions (n= 13). Group 2 consisted of all patients who either exhibited signs of centralization after their 3rd visit and/or did not demonstrate centralization (n= 10). The initial and final NDIs were compared for each group; the change score for Group 1 was 30.55 and the change score for Group 2 was 22. The average NDI score at discharge for group 1 was 4.85 (+/- 1.51 SD) and group 2's average was 26.80 (+/- 7.88 SD). An independent sample single tailed t-test comparing the final NDI score between the two groups was statistically significant (p= 0.022). The change score for Group 1 was 30.55 and the change score for Group 2 was 22. The independent sample single tailed T-Test comparing the change scores between the two groups was statistically significant (p= 0.022). Discussion - Conclusions: Previous literature indicates that people with neck pain who demonstrate centralization phenomenon in the cervical spine have more favorable functional outcomes than those who do not. In this study, patients who demonstrate centralization in the first three treatment sessions presented with more favorable functional outcome measures than their late and non-centralizing counterparts.

CONTROL ID: 2553007

Platform #12

EFFECTIVENESS OF EARLY PHYSICAL THERAPY INTERVENTION
FOR PATIENTS WITH DIZZINESS AFTER A SPORTS-RELATED
CONCUSSION: A RANDOMIZED CLINICAL TRIAL

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KEYWORDS: Head injuries/ concussion, cervical spine, physical therapy/ rehabilitation

Background & Purpose: Dizziness is experienced by a majority of individuals who sustain a concussion. Rest continues to be the treatment of choice until individuals are no longer symptomatic. There are no studies exploring recovery times with active intervention in the acute phase after sport-related concussion. The purposes of this study were to assess the feasibility & safety of physical therapy (PT) delivered in the acute phase of recovery and to estimate the size of the effect between experimental & control groups. **Methods:** This was a prospective pilot double-blind randomized clinical trial. Subjects aged 10–23-years-old with acute concussion and dizziness were enrolled from sports-medicine centers. Forty-one participants were randomized into treatment and were seen for PT beginning at 10 days post-concussion. A prescriptive examination was used to differentiate the cause of dizziness in each participant. Based on the results of the examination, subjects in the experimental group received individually tailored, pragmatically delivered progressive interventions including manual therapy, vestibular rehabilitation techniques, oculomotor and neuromotor retraining. Subjects in the control group had prescriptive interventions that ranged from sham to minimally progressive therapeutic

techniques. The two primary outcomes were symptomatic recovery and medical clearance for return-to-play. Survival analyses were completed. Results: According to Kaplan-Meier, the median number of days to medical clearance for the experimental group was 15.5 and for the control was 26. The median number of days to symptomatic recovery was 13.5 for the experimental group and was 17 for the control. According to Cox Proportional Hazards regression, for time to medical release for return to play, the experimental group demonstrated a Hazard Ratio of 2.91 (95% CI: 1.01, 8.43) compared to the control. For time-to-symptomatic recovery, those in the experimental group demonstrated a Hazard Ratio of 1.99 (95% CI: 0.95, 4.15) compared to the control. Discussion - Conclusions: The results indicate that it is feasible and safe to complete this type of intervention study and provide strong support for the allocation of resources to conduct well powered randomized clinical trial. Sports-medicine physicians may consider individually prescribed progressive PT intervention, including manual techniques, vestibular rehabilitation, oculomotor and neuromotor retraining as treatments for concussion much earlier than when symptoms become chronic.

CONTROL ID: 2545988

Platform: #16

THE ROLE OF PHYSICAL THERAPY ASSISTANTS IN THRUST/NON-THRUST MANUAL THERAPY PROCEDURES: A SURVEY OF ROLE PERCEPTION

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KEYWORDS: Manual therapy, Professional issues, examination

Background & Purpose: A current topic of interest in physical therapy practice is the role of physical therapist assistants (PTAs) in the performance of manual therapy procedures thrust and non-thrust. Relatively little is known of the frequency with which PTAs complete manual therapy procedures along with whether they and their supervising physical therapists (PTs) understand all the professional, legal, and safety aspects involved in the administration of manual therapy. Methods: Surveys were constructed separately for physical therapists and physical therapist assistants and were distributed through the state professional organization website. Questions included whether PTAs under PT supervision in the participants' facilities perform thrust or non-thrust techniques and whether PTAs performing thrust or non-thrust techniques was considered appropriate. Additional questions explored the participants familiarity with professional guidance documents such as APTA's Guide to Physical Therapist Practice (Guide 3.0) and the Direction of Mobilization/Manipulation: An Educational Resource Paper as published by the APTA. Results: A total of 37 PTs participated in the survey. Only 8 PTAs completed the survey, while an additional 8 opened the survey, but did not complete it. Only 5% of PTs reported PTAs under their supervision perform thrust techniques while 25% of the PTAs reported completing thrust techniques. Among PTs, 43% reported PTAs under their supervision complete non-thrust techniques and 38% of the PTAs reported completing non-thrust techniques. Among PTs, 78% reported PTAs performing thrust techniques was inappropriate while 50% of the PTAs reported it was

inappropriate. In reference to familiarity with the Guide to Practice, 46% of PTs were familiar with its content on the topic. When Physical Therapists were asked if they were familiar with APTA's Direction of Mobilization/Manipulation educational resource paper, 54% reported that they were not familiar. When asked if they were familiar with state practice act and delegation of thrust/non-thrust techniques to PTAs, 76% answered they were familiar. Discussion - Conclusions: Although the survey size is limited, a noteworthy percentage of PTAs are involved with thrust and non-thrust manual therapy techniques. Perhaps most notable is a substantial percentage of PTs and PTAs are not familiar with available guide documents describing the safety, legal, and professional implications of PTAs having such roles in the administration of manual therapy.

CONTROL ID: 2543418

Poster #23

INFLUENCING THE MOVEMENT SYSTEM FOR THOSE WITH LOW
BACK PAIN BY ADDRESSING CONNECTIVE TISSUE USING AN
INTEGRATED BIOMECHANICAL MODEL

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KEYWORDS: Connective Tissue, Pragmatic, Outcomes

Background & Purpose: Connective tissue mobility influences motor unit recruitment. Restoring fascial gliding permits optimal muscle function. The Fascial Manipulation® (FM) method is a multiplanar biomechanical means

to assess fascia mobility at specific anatomical vector points where motor unit forces converge. Our study compared FM to standard physical therapy (SPT) for low back pain (LBP) outcomes. Methods: A pragmatic experimental time series study on subjects 18 years and older presenting with varied LBP diagnoses were randomized into SPT and FM. Both groups received thermal and/or electrical modality and general exercises. SPT received general soft tissue mobilization, mobilization, manipulation, and/or traction. FM received FM. Participants completed the Oswestry Disability Index (ODI), Numeric Pain Rating Scale (NPRS) at initial evaluation and discharge and a 15-point Likert Global Rating of Change (GROC) at discharge. Results: SPT (n=49) had 10.1±6.7 visits versus FM's 7.5±3.5 visits (n=53) (p=0.01). Groups were similar for gender, age and chronicity of LBP (p>0.05). Final ODI decreased by at least 1 category, where categories are in 20% increments ranging from minimal disability to crippled, in 48.9% SPT cases with no change in 36.2%. FM decreased in 60% cases with no change in 38%. ODI increased in 14.9% SPT versus 2% FM (p=0.06). GROC at discharge was ≥5 in 44.7% SPT versus 92% FM (p=0.0001). GROC scores ≥6 were 19.1% SPT versus 72% FM (p=0.0001). At discharge, FM had more than twice the change in NPRS versus SPT (4.3±2.2 compared to 1.5± 2.4, p=0.0001). NPRS decreased ≥ 2 points in 94% FM versus 57.4% SPT (p=0.0001). NPRS decreased ≥4 points in 58% FM compared to 17% SPT (p=0.0001). FM group improved more in all post intervention outcome measures and significance was found when means were adjusted for initial scores (p<0.05). Age, gender, and chronicity did not affect the statistical outcomes. ANCOVA showed statistically significant GROC values between groups when accounted for number of visits (p=0.01). Discussion - Conclusions: Data analysis revealed statistically significant differences between SPT and FM in NPRS

and GROC, unlikely due to chance. The main limitation of this pragmatic study was its broad inclusion criteria preventing generalizability to specific LBP diagnoses. However, this increases its applicability to real life clinical practice for those treating patients with LBP.

CONTROL ID: 2545568

Platform #39

PREDICTORS OF SUCCESSFUL OUTCOMES OF HIP MANIPULATION FOR YOUNG ADULTS WITH PAIN IN GROIN, LATERAL HIP OR BUTTOCK

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KEYWORDS: hip pain, hip manipulation, non-arthritic hip

Background & Purpose: Non-traumatic hip pain in active young adults, exhibiting unique clinical signs and symptoms, is hypothesized to be due to abnormal anterior hip stress from intra- or extra-articular dysfunction. A new hip manipulation, designed to treat hip range of motion (ROM) limitation and pain, has shown promising clinical benefits. The purposes of this study are 1) to describe an unrestrained femoral internal rotation (UFIR) hip manipulation and 2) to identify predictors for determining which young adults with groin, lateral hip or buttock pain would have positive clinical outcomes from UFIR. Methods: Young adults aged 20-40 y/o with

complaints of groin, lateral hip or buttock pain were recruited. Participants completed self-report measures (e.g. Lower Extremity Functional Scale - LEFS, Hip and Groin Outcome Scores - HAGOS), standardized clinical examination, including functional tests, range of motion (ROM), muscle strength, provocative and palpation tests. After the examination, participants received a treatment of UFIR hip manipulation. The Global Rating of Change (GROC) scores were collected immediately after the manipulation and 24 hours later. The participants were classified as a successful outcome based on a score of +4 or greater either on the GROC collected immediately or on the GROC collected 24 hours later. The success and non-success groups were compared for continuous variables using independent t-tests and for categorical variables using chi-square (χ^2) tests. The dichotomized variables with significance level of $P < 0.1$ were used for the regression model analysis. Significant predictor variables of ratio data were further analyzed using receiver-operator-characteristic (ROC) curves to determine cut-off scores. Results: Seventy-five young adults (21 men, 54 women, age: 29.9 ± 5.8 years) participated: 50 (66.6%) had successful outcomes, 25 (33.3%) had non-successful outcomes. Four significant predictor variables were identified: posterior hip pain ($p=0.003$), HAGOS-ADL subscale score <3.5 ($p=.023$), FMS Hurdle ipsilateral ($p=0.029$) and Patrick provocative test ipsilateral ($p=0.029$). The regression analysis (success vs. nonsuccess) on these 4 predictors revealed model $\chi^2 = 25.26$, $df = 6$, Naglekerke $R^2 = 0.520$ ($p=0.0003$). Discussion - Conclusions: Four variables could be used to predict clinical success of UFIR manipulation for treating young adults with hip pain. In addition, the regression analysis demonstrated a significant relationship between successful outcomes and these four predictors.

CONTROL ID: 2545362

Platform #2

EXAMINATION OF A CLINICAL PREDICTION RULE TO IDENTIFY PATIENTS WITH SHOULDER PAIN LIKELY TO BENEFIT FROM CERVICOTHORACIC MANUAL THERAPY: A MULTI-CENTER RANDOMIZED CLINICAL TRIAL

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KEYWORDS: Shoulder pain, Clinical Prediction Rule Validation, Cervicothoracic Manual Therapy

Background & Purpose: The point prevalence of shoulder pain has been reported to range from 7-26% in the general population, with a lifetime prevalence of up to 67%. These numbers appear to be increasing. Due to the heterogeneous nature of shoulder pain and overall varied presentation, it is often challenging for physical therapists to determine which interventions are more likely to result in a favorable outcome for individuals with shoulder pain. Prognostic variables identifying patients with shoulder

pain who are likely to respond to cervicothoracic manual therapy have been reported; however, they have yet to be validated. The purpose of this study was to investigate the validity of the previously identified prognostic variables in identifying patients with shoulder pain who will respond favorably to cervicothoracic (CT) manual therapy (MT) in a multicenter randomized clinical trial in an independent patient sample. Methods: Participants (n=140) with a report of shoulder pain were randomly assigned to receive either two sessions of range of motion (ROM) exercises plus six sessions of stretching and strengthening exercises (Ex group), or two sessions of cervicothoracic MT and ROM exercises followed by six sessions of stretching and strengthening exercise (MT+Ex group). Outcomes of disability (Shoulder Pain and Disability Index - SPADI) and pain (Numeric Pain Rating Scale) were collected at baseline, 1-week, 4-weeks and 6-months. Time, treatment group and status of predictor variables, and 2-way and 3-way interactions were analyzed using linear mixed-model with repeated measures. Results: The linear mixed-model with repeated measures did not show a significant difference ($p=0.094$) for individuals in the MT+Ex group when comparing those +rule versus those - rule. Those who were +rule and received MT+Ex did not have a significantly better outcome than those that were received Ex only ($p=0.69$) for the SPADI, suggesting that the rule is not valid. There were no significant 3-way interactions for either disability ($p=0.27$) or pain scores ($p=0.70$) for time, group, and predictor status for any of the predictor variables. Discussion - Conclusions: The results of the current study did not validate the previously identified prognostic variables, therefore we cannot support using these in clinical practice. Due to the heterogeneity of shoulder pain, further research is needed to identify subgroups of individuals with a primary complaint of shoulder pain that may benefit CT

MT.

CONTROL ID: 2536586

Platform #40

RELATIONSHIP BETWEEN PATIENT REPORTED FUNCTIONAL
ACTIVITY LEVEL AND KNEE OSTEOARTHRITIS IN PATIENTS AFTER
KNEE SURGERY

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KEYWORDS: Knee osteoarthritis, Knee Outcome Survey, Post-operative

Background & Purpose: The Knee Outcome Survey – Activities of Daily Living (KOS-ADL) is a patient-completed questionnaire to determine symptoms and functional limitations in daily activities. It has been shown to be reliable and responsive in patients with knee osteoarthritis (OA). Fourteen items are scored and the higher score indicates greater function. The severity of osteoarthritis can be measured by the 5-point Kellgren & Lawrence rating system where the higher score indicates greater amount of OA. Validity and intra-rater reliability of this rating system ranged from moderate to near perfect. There is conflicting evidence between knee OA and a patient's pain. The literature has not shown a relationship between knee OA and level of function, specifically postoperatively. The purpose of this study was to determine the relationship between patient-reported functional activity level determined by the KOS-ADL and the severity of

knee OA. Methods: This was a retrospective correlation study. In 2015, the KOS-ADL was administered to 164 patients in a health maintenance organization in California who underwent knee surgery and physical therapy. Surgeries included meniscectomy, meniscal repair, chondroplasty, and microfracture. The KOS-ADL was administered at week one and subsequent monthly intervals. The surgeon used the Kellgren & Lawrence system intra-operatively. Data was unavailable for 115 patients due to absence in physical therapy, incomplete data collection, or lack of OA grade on operative notes. These patients were not included in the analysis. The data was pooled into initial, final, and change in KOS-ADL scores and a linear regression analysis and correlation were completed. Results: Data from 49 patients was available. The R square value for the initial KOS-ADL score was 0.006 (P= 0.590; 95% CI=-2.55-4.44). The R square value for the final score was 0.044 (P= 0.147; 95% CI=-4.56-0.70). The R square value for the change in KOS-ADL scores was 0.075 (P= 0.057; 95% CI=-5.8-0.09). The correlation for the initial KOS-ADL score was 0.078, the final score was -0.210, and the change in score was -0.273. Discussion - Conclusions: Our results demonstrated there is no correlation between the grade of knee OA and the patient's function as reported on the KOS-ADL at initial and final physical therapy visits, as well as the KOS-ADL score change between initial and final visits after knee surgery. Attrition was a weakness of this study.

CONTROL ID: 2545010

Platform #33

INCONSISTENT REPORTING OF FUNCTIONAL OUTCOME

MEASURES IN THE UPPER QUADRANT: A REVIEW OF DRY

NEEDLING LITERATURE

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KEYWORDS: Dry Needling, Regional Interdependence

Background & Purpose: Recent randomized controlled trials (RCTs) using dry needling (DN) for treatment of upper quadrant (UQ) impairments are lacking consistency in their use of functional outcome measures.

Standardization is needed to assess this emerging intervention in physical therapy practice and clinical research. There is a spectrum of variation observed in methodology, including how treatment is assessed. DN literature does not take into account the effects of regional interdependence (RI) when assessing functional outcomes. RI has the potential to rationalize why treatment and assessment of body regions remote to a treated location are needed. Identifying treatment efficacy for meaningful change following DN procedures to the neck and all surrounding structures within the UQ would benefit the profession of PT. The purpose of this review was to analyze the literature, assess methodology, and summarize DN outcomes in research and clinical practice. **Methods:** Following van Tulder's approach to ensure a thorough literature review, a search using Medline, PEDro, TRIP, and Cochrane Central Register of Controlled Trials was completed. Proper search methods utilizing a series of keywords (dry needling, upper quarter, neck,

shoulder, trapezius, myofascial trigger points, myofascial pain) were used to find UQ DN RCT's. Twelve studies met the inclusion criteria with their PEDro score averaging 6.6/10. Data extraction and analysis were completed and verified by at least two researchers. Results: Ten different outcome measures were used to assess DN efficacy. Neck range of motion (ROM) was cited in 7 of 12 studies (58%); shoulder ROM and SF-36 were each cited twice (17%); the remaining 7 outcomes were cited only once (8%). Seven of 12 studies (58%) recorded assessments specific to the targeted site and 2 of 12 studies (17%) assessed remote body regions. Discussion - Conclusions: It is our opinion that reporting both target and remote site assessment data would enhance the treatment efficacy of DN and capture the relevance of RI; yet few DN studies assessed more than one UQ location. Furthermore, assessment tool selection is inconsistent, especially for UQ DN treatment. Homogenous standardization in assessment reporting is needed if comparative data analysis of DN efficacy is to occur. To better evaluate the total response to UQ-directed DN treatments, assessments at both target and remote body regions should be considered. Our pilot analysis suggests further research is needed to determine optimal tool selection.

CONTROL ID: 2544357

Platform #21

IMPORTANCE OF PATIENT RAPPOR FOR REHABILITATION: A
SURVEY OF CLINICAL INSTRUCTORS

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KEYWORDS: Rapport, Biopsychosocial, Clinical Reasoning

Background & Purpose: At West Coast University, the core orthopedic curriculum includes components focused on both diagnostic and narrative reasoning with an emphasis on pain sciences and a patient-centered care approach within a biopsychosocial framework. Establishing patient rapport is crucial to the success of a patient-centered approach by developing trust and confidence between student and patient, which ultimately facilitates positive outcomes. The purpose of this study was to disseminate a survey to clinical instructors who mentored our students' first 6-week clinical rotation for an assessment of their overall performance in six key clinical skills including student/patient rapport. Methods: Clinical instructors (CI) who mentored a West Coast University student physical therapist (WCUSPT) in their first clinical rotation were sent online surveys. Survey requested CIs to rank order importance of clinical skills, provide short answers supporting their responses and rank order the WCUSPT's ability to perform the same skills. Surveyed skills included clinical reasoning ability, knowledge of therapeutic exercises, hands-on manual therapy skills, diagnostic examination, subjective history questioning and student/patient rapport. Results: Twenty-two CIs returned surveys representing outpatient orthopaedic (61%), skilled nursing (20%), pediatrics (14%) and neurological rehabilitation (5%) settings. Results revealed 61% of CIs ranked student/patient rapport among the top 2 "most important" clinical skills. Clinical instructors also discussed how crucial rapport is to develop trust and confidence especially in a student therapist. Several CIs elaborated that a therapeutic relationship is essential to motivate patients and achieve desired outcomes. They also commented on

how empathy and ability to interact well with patients is often an innate characteristic. Discussion - Conclusions: Physical therapists must take into account both biomechanical impairments and biopsychosocial factors that impact recovery. Non-mechanical factors play a large role in the patient's desire to improve and participate in therapy. In addition to diagnostic skills, WCUSPTs are taught the importance of student/patient rapport and the influence of a therapeutic alliance on rehabilitation. The results of this survey demonstrate CIs agree a partnership between student and patient is an important clinical skill to achieve favorable outcomes.

CONTROL ID: 2528782

Poster #25

A COMPARISON OF TWO THORACIC MANIPULATION TECHNIQUES TO IMPROVE NECK PAIN

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KEYWORDS: thoracic spine, manipulation, technique

Background & Purpose: Neck pain is common, disabling and costly. Thoracic spine manipulation combined with exercise is an effective treatment for patients with neck pain; therefore it seems appropriate to determine whether certain techniques are better than others. The purpose of this study is to compare the short-term effects of two different thoracic

spine manipulation techniques on neck range-of-motion (ROM), pain, and self-reported disability in individuals experiencing neck pain. Methods: At the initial session the participant completed the Numeric Pain Rating Scale (NPRS), the Neck Disability Index (NDI), and QuickDASH prior to intervention. Participants were randomized into supine or prone thoracic manipulation. A history and physical examination were performed to ensure that the participants were appropriate candidates. The techniques used in this study involved positioning the participant so that a small amplitude quick stretch could be applied to the most hypomobile area of the thoracic spine. The supine or prone thoracic spine thrust manipulation technique was applied two times at each treatment session. After receiving the manipulation, participants were taught six neck mobility exercises for their home exercise program (HEP): cervical retraction, extension, flexion, rotation, side-bending and scapular retraction. Participants returned for two follow-up visits that included completing the outcome measures, assessing ROM, and receiving the same thoracic manipulation (supine or prone) received on their initial visit. At the fourth visit, participants returned for reassessment without intervention. Results: The supine (n=5) and prone (n=9) thoracic spine manipulation techniques significantly improved pain for the NPRS current score ($p < 0.05$). The supine and prone thoracic spine manipulation techniques significantly reduced percentage disability as measured by the NDI and QuickDASH ($p < 0.05$). No significant difference was found between the supine and prone groups for any of the variables. No statistically significant correlation was found between exercise adherence and change in outcomes. Discussion - Conclusions: This study demonstrates no difference in outcomes with both supine and prone thoracic spine manipulation techniques decreasing neck pain and disability related to neck pain. Because there was not a significant difference

between groups, the choice of which technique to use when treating neck pain should be left to the discretion of the practicing clinician and the preference of the patient.

CONTROL ID: 2543908

Platform #13

INTERPRETATION OF THE PASSIVE STRAIGHT LEG RAISE TEST AMONG PHYSICAL THERAPISTS

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KEYWORDS: radiculopathy, classification, examination

Background & Purpose: The passive straight leg raise (SLR) is a common test used by practitioners to categorize patients with low back pain (LBP) for treatment decisions. Despite being extensively studied, little evidence exists on reliability of interpretation of the test among clinicians. The purpose of this study was to assess the inter-rater reliability of interpretation of the SLR among clinicians by modeling multiple test result clinical scenarios. **Methods:** Thirty-five physical therapists in multiple states completed a web-based survey with attached links for viewing test simulation videos. Four different patient responses to the SLR were simulated, based on the distribution of symptoms prior to testing, provocation or changes of distribution of symptoms during the test, and the angle of hip flexion at which those changes occurred. Respondents were

asked to interpret whether the observed test result was positive or negative. Descriptive data of the participants, such as age, years of experience, highest degree earned, certifications earned, number of patients with LBP examined weekly, and percentage of patients upon which the SLR test is used were included in the survey. Inter-rater reliability between respondents was assessed for each test simulation and adjusted for chance agreement using the Fleiss Kappa coefficient. Results: No significant between group differences were found for the respondent characteristics for any of the test simulations. Inter-rater reliability using the Fleiss Kappa coefficient was found to be 0.342 for test simulation of no symptoms prior to testing with distal symptom provocation at 40 degrees of hip flexion. Test simulation of no prior symptoms with provocation of distal symptoms at 70 degrees hip flexion resulted in inter-rater reliability of 0.112 k. Test simulation of no prior symptoms and provocation to the posterior thigh at 40 degrees of hip flexion yielded a value of -0.028 k. Test simulation of resting LBP with provocation of buttock pain at 20 degrees of hip flexion had an inter-rater reliability of 0.072 k. Discussion -

Conclusions: Fair to poor inter-rater reliability was evident in positive versus negative interpretation of the SLR among physical therapists in four test simulations. Given the importance of the test in classification of patients with LBP, disagreement on test results, such as the SLR, may account for disagreement in patient categorization. The results also have implications for educational curricula and post-graduate education content.

CONTROL ID: 2543865

Platform #31

THE ROLE OF UNLOADING TESTS AND EXAMINATION VARIABLES

AS INDICATORS OF IMMEDIATE RESPONSE TO PRAGMATICALLY
SELECTED MANIPULATIONS IN PATIENTS WITH CHRONIC LOW
BACK PAIN: RESULTS OF A PLANNED SECONDARY ANALYSIS

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KEYWORDS: manipulation, chronic low back pain, unloading

Background & Purpose: Spinal manipulation is highly effective for individuals with acute low back pain, with benefits including improvements in pain and disability. However, spinal manipulation appears to be less effective for individuals with chronic low back pain (CLBP). The purpose of this study was to investigate the relationships between specific examination findings, including unloading, and success following manipulation in patients with CLBP. Methods: Recruitment occurred from a publicly funded, hospital based outpatient physical therapy clinic. As part of the physical examination, all participants identified their most provocative motion and completed a Visual Analog pain Scale (VAS) for that motion. Participants were then tested for response to manual unloading while in the provocative position. The physical therapy intervention consisted of one treatment session that included pragmatically selected manipulation techniques to the thoracolumbar spine, sacroiliac joint, and/or hips. Post manipulation, all participants were retested for their concordant motion, with a repeat of the VAS. Results: Subjects (n=21) were divided into groups as responders and non-responders, defined by achievement of the

minimal clinically important difference (15mm or 30%) on the VAS post-manipulation. An independent samples t-test was run to assess between group differences. Statistically significant improvements in pain were observed for responders (n=14, 38.46mm \pm 19.41) compared to non-responders (n=7, 1.71mm \pm 12.09), t= 4.552, p<0.001; representing a large effect size, d=2.27. Unloading response demonstrated no correlation to response (r=0.00, p=1.00). An analysis of responder status by provocative motion was conducted; all groups containing >50% responders (extension (EXT) 7/8, side bending (SB) 3/4) were combined into one variable, which demonstrated a moderate to strong correlation to response, r=0.408, p=0.03 and clinically useful likelihood ratios LR+=2.50, 95% CI: [0.74,8.44], LR- = 0.40, 95% CI: [0.15,1.04]. Discussion - Conclusions: All subjects in this study presented with CLBP; 14/21 responded to manipulative treatment. The odds of success post-manipulation were significantly higher when either EXT or SB was the most provocative direction of motion, while unloading had no relationship to response. The findings suggest primary pain complaints with EXT or SB during the physical exam may help identify potential immediate responders to manipulation in the CLBP population.

CONTROL ID: 2541825

Platform #1

THE EFFECTIVENESS OF TRIGGER POINT DRY NEEDLING FOR MUSCULOSKELETAL CONDITIONS BY PHYSICAL THERAPISTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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KEYWORDS: Dry Needling, Musculoskeletal Pain

Background & Purpose: Dry needling is being utilized by an increasing number of physical therapists in the United States and throughout the world in the treatment of musculoskeletal pain. The purpose of this systematic review and meta-analysis is to examine the short and long term effectiveness of dry needling delivered by a physical therapist for any musculoskeletal pain condition. Methods: Electronic databases MEDLINE, AMED, CINAHL, and EMBASE were searched. Eligible studies were randomized clinical trials that examined the effectiveness of dry needling performed by a physical therapist in individuals with musculoskeletal conditions. Studies were excluded if patients were less than 18 years old, and if the full text was not published in English. Results: The initial search returned 218 articles. After screening, 13 were included. PEDro quality scale scores ranged from 4 to 9 points out of maximum score of 10 with a mean score of 6.69. Eight studies that compared dry needling to control or sham treatment in the immediate to 12 weeks time frame provided evidence that dry needling can decrease pain (six studies) and increase pressure pain threshold (five studies) in patients with musculoskeletal pain. Two studies examined dry needling to control or sham treatment in 6-12 months time frame and provided evidence that although dry needling was favored, treatment effect was not statistically significant. Eight studies that compared dry needling to other treatment in the immediate to 12 weeks

time frame provided evidence that dry needling can decrease pain (seven studies) and increase pressure pain threshold (four studies) in patients with musculoskeletal pain. Dry needling effectiveness on functional outcome was reported in 11 trials at various time frames from one week to one year, with six reporting in favor of dry needling. Discussion - Conclusions: This review found that dry needling performed by physical therapists was superior to no treatment, sham dry needling, or other treatments for reducing pain and improving pressure pain threshold in patients presenting with musculoskeletal pain in the immediate to 12 week follow-up period. Evidence suggests superior outcomes with dry needling for functional outcomes when compared to no treatment or sham needling, but no difference in functional outcomes when compared to other physical therapy treatments. Further high quality studies with long term outcomes are needed to determine the long-term effectiveness of dry needling on musculoskeletal pain.

CONTROL ID: 2537681

Platform #20

MANIPULATION GUIDELINES FOR PEDIATRICS: A GAP IN THE LITERATURE

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KEYWORDS: Manipulation, pediatric

Background & Purpose: The American Physical Therapy Association (APTA) has published clinical practice guidelines supporting manual therapy interventions including manipulations for adults with back and neck pain. The purpose of this review was to determine whether there are guidelines for manipulation exclusive to pediatrics or if guidelines for adults are transferable. Methods: Gathered information came from three approaches. First, a literature search of numerous databases was completed. Studies examined pertained to the pediatric population and adolescents (ages 0-19) as defined by the World Health Organization. Second, we contacted four international physical therapy organizations, six American multidisciplinary professional organizations, and the APTA's Pediatric Section. Finally, a manual search of professional organization websites was conducted. Results: All professional organizations responded to our inquiries; none identified guidelines specific to manipulation in pediatrics. Results from the literature and website searches identified manipulation guidelines related to adults; however, there were no clear guidelines for manipulation in pediatrics. Discussion - Conclusions: Guidelines for manipulation have been developed for adults. Based on our communications, professional organizations are unable to identify manipulation guidelines pertaining to pediatrics. Clinical prediction rules have been established for many pediatric interventions; however, none have been established for manipulation. In addition, the Manipulation Education Manual for Physical Therapist Professional Degree Programs, authored by the APTA Manipulation Task Force makes no mention of guidelines specific to pediatrics. Pediatric patients have distinctive physical characteristics that should be considered when screening, determining parameters, and performing manipulation, which are not found in the current literature across disciplines. We hypothesize that professionals are

not in agreement regarding application of adult guidelines when treating pediatric patients. Due to limited findings in our study, we recommend more extensive expert input. We plan to develop a survey to send across disciplines to key associations and clinical experts to answer the following questions: Should manipulation be performed on pediatric patients? If so, how should manipulation be performed? Who should be responsible for developing guidelines in the future?

CONTROL ID: 2536809

Platform #3

PREDICTORS OF RESPONSE TO MANUAL THERAPY AND EXERCISE FOR INDIVIDUALS WITH A PRIMARY COMPLAINT OF LOW BACK PAIN: A SECONDARY ANALYSIS

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KEYWORDS: Lumbar spine, hip, predictors

Background & Purpose: The purpose of this study was to identify

prognostic factors for individuals with a primary complaint of low back pain (LBP) likely to achieve improvements in pain and function after receiving a pragmatic treatment approach to LBP only or pragmatic LBP interventions plus manual therapy and exercise directed at the hip(s). Methods: Patients presenting with a primary complaint of LBP were enrolled in a previous randomized clinical trial investigating manual therapy and exercise interventions. Subjects had a mean age of 46.4 (+/-15.9) years with an average duration of LBP symptoms of 20.4 (+/-46.1) weeks. Also, the sample had baseline modified Oswestry Disability Index (ODI) score of 36.5% (+/- 12.24) and baseline Numeric Pain Rating Scale (NPRS) score of 5.25 (+/- 1.85). TRIPOD guidelines were used for reporting and analysis. Potential prognostic variables were entered into a logistic regression model to determine the set of variables that best predicted treatment success. A multi-contextual construct of recovery was utilized to define success which included the following items: discharge status of the NPRS ≤ 2 points and ODI $\leq 10\%$ and Global Rating of Change (GRoC) score of $\geq +4$ at both two weeks and discharge. Results: Data from 90 subjects was included in the analysis with 44% (n=40) achieving success. The variables of concurrent hip problem, body mass index (BMI) and duration of symptoms were predictive of achieving success ($r^2 = 0.323$). Concurrent hip problem was the single greatest predictor in this model [OR = 4.71 (1.04-21.3)] with subjects with a concurrent hip problem experienced greater improvements with the interventions. Treatment group was significantly related to outcomes, but after adjusting for the multi-contextual construct of recovery it was no longer significant. Additionally, group and concurrent hip problem did not have a significant interaction. Discussion - Conclusions: Concurrent hip problem, BMI and duration of symptoms may assist clinicians in predicting outcomes at discharge in patients with a primary complaint of

LBP. Patients with lower BMI and shorter duration of symptoms were likely to have improved outcomes. The presence of concurrent hip problems have improved outcomes with manual therapy and exercise directed at the lumbar spine and/or hip region. Only 16.7% of the sample had a concurrent hip problem at evaluation so these results should be interpreting with caution. Further research should continue to investigate the interplay between the lumbar spine and hip joint(s).

CONTROL ID: 2536312

Platform #30

KNEE EXTENSOR ACTIVATION AFTER LUMBO-PELVIC
MANIPULATION AND EXERCISE

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KEYWORDS: Quadriceps activation, Manipulation, Lumbopelvic

Background & Purpose: Lumbo-pelvic manipulations have been shown to improve knee extensor strength in the short term, and therefore could be beneficial in rehabilitation for movement impairments and pain that can occur secondary to inadequate knee extensor activation. Exercise has also been shown to increase knee extensor strength after six weeks of intervention. The purpose of this study was to investigate if lumbo-pelvic manipulation combined with lower- extremity strengthening exercises could

be more effective than exercise alone in increasing knee extensor activation during a maximal voluntary isometric contraction (MVIC).

Methods: Inclusion criteria for the study included having less than 80% MVIC via the interpolated twitch technique. Twenty-three subjects [mean age: 26.3 year and range of 23-34] were identified as having below 80% knee extensor activation during an MVIC and randomly assigned to one of three groups: no intervention, knee extensor strengthening, or knee extensor strengthening plus lumbo-pelvic manipulation. Interventions were performed over a six-week period. Exercise was performed three times/week. The manipulation group received the additional lumbo-pelvic manipulation (Chicago manipulation) once per week prior to an exercise session. Knee extensor activation was measured after six weeks. A two-way repeated-measures (group x time) ANOVA was completed to determine the difference between groups. Results: There was no significant difference ($p=0.075$) between groups for the change in knee extensor activation from before to after intervention. Mean knee extensor activation for the manipulation plus exercise and exercise groups increased 5.4% and 1.5% respectively. The mean extensor activation for the control group decreased 11.9%, though one participant in the control group decreased 30% from pretest to posttest thereby skewing the percent decrease. Discussion - Conclusions: Though the research demonstrated a trend suggesting that manipulation plus exercise and exercise have better results on knee extensor activation versus the control group, there was no significant difference between groups. Further research with a larger sample size may be necessary to determine if manipulation plus exercise has an effect on long-term knee extensor activation and strength.

CONTROL ID: 2574519

Poster #50

THE USEFULNESS OF THE NECK PAIN CLINICAL PRACTICE
GUIDELINES FOR STUDENT PHYSICAL THERAPISTS: A CASE
REPORT

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KEYWORDS: Clinical Practice Guideline, Neck Pain, Clinical Reasoning

Background & Purpose: The cervical spine comprises a large percentage of annual physical therapy visits, with a spectrum of symptoms, presentations, and conditions for the “cervical spine pain” diagnosis. Identifying common patterns of presentation and impairment-based categories as identified in Clinical Practice Guidelines (CPG) of neck pain might prove to be a valuable tool for novice student physical therapists. The purpose of this case highlights the use of CPG in a patient with neck pain. Description: A 46-year-old male presented with a two-year history of cervical spine and neurogenic pain. The patient reported multiple prior episodes of physical therapy that were not successful in generating lasting pain relief. Examination findings demonstrated peripheral nerve symptoms, glenohumeral hypermobility, poor scapular strength, and hypertrophied scapular and cervical spine musculature. Assessment and patient management was achieved using a Maitland-based clinical reasoning strategy and International Classification of Functioning, Disability and Health impairment-based categories, as recommended by the neck pain CPG. Initial treatment was consistent with the “neck pain with radiating

pain” recommendations including soft tissue mobilization, manual myofascial trigger point release, dry needling, nerve mobilization, cervical spine joint mobilization. After resolution of radiating pain, intervention eventually incorporated suggested treatments from the “neck pain with movement coordination impairments” categories. The compliment of a structured clinical reasoning model, included the identification of contributing factors of faulty shoulder biomechanics and hypermobility and the concept of regional interdependence, which resulted in treatments that address cervical and shoulder impairments, such as kinesiotaping for shoulder stability, and scapular and shoulder stabilization exercises. Outcomes: The patient had an initial score of 26% disability on the Neck Disability Index (NDI), which improved to 12% disability after six visits. This 14% reduction in disability met the minimally clinically important difference for the NDI. Functionally the patient reported pain free participation in recreational activities without exacerbation. Discussion - Conclusions: This case demonstrated the successful management of patient by a student physical therapist utilizing the neck pain CPGs in conjunction with a structured clinical reasoning model.

CONTROL ID: 2570111

Poster #46

MANAGEMENT OF MOBILITY DEFICITS AND SHOULDER PAIN IN A PATIENT WITH BREAST CANCER: A CASE REPORT

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KEYWORDS: Shoulder Pain, Breast Cancer, Adhesive Capsulitis

Background & Purpose: Shoulder pain and limited range of motion (ROM) are common sequelae of breast cancer treatment. Evidence exists to support the utilization of physical therapy (PT) for patients with upper extremity pain following surgery for breast cancer. Currently, there is one study that demonstrates the effectiveness of PT after manipulation under anesthesia (MUA) on patients with breast cancer. The purpose of this case study is to describe PT management after MUA for a patient with breast cancer who underwent a left (L) radical mastectomy and axillary dissection. Description: The patient was a 52-year-old right-hand dominant female seen in PT following L MUA for adhesive capsulitis. The patient was undergoing treatment for active breast cancer, and her primary goal for PT was to achieve adequate L shoulder ROM to allow positioning for radiation therapy. Eight months prior to the MUA, she underwent a L modified radical mastectomy and an axillary node dissection. Shortly afterwards, she began experiencing L shoulder pain, lymphedema and limited L shoulder mobility. Limitations in L shoulder ROM prevented positioning for radiation therapy. The patient underwent lymphedema treatment for 10 weeks with successful management of lymphedema but with limited improvements in L shoulder ROM. She underwent a MUA and initiated PT. At the PT evaluation, the patient presented with limited L shoulder AROM and PROM with a painful end-feel. There was hypomobility of the L glenohumeral, acromioclavicular, and scapulothoracic joints, impaired L shoulder strength, L protracted scapular posture, and palpable cording in the L axilla. PT intervention included L shoulder AAROM and strengthening exercises, non-thrust mobilization of

the L shoulder joints, manual stretching, and postural education.

Outcomes: After three PT sessions over two weeks, the patient achieved the L shoulder ROM required for radiation treatment. L shoulder AROM improved in flexion (88°-135°), abduction (45°-92°), external rotation (25°-53°) and internal rotation (55°-70°). Disabilities of the Arm, Shoulder and Hand score decreased from 65% to 22.4%, and the Patient-Specific Functional Scale score improved from 1.3/10 to 4/10. Discussion -

Conclusions: There is limited data regarding the effects of MUA and PT to achieve increased functional ROM in patients undergoing active breast cancer treatment. This case report described the successful interventions of MUA and PT for a patient experiencing shoulder pain and limited ROM during breast cancer treatment.

CONTROL ID: 2570042

Poster #22

MOBILIZATION WITH MOVEMENT OF THE SACROILIAC JOINT FOR EFFECTIVE MANAGEMENT OF A PATIENT WITH SACROILIAC JOINT DYSFUNCTION: A CASE REPORT

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KEYWORDS: sacroiliac joint, mobilization with movement

Background & Purpose: The prevalence of sacroiliac joint (SIJ) dysfunction has been shown to be as high as 22.5% of individuals with low back pain. The use of stabilizing exercises, muscle energy techniques, soft tissue

mobilization, and joint thrust manipulation has been shown to have moderate efficacy for managing SIJ dysfunction. There is limited research on the use of mobilization with movement (MWM) targeting the SIJ in those with SIJ dysfunction. The purpose of this case report is to describe the use of MWM targeting the SIJ in a patient with SIJ dysfunction who minimally improved with the previously listed interventions currently supported in the literature. Description: A 33-year-old female presented to physical therapy (PT) with a 10 month history of left sided low back/buttock pain secondary to lifting her 3-month old child. She had two severe episodes of pain since the initial onset of symptoms. She reported a constant, dull ache in her low back/buttock area between these episodes. Examination revealed a positive SIJ special test cluster for pain provocation, stork test, and active straight leg raise test, indicating SIJ dysfunction as the primary diagnosis. Over the next three visits, muscle energy techniques, core stabilization, non-thrust unilateral SIJ mobilizations, and soft tissue mobilization of posterior hip, lumbar paraspinals, and left posterior sacroiliac ligament were used with minimal change in function. On the 4th visit, a MWM of the left SIJ to facilitate posterior innominate rotation during active lumbar extension was performed. Her final home exercise program consisted of a self-MWM to the SIJ, core stabilization, and proximal hip strengthening to maintain pelvic girdle stability. Outcomes: Immediately following the MWM intervention and at discharge, the patient tested negative on the SIJ cluster, stork, and active straight leg raise tests. The patient was seen for a total of six visits over seven weeks. Her Patient Specific Functional Scale improved from 4/10 to 10/10 for sitting thirty minutes or more and 3/10 to 7/10 for lifting her child. Her Numeric Pain Rating Scale score reduced from a constant 5/10 to an intermittent 2/10. Discussion - Conclusions:

This case highlights the successful management of a patient presenting SIJ dysfunction. The proposed mechanical effect of the SIJ MWM technique may improve the load transfer ability of the SIJ, facilitating restoration of normal movement patterns of the pelvic girdle; however, further research is needed.

CONTROL ID: 2564235

Poster #31

USE OF ELASTIC TAPE TO AFFECT PROPRIOCEPTION IN A PATIENT WITH CERVICOGENIC DIZZINESS

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KEYWORDS: proprioception, elastic tape, cervical

Background & Purpose: Currently research is conflicting on the effects and best uses of elastic tape related to muscle activation and joint position sense. Recent literature has suggested improvements in joint position sense at the ankle using elastic tape; as well as, increased range of motion and pressure pain threshold with elastic taping performed on the cervical spine. Cervicogenic dizziness is described as a condition of disequilibrium and disorientation associated with a lack of proprioception. Traditional treatment approaches include manual therapy, therapeutic exercise and biofeedback. The properties of elastic tape may enhance proprioceptive feedback and improve coordination in cervical musculature in patients with cervicogenic dizziness. The purpose of this case presentation is to

examine the effect of elastic tape on cervical proprioception in a patient with signs and symptoms of cervicogenic dizziness. Description: The patient was a 37-year-old female who was employed as a restaurant manager and full time student with symptoms of bilateral occipital and cervical pain with headaches and dizziness. The patient had been experiencing symptoms for over ten years. She was also found to have a Type 1 Chiari Malformation. Key physical examination findings consisted of limited cervical active range of motion (AROM), muscle guarding, joint hypermobility, and abnormal deep cervical neck flexor endurance and impaired cervical proprioception. Outcomes: Joint reposition error testing was performed as standardized with and without cervical elastic taping with average improvement of 6.72 cm after tape application (right rotation: 14.1 cm to 5.52 cm; left rotation: 13.42 cm to 8.56 cm). Deep cervical neck flexor activation and endurance, ROM, Number Pain Rating Scale (NPRS), Neck Disability Index (NDI), and the Dizziness Handicap Inventory (DHI) were monitored. Overall improvements in cervical flexion AROM (12 to 45 degrees), NPRS (6/10 to 2/10), Neck Disability Index (24 to 16%) and DHI (66 to 18) were observed. Overall the patient improved cervical joint reposition error testing averages with right rotation (15.3 cm to 5.1 cm) and left rotation (14.32 cm to 8.12 cm). Discussion - Conclusions: This case report describes a clinically feasible approach of utilizing elastic tape to enhance proprioception in patients with cervicogenic dizziness as an adjunct to traditional skilled physical therapy interventions. Further research is needed to determine the validity and reliability of using this intervention in a clinical setting.

CONTROL ID: 2546701

Platform #6

MANUAL THERAPY TO THE TIBIOFEMORAL JOINT YIELDS GREATER STRENGTH IMPROVEMENTS IN THE QUADRICEPS THAN LUMBAR MANIPULATION OR NMES FOLLOWING ACL RECONSTRUCTION: A CASE REPORT

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KEYWORDS: ACL, tibiofemoral, mobilization

Background & Purpose: Quadriceps (quad) weakness due to pain inhibition is common following knee surgery. Previous studies demonstrated improved quad recruitment immediately after a lumbar manipulation. Lumbar manipulation plus exercise demonstrated increased quad activation following ACL reconstruction 8 months post-operatively in a case report. There is no evidence supporting the use of joint mobilization, either local or proximally, following knee surgery to improve quad activation. The purpose of this case report is to compare within-session changes in quad force generating capacity (FGC) following exercise alone, exercise combined with tibiofemoral joint mobilization, lumbar manipulation plus exercise, and neuromuscular electrical stimulation (NMES) plus exercise in a patient following an ACL reconstruction. Description: A 23-year-old male presented to physical therapy (PT) with primary complaints of anterior knee pain 2 weeks after

an ACL reconstruction. He demonstrated quad weakness. The patient received PT one time per week for 16 weeks; post-operative protocol procedures were followed. After 6 weeks, the patient was unable to perform a straight leg raise (SLR) without a quad lag. Quad FGC was measured using hand held dynamometry before and after 4 different interventions were applied at 4 different individual treatment sessions: exercise (quad sets/SLR) L3-4 lumbar manipulation+exercise, tibiofemoral anterior-posterior (A/P) mobilizations+exercise, and NMES+exercise. Outcomes: After the initial 6 weeks of PT, left quad FGC was 29.63 lbs. Within the session changes for quad FGC were as follows: exercise alone improved from 29.63 to 30.33 lbs (0.7 lb, 2.36% change), L3-4 lumbar manipulation+exercise improved from 33.23 to 38.3 lbs (5.07 lb, 15.25% change), tibiofemoral A/P mobilization improved from 39.73 to 47.90 lbs (8.17 lb, 20.56% change), NMES+exercise improved from 43.90 to 48.83 lbs (4.93 lb, 11.23% change). NMES alone did not yield within session improvement. Over 4 weeks, total improvement of quad FGC was 48.83 lbs (115.32%), Lower Extremity Functional Scale improved from 13/80 to 65/80. Global Rating of Change was +6. Discussion - Conclusions: This case report demonstrates there may be improved FGC of quadriceps following an ACL reconstruction using exercise combined with tibiofemoral joint mobilizations, lumbar manipulation or NMES. In this particular case, tibiofemoral joint mobilizations in combination with exercise yielded better improvements than lumbar manipulation or NMES with exercise or exercise alone.

CONTROL ID: 2545976

Platform #22

INTEGRATION OF NEUROSCIENCE EDUCATION, TACTILE
DISCRIMINATION, LIMB LATERALITY AND GRADED MOTOR
IMAGERY IN AN INDIVIDUAL WITH FROZEN SHOULDER

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KEYWORDS: adhesive capsulitis, central sensitization

Background & Purpose: Aggressive physical therapy in the freezing/painful
stage of frozen shoulder may prolong the course of recovery. Central
sensitization may play a role in the early stages of frozen shoulder.

Neuroscience education (NE), limb laterality (LL), tactile discrimination
(TD) and graded motor imagery (GMI) have been used with success in a
number of conditions with known central sensitization. The purpose of this
case report is to describe the examination and treatment of a patient in the
painful stage of frozen shoulder using NE, LL, TD and GMI training.

Description: A 54-year-old female with a diagnosis of frozen shoulder was
referred by an orthopedic surgeon and sent for aggressive daily physical
therapy. She had 7/10 pain at rest on a Numeric Pain Rating Scale
(NPRS) and a Shoulder Pain and Disability (SPADI) score of 62%. Patient
had limited active range of motion (AROM), Fear Avoidance Beliefs
Questionnaire (FABQ) scores were 34 and 22 on the Work and Physical
Activity subscales, respectively. Two-point discrimination shoulder laterality
accuracy was significantly impaired. She also had hypersensitivity to cold,
heat and pressure, suggesting central sensitization. Due to her fear of

movement and being touched, we instituted a graded, "top-down program" focusing on central sensitization with NE, LL, TD, and GMI. Outcomes: After six weeks of a "top-down"/GME approach (including NE, LL and TD), her resting pain decreased to a 2/10, the SPADI decreased to 32%, and her active flexion, abduction and external rotation AROM had improved to 129, 79 and 42 degrees respectively. Her hand and shoulder laterality accuracy was normal at 80% and her 2-point discrimination improved by 10mm. At the end of 12 weeks following the addition of manual therapy and exercise, her SPADI had decreased to 22%, her NPRS at rest was a 0/10, her FABQ-W was 14 and her FABQ-PA was 8. Her active flexion, abduction and external rotation AROM had improved to 162, 111 and 65 degrees, respectively. Discussion - Conclusions: Traditional approaches using aggressive physical therapy in the early stages of this condition may be detrimental to long term outcomes. This case report demonstrated the successful integration of a "top-down approach" in patients with painful frozen shoulder. This approach allows clinicians to educate patients about pain and calm the central nervous system which may lead to a quicker transition from the freezing stage to the thawing phase of frozen shoulder.

CONTROL ID: 2544872

Poster #1

A MANUAL THERAPY AND MOVEMENT SCIENCE APPROACH FOR
THE TREATMENT OF UPPER EXTREMITY ADVERSE NEURAL TISSUE
TENSION: A CASE REPORT

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KEYWORDS: Movement Systems, Manual Therapy

Background & Purpose: Manual therapy applied to the cervical and thoracic spine produces positive clinical outcomes of decreased pain and improved upper extremity range of motion during upper limb tension testing. By integrating manual therapy into a movement science understanding of dysfunction, one can select the most appropriate intervention and follow a pattern of care with less variability for trial and error. The purpose of this case study is to demonstrate the use of manual therapy in conjunction with movement science and biopsychosocial approaches in the treatment of a patient presenting with adverse neural tissue tension (ANNT) of the radial nerve. Description: A 39-year-old female presented with a crush injury to the right dorsal aspect of her wrist. The patient, who was a custodian, reported 7/10 pain on the Numeric Pain Rating Scale (NPRS) with all wrist and thumb motions and was unable to perform work functions of vacuuming, carrying garbage bags, and wiping window. Upon objective examination of the wrist, a movement system impairment syndrome of right wrist extension with radial deviation was noted, as well as local and regional joint dysfunctions, myofascial restrictions, and a positive upper limb tension testing of the radial nerve. The patient was treated for ten visits over a four-week period with a combined approach of manual therapy directed to the local and regionally-interdependent joints and myofascia, movement science as described by Sarhmann on motor control exercises to correct the wrist movement systems impairment syndrome, and biopsychosocial patient education and empowerment. Outcomes: After ten visits, significant improvements were noted in the patient's wrist movement strategies, grip strength, range of

motion, joint mobility, radial nerve excursion, pain level, and biopsychosocial components. The NPRS improved from 7/10 at rest to 0/10 pain with rest and activity. The Fear Avoidance Beliefs Questionnaire (FABQ), physical activity improved from 24/24 to 0/24; the FABQ work subscale improved from 24/42 to 6/42. The QuickDASH improved from 75% symptom related disability to 0% disability. The patient was referred back to the physician, who returned her to full duty at work. Discussion - Conclusions: This case demonstrated the successful management of integrating manual therapy into a movement science and biopsychosocial approach for a patient after a crush injury.

CONTROL ID: 2544741

Poster #59

USE OF A THORACIC SPINE MANIPULATION FOR A PATIENT WITH HEADACHES: A CASE REPORT

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KEYWORDS: Cervical, Headaches, Manipulation

Background & Purpose: Recently, there has been a growing body of research to support interventions aimed at treating one anatomical region and the influence it has on the function of other regions of the body. This concept is often termed 'regional interdependence.' In the upper quadrant

there is evidence to support treating the thoracic spine for mechanical neck pain and shoulder pain. The purpose of this case is to demonstrate the application of regional interdependence through treatment of the thoracic spine for a patient with headaches when cervical mobilizations aggravated symptoms. Description: A 21-year-old male presented to physical therapy with chief complaint of a constant, nagging unilateral right sided headache that had been present for four to five months. Initial findings were increased symptoms with active cervical extension and axial compression. He also reported local neck pain with muscle guarding during cervical passive joint mobilizations. There was reduced range of motion (ROM) with the flexion-rotation test and decreased passive joint mobility with accessory motions of the thoracic spine. Cervical spine mobilizations were attempted for intervention, but the patient reported an increase in headache and local neck pain. Therefore, a combination of thoracic mobilization and manipulation with thoracic ROM, scapular strengthening and deep neck flexor exercises were utilized over the course of five visits to decrease his subjective reports of headaches. Outcomes: Immediate reductions in headache intensity were reported every treatment session immediately after thoracic spine manipulation. The patient's Care Connection functional score improved from 87% to 98% from initial evaluation to discharge. He reported a Global Rating of Change score of +7. At discharge, he no longer reported a constant headache and demonstrated pain-free cervical active ROM in all directions with symmetrical flexion-rotation test. His headache symptoms improved from 6/10 on the Numeric Pain Rating Scale initially to 0/10 at time of discharge. His pain at worst over the previous 24 hours was rated at 2/10. Discussion - Conclusions: This case demonstrated the use of thoracic intervention to treat a headaches. If a patient's response to intervention at the area of

primary complaint is poor, treatment to adjacent areas may be considered to achieve clinically significant outcomes, following the concept of regional interdependence.

CONTROL ID: 2544413

Poster #49

SUCCESSFUL DIFFERENTIAL DIAGNOSIS FOR THE MANAGEMENT OF A PATIENT EXPERIENCING HEADACHES: A CASE REPORT

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KEYWORDS: headaches, differential diagnosis, manual therapy

Background & Purpose: Physical therapists screen patients for appropriateness for conservative care. If appropriate, therapists then determine a comparable sign to monitor effects of intervention. The purpose of this case study was to demonstrate successful differentiation of a headache presentation while proceeding with caution due to potential red flags and co-morbidities. Description: A 55-year-old female with a chief complaint of headaches and upper neck pain that began one month ago when performing valsalva maneuver. She reported throbbing and stabbing pain traveling from the base of her skull to parietal, frontal, and temporal

regions. Symptoms were worsening and now were waking the patient at night. She experienced dizziness and nausea, but denied bowel/bladder abnormalities, drop attacks, loss of balance, and difficulty swallowing. Health history included multiple myeloma treated with two bouts of chemotherapy and radiation in 2003 & 2008, followed by bone marrow transplants in 2013 & 2014. Imaging studies showed vascular changes in white matter and in the Circle of Willis. Other findings included poor posture, decreased upper cervical mobility and the neck pain reproduced with extension and side bending to the right. Headaches were reproduced with movement from sitting to supine and palpation of C2 transverse process and suboccipital muscles. Neurologic and cranial nerve screen was negative and vitals were normal. Due to patient's history and objective findings, clinical decision-making supported gentle manual interventions to restore mobility through the upper cervical spine, manual thoracic mobilization, postural strengthening and education. Condition monitored by questioning and continuous screening of presentation and remained stable throughout treatment. Outcomes: The patient responded well to initial treatment with no adverse response. Further treatment included soft tissue mobilization, joint glides, exercise and education. After 11 sessions, she had minimal neck pain, no further headaches, near normal cervical movement and returned to full prior level of function. Cervical functional survey improved from 82% to 100% and pain on the Visual Analog Scale) decreased from 6.5 to 0.5 cm. Discussion - Conclusions: This case study demonstrated that despite the presence of potential red flag indicators, differential diagnosis process showed patient was appropriate for treatment for cervicogenic headache. Decision making for treatment was based on the ability to find a comparable sign that reproduced patient's symptoms.

CONTROL ID: 2545421

Poster #40

SPONTANEOUS VERTEBRAL ARTERY DISSECTION IN A 69 YEAR
OLD FEMALE RESULTING FROM A BENIGN MECHANISM OF INJURY:
DESCRIPTION OF A MEDICAL CASE REPORT

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KEYWORDS: Vertebral artery dissection, Differential Diagnosis, Imaging

Background & Purpose: Cervical manipulation has been implicated as a potential mechanism for vertebrobasilar artery insufficiency (VBI) due to dissection. Recent evidence suggests that end-range active cervical range of motion (ROM) may be more stressful to the vertebral artery than cervical manipulation. Age and cardiovascular risk factors increase the likelihood of VBI. Physical screening examinations for VBI carry little diagnostic utility, and recent guidelines suggest utilizing a thorough subjective history and cardiovascular screening in suspected patients. Description: The purpose of this case report is to describe a patient who sustained a spontaneous vertebral artery dissection due to a cervical active ROM mechanism. A 69-year-old female with a history of uncontrolled hypertension and hyperlipidemia sustained a right (R) vertebral artery dissection with the suspected mechanism being a neck rotation to the left (L) after hearing a loud noise. The patient's symptoms included immediate L visual field loss

followed by occipital neck pain and headache. The patient reported a prior history of a visual field loss event two years prior. Outcomes: The patient scored a 2 on the National Institutes of Health (NIH) stroke scale due to the presence of homonymous hemianopsia. Results of MRA included R vertebral artery long segment stenosis combined with complete occlusion of V1 and proximal V2 segments suggesting vertebral artery dissection. Additionally, MRI of the brain resulted in finding of acute ischemia to the right occipital lobe. The patient was treated with anticoagulant therapy and discharged after one day in the hospital. Discussion - Conclusions: Physiotherapists who use cervical spine manual therapy should screen patients for a history of hypertension, hyperlipidemia or history of headache, neck pain, and visual field loss. This case report highlights the feasibility of spontaneous dissection in the presence of cardiovascular risk factors and increased age, which may increase the overall risk of a VBI event. Spontaneous dissection of the vertebral artery is a rare but serious event. This case report strengthens the argument that physiotherapists should perform a careful history and cardiovascular screen on patients presenting with head and neck pain.

CONTROL ID: 2545388

Platform #35

DRY NEEDLING AND ECCENTRIC EXERCISE FOR THE TREATMENT OF PATIENTS WITH CHRONIC BICIPITAL TENDINOPATHY: A CASE SERIES

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KEYWORDS: Dry Needling, Shoulder, Eccentric Exercise

Background & Purpose: Chronic tendinopathy of the long head of the bicep (LHB) is a common condition and is often difficult to treat. Few studies have described specific techniques of manual therapy and exercise for rehabilitation of patients with chronic tendinopathy of LHB. Eccentric exercise (EE) is an effective treatment for certain tendinopathies. Dry needling (DN) has been advocated as an intervention for tendinopathy to induce bleeding and a localized healing response. The effect of these combined interventions on bicipital tendinopathy is unknown. The purpose of this case series is to describe the use of the novel treatment approach of EE and DN in ten patients with chronic LHB tendinopathy. Description: All ten patients (age range 26-54-years-old) had chronic anterior shoulder symptoms greater than six months, pain with palpation of the LHB, and a combination of positive results on Speed's, Hawkins Kennedy, Neer and Yergason's tests. Of the ten patients, eight had failed traditional physical therapy. One patient reported chronic biceps pain that began six months after a biceps tenodesis. The average QuickDASH score at initial examination was 33.61%. The average Numeric Pain Rating scale (NPRS) score at initial examination was 6.1. All ten patients were treated with 2-8 sessions of DN into the most painful and/or thickened areas of the tendon, confirmed with palpation, 20-30 times per session. An EE program and stretching of the biceps muscle/tendon followed each DN session and was performed daily for the course of treatment. Outcomes: At the end of treatment, the average final QuickDASH score was 7.75%, NPRS was 2.2 and the 10 patients had an average global rating of change (GROC) of 5.4. Findings resulting from this retrospective case series suggest that EE and

DN may be beneficial in patients with chronic LHB tendinopathy resulting in both symptomatic and functional improvement. Discussion -
Conclusions: The results of this case series suggest that DN and EE may be a compliment treatment to traditional manual therapy and strengthening of the rotator cuff and scapular muscles typically utilized as an intervention to treat shoulder pain. Further exploration of this novel treatment approach is warranted. Further implications from this treatment approach may include avoidance of more invasive techniques commonly used to treat this condition including, injection, biceps tenotomy and tenodesis.

CONTROL ID: 2545213

Poster #2

ECCENTRIC HIP FLEXION TRAINING IN PATIENTS WITH
MECHANICAL LOW BACK PAIN: IMPLICATION AND EFFECT OF
ECCENTRIC HIP FLEXION EXERCISES: A CASE REPORT

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KEYWORDS: Hip flexors, Eccentrics, low back pain

Background & Purpose: The psoas muscle has been shown to work as a spinal stabilizer and potential contributor to segmental dysfunction. While current research regarding treatment of the psoas describes passive techniques, no studies describing active hip flexor exercises were found in literature databases. The goal of this case study is to describe eccentric hip flexion exercises in a patient with mechanical LBP. Description: A 52-

year-old female with subacute mechanical LBP and right anterior thigh pain in psoas referral pattern, who was seen four times in three weeks. Concordant sign (CS) was reproduced with lumbar and hip extension, lower lumbar posterior-to-anterior (PA) mobility testing, as well as active concentric and resisted eccentric straight leg raise (SLR). Increased tone was noted with psoas palpation and patient reported localized pain and reproduction of CS. Prone instability and vertical compression testing were positive and patient demonstrated aberrant lumbar active range of motion (ROM). Reproduction of CS with standing lumbar extension and quadrant was decreased by placing the right foot on a stool. Graded eccentric hip flexor training was selected as an initial intervention to facilitate lumbopelvic dissociation with extension biased movements. The exercises were modified and progressed in regards to range and difficulty to allow pain free performance. Advanced lumbopelvic motor control exercises for improved dissociation and lifting mechanics were added during later visits. Outcomes: Immediately after the first bout of hip flexor eccentrics, patient demonstrated improved pain free lumbar and hip ROM, as well as significantly decreased reproduction of CS with lumbar PA mobility testing and resisted eccentric SLR, despite lack of direct manual intervention to the spine. Severity of CS and irritability with provocative testing continued to decrease each visit. After visit four, patient self discharged, reporting complete resolution of pain and functional limitations. Discussion -

Conclusions: This case study demonstrated the successful management of a patient with mechanical LBP with eccentric hip flexion strengthening. Further investigation for specific indication and clusters of findings will be needed for appropriate selection. Improvements in objective tests listed above could indicate different effects of eccentric hip flexor exercises, including decreased anterior torque on vertebral bodies and pelvis and

neurophysiological changes, such as decreased extensor inhibition.

CONTROL ID: 2545211

Poster #48

APPLICATION OF MANUAL THERAPY INTERVENTIONS IN A CASE OF
FOCAL HYPERHIDROSIS: A CASE REPORT

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KEYWORDS: Hyperhidrosis, Thoracic, Rib

Background & Purpose: Focal hyperhidrosis (FH) affects 3% of the population, with excessive perspiration in the palms, axillae and soles of feet. FH is challenging to manage and results in social and psychological distress. Interventions, including anticholinergic medications and endoscopic thoracic sympathectomy, target the autonomic system and variable results hinder satisfactory outcomes. Research has described neurophysiological effects of spinal manual therapy (SMT) and associated sympathetic nervous system response where the peri-aqueductal grey (PAG) is the proposed link. There is a paucity in the literature for SMT treatment of FH. The purpose of this case is to describe the utilization of SMT in conservative management of FH. Description: A 14-year-old female was referred to physical therapy for application of iontophoresis to address FH. Chief complaints included excessive perspiration in her

bilateral (B) palms, soles of feet and axillae and self-reported increased body temperature and odor resulting in activity and social restrictions. Aggravating factors included prolonged slouched sitting. Sympathetic slump testing (trunk slumped sitting with progressive long-sitting) recreated perspiration to 10/10 severity in affected areas and increased upper quarter body temperature. Posterior-to-anterior (PA) mobility assessment at T4/T5 levels reproduced B palm perspiration and B upper extremity pilomotor response (PMR). Caudal accessory assessment of first ribs reproduced ipsilateral palm/axilla perspiration and PMR. SMT included T4/T5 PA mobilizations and caudal mobilizations at B first ribs. Home exercise program (HEP) included seated postural correction. Within session changes in B palm perspiration were demonstrated with all interventions. Outcomes: The patient was seen for four visits over the course of two months and self-discharged due to development of an abdominal hernia. At 3-week follow-up via phone call the patient reported improved FH symptoms with postural correction at school. Her mother reported the patient had overall decreased complaints of perspiration with adherence to HEP. Discussion - Conclusions: The exact mechanism for hyperhidrosis is not completely understood, but sympathetic dysfunction has been proposed as a contributing factor. SMT has a purported neurophysiological mechanism involving sympathoexcitatory structures, specifically the PAG. This case highlights the use of SMT in FH. Further research is warranted to identify possible benefits of SMT as a conservative treatment for patients with FH.

CONTROL ID: 2536566

Poster #51

PREGNANCY AS A RISK FACTOR FOR STRESS FRACTURES: A CASE

REPORT

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KEYWORDS: Stress fracture, Pregnancy, Lactation

Background & Purpose: Lower extremity stress injuries are common among endurance athletes and the military. While deficiency in bone density, training errors, female gender and previous stress fractures are well known risk factors for stress injury, less frequently reported are pregnancy and lactation induced osteopenia. Screening for osteopenia during pregnancy is not routine. Estimated incidence of pregnancy related osteoporosis is 0.4 cases per 100,000. The purpose of this case report is to describe a stress injury in a postpartum female who was breast-feeding.

Description: A healthy 35-year-old postpartum active-duty female developed insidious medial knee pain after starting a gradual return to run program four months after caesarian delivery. Initial medical diagnosis was medial knee strain and radiographs were unremarkable. There was no trauma, previous bone or nutritional deficiencies and labs were normal. Symptoms progressed from pain with running (<1 mile 3x/week), to pain with walking and eventually at rest. Given the presence of postpartum/lactation mediated hormonal changes, recent change in activity, combined with an insidious onset, focal bony tenderness and negative ligamentous and meniscal tests, there was a heightened suspicion for stress injury. Further diagnostic imaging, specifically magnetic resonance imaging (MRI), was ordered based upon the physical

therapy evaluation and clinical findings. Outcomes: Conventional radiographs may not detect stress fractures given high false negatives and low sensitivity; therefore, MRI is the preferred imaging choice for diagnosis. In this case, MRI confirmed evidence of stress reaction/fracture at the proximal medial tibia and medial femoral condyle. Subsequently, interventions focused on protected, then progressive weight bearing tasks, including body weight assisted treadmill training. At time of discharge the patient surpassed her predicted Focus On Therapeutic Outcomes score and passed her military fitness test. Discussion - Conclusions: The increasing number of females in the military and in endurance sports may provide clinicians with instances when environmental and gender-related risk factors combine in novel ways. This case highlights the need for clinicians to screen risk factors beyond those traditionally established for the development of stress fracture and to include the less frequently reported factors of pregnancy and lactation-induced osteopenia.

CONTROL ID: 2535981

Poster #4

DIAGNOSIS AND TREATMENT OF BILATERAL LATERAL CALCANEAL NERVE ENTRAPMENT WITH MANUAL THERAPY TECHNIQUES: A CASE REPORT

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KEYWORDS: Heel pain, Nerve entrapment, Nerve compression syndromes

Background & Purpose: Even though only 10% of the population will experience plantar heel pain (PHP), this diagnosis results in over one million physician visits per year in the USA. Neurological etiology is suspected in nearly 20% of cases. Despite being a common disorder, there is limited evidence for any one conservative treatment and surgery is recommended for unresolved symptoms. Clinical signs for lateral calcaneal nerve entrapment (LCNE) include absence of morning pain, paresthesia across plantar surface, and pain upon palpation of medial heel. Currently, stretching of the Achilles tendon and plantar fascia only hold low to moderate efficacy. This case study highlights the clinical diagnosis of LCNE and successful treatment with use of orthopedic manual physical therapy (OMPT). Description: A 53-year-old male presented with eight-month history of bilateral PHP. Medical evaluation and referral indicated plantar fasciitis. Unsuccessful medical management over the course of five months included injections, pharmacological, orthotics, ice, and physician directed stretching. Patient was referred for physical therapy where he reported 3/10 resting pain, described as "warmth, needles, and pressure", and not being able to stand or walk for longer than 10 minutes before 8/10 pain. Passive range of motion (PROM) was limited bilateral in dorsiflexion (8°) and hallux extension (30°) with hypomobile subtalar, intertarsal, and first metatarsophalangeal joint (MTP) motion. Pain was reproduced bilateral at origin of abductor hallucis on nodules. All plantar fascia provocation tests were negative. Outcomes: He was seen for five visits. Sessions were directed at OMPT interventions to improve subtalar and first MTP joint mobility and decrease soft tissue trigger points through soft tissue mobilization. Numeric Pain Rating Scale decreased from 8/10 to 0/10 with standing and walking greater than 30 minutes. Functional

dorsiflexion improved from 6cm to 8cm. Hallux extension PROM improved to 60°. Trigger point tenderness and restrictions in joint mobility resolved and Foot and Ankle Ability Measure score improved by 26%. He scored +7 on the Global Rating of Change at discharge. Discussion - Conclusions: This case study highlights a patient who had failed initial traditional conservative treatment but following OMPT has resumed all desired activities without pain and did not undergo suggested surgery. Further research is needed to examine the effectiveness of OMPT in LCNE.

CONTROL ID: 2534617

Poster #38

DIFFERENTIAL DIAGNOSIS AND CLINICAL DECISION-MAKING WITH
A PATIENT WITH UNDIAGNOSED SLIPPED CAPITAL FEMORAL
EPIPHYSIS: A CASE REPORT

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KEYWORDS: SCFE, differential diagnosis, pediatric

Background & Purpose: Slipped capital femoral epiphysis (SCFE) is defined by slippage of the proximal epiphysis on the metaphysis through the epiphyseal plate. Prevalence is estimated at 11/100,000 and is 2-3 times more common in males who are obese/overweight. Common clinical presentation includes antalgic gait with the limb held in external rotation

(ER) with complaints of non-traumatic hip, thigh, and/or knee pain. Clinical examination typically reveals limited hip flexion and internal rotation range of motion (ROM) and a leg length discrepancy (LLD) may be present. Medical diagnosis is made via radiography; surgical fixation is typically required. Prognosis is negatively impacted by delays in diagnosis. The purpose of this case is to describe the importance of recognizing SCFE cardinal signs and symptoms and performing a discriminative evaluation in adolescent male with a referral for leg pain. Description: An overweight 14-year-old male was referred to outpatient physical therapy (PT) for “quadriceps strain” by a nurse practitioner in a school-based clinic. The patient reported non-traumatic right medial thigh pain that began after a strenuous football practice. No imaging was available at the PT evaluation. He ambulated with bilateral axillary crutches with his right leg held in excessive ER. He endorsed "moderate" pain and popping in his right hip with minimal relief with rest, ice, or elevation. He had a 1" LLD measured from the anterior superior iliac spine to the medial malleolus. Right hip flexion ROM was limited to 90°. He held his leg in 25° ER and was unable to achieve neutral. He had normal knee ROM with no quadriceps pain with active contraction or passive elongation. The physical therapist referred the patient to the emergency department (ED) with a letter indicating a suspicion of SCFE. Outcomes: Radiographic imaging performed in the ED revealed a right SCFE with moderate displacement and widening of the left capital femoral epiphysis without displacement. The patient received bilateral surgical fixation the following day. Discussion - Conclusions: Although the patient presented with vague symptoms and thigh pain, cardinal signs and symptoms of SCFE were evident. This case highlights the importance of clinical reasoning with knowledge of pediatric red-flag orthopedic diagnoses that necessitate immediate medical referral.

CONTROL ID: 2533963

Poster #24

TOTAL SHOULDER ARTHROPLASTY IN A PATIENT WITH BILATERAL
MASTECTOMY: A CASE REPORT

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KEYWORDS: Total shoulder arthroplasty

Background & Purpose: Total shoulder arthroplasty (TSA) is the third most common joint replacement behind hip and knee arthroplasty but the effects of preexisting comorbidities on postoperative outcomes with TSA are not well documented. Increased incidence of lymphedema after TSA is noted in patients with and without a history of lymphedema after mastectomy. Complications of mastectomy with implant based breast reconstruction include decreased extensibility of the soft tissues of the chest wall. This case study uses evidence-informed clinical reasoning to discuss potential complications affecting post-operative recovery after a TSA in a patient with a history of mastectomy with implant-based breast reconstruction.

Description: A 79-year-old female presented eight days after right TSA with complaints of mild arm fatigue and weakness with swelling of the upper arm limiting her ability to complete Pilates or play the piano. Passive range of motion (ROM) flexion was 20° and external rotation (ER) was lacking 10°. Preoperative history included bilateral mastectomy with implant-based

reconstructions and revisions without lymphedema. Postoperative protocol required passive ROM limited to be limited to 100° of flexion and 30° of ER for four weeks. Active ROM could begin at four weeks, and strengthening at 10 weeks. Outcomes: The patient was seen for 16 visits over 27 weeks. Manual techniques were used to address joint limitations, passively stretch soft tissues, and guide the patient in her ROM exercises. At four weeks the patient complained of increasing pain limiting her ROM, a fear of lymphedema provoked by movement, and reluctance to wean out of the immobilizer. Patient education included risks of prolonged immobilization, including loss of ROM, risk of lymphedema, and persistent pain, while continuing with manual interventions and graded exposure to increased ROM. By 14 weeks, the patient reported improving ROM and function, but continued weakness. She was enrolled in a strengthening class for three sessions to reinforce her home exercise program. At week 27, near normal ROM and strength with reduced pain allowed a return to Pilates and playing the piano. Discussion - Conclusions: Surgical intervention for breast cancer is a risk factor for developing soft tissue complications with the often unappreciated potential to affect recovery after a subsequent TSA. This case demonstrated successful management of patient after TSA, which included recognizing the impact of prior mastectomy on both tissue healing.

CONTROL ID: 2545003

Poster #8

"LEAP"ING FROM FELLOWSHIP TRAINING TO EXPERT CLINICAL PRACTICE: UTILIZATION OF A LEAP CASE STUDY FOR THE EFFECTIVE MANAGEMENT OF A PATIENT WITH NECK PAIN

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KEYWORDS: Mobilization, Cervical, Case Study

Background & Purpose: There is a growing paradigm shift in physical therapy for evidence-based practice. There are numerous challenges to synthesizing all of the available research and linking these findings into clinical practice. The aim of clinical practice guidelines and systematic reviews are to serve as a resource regarding the best current practice of orthopedic physical therapy. The question arises, how do we best apply these resources for best patient management? Linking Evidence and Practice (LEAP) case studies highlight the findings and application of evidence to the practice of physical therapy. The purpose of this case is to demonstrate the use of a LEAP case study during fellowship training to assist in the application of clinical guidelines for cervical mobilization on a patient with chronic neck pain. Description: A patient was identified for possible application of manipulation/mobilization of the cervical spine during fellowship training. A LEAP case study was identified (Jonely et al 2014) and a similar PICO format (patient, intervention, comparison, outcome) as the case study was applied to the patient case. Relevant interventions were applied, and results compared through similar guided reflection as found in this and other LEAP studies between fellowship mentors and peers. Outcomes: Outcome measures were collected at regular intervals for the identified patient. Neck Disability Index (NDI) ratings were collected throughout treatment. At each visit, global functional rating, pain visual analog scale and global rating of change were also

collected. Minimal clinically important differences were met for all outcome measures in the patient. Clinical applicability of the patient case to the LEAP study and pertinent clinical guidelines were analyzed with fellow mentorship. Discussion - Conclusions: A study on low back pain showed that adherence to guideline recommendations was associated with better short-term clinical outcomes and reduced cost. Successful outcomes were demonstrated for this case study with integration of a LEAP case study. Application of evidence-based practice for treatment effectiveness is a challenging process and involves multiple steps, including formulating a question, literature reviews, and critically appraising the literature for appropriate management. This case highlights the value of utilizing LEAP cases in specialty training, a potential area for future research, and the additional challenges of applying evidence, clinical expertise, and patient expectations to clinical practice.

CONTROL ID: 2544984

Poster #9

WHAT ARE THE ODDS? A SERIES OF SPINE REFERRALS IN
RESIDENCY AND FELLOWSHIP TRAINING: A CASE SERIES

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KEYWORDS: Lumbar, Imaging, screening

Background & Purpose: Physical therapists (PT) appropriate referral to

another medical professional is well documented. Jette et al concluded there is a "need for further emphasis on [PT] education in medical screening, identification of red flag symptoms, and differential diagnosis." The purpose of this case series is to highlight the identification of a series of low back pain (LBP) cases requiring further medical referral during PT specialty training. Description: There is a 0.9% prevalence of serious spine pathology from a cohort of patient's seeking primary care treatment for LBP. In the first three months of specialty training, 6 of 100 evaluations (6%) performed by a single PT which required medical referral. The examination of all cases of non-critical medical referral was subsequently analyzed due to this discrepancy between the odds in the published literature. This detailed analysis was performed on three of the six patient cases in which there was disagreement between the physician's diagnosis and the PT's findings. The inclusion criteria for the three cases were non-specific, non-traumatic LBP with benign radiographic images. The other three cases were excluded (e.g. cases of vertigo, neck pain, and diffuse upper extremity numbness). All three patients were initially referred from physicians who specialized in the spine. Outcomes: Pre-test probabilities were estimated from prevalence statistics. Clinical reasoning strategies were evaluated, and the diagnostic accuracy of subjective data and clinical findings were applied to calculate the post-test probability of pathology. For the three patient cases described, appropriateness of referral to the physician was confirmed with magnetic resonance imaging, with findings of a C5 posterior disc herniation with caudal migration and subsequent myelomalacia, a left Achilles rupture which had initially been equated to radicular symptoms, and an intradural extramedullary schwannoma at L5. Patient outcomes and appropriateness of referral for the case examples are described. Discussion - Conclusions: This case series highlights the

analysis of red flag screening in PT specialty education and the use of a consistent management model in differential diagnosis of the spine. It is imperative for PTs to implement best-evidence strategies to appropriately screen for these pathologies. Utilizing the diagnostic accuracy of test findings to reflect back on these cases demonstrated that the clinical decision-making was consistent with subsequent imaging findings.

CONTROL ID: 2544974

Poster #11

MANUAL THERAPY FOR NON-CARDIAC RELATED CHEST WALL
PAIN: A CASE REPORT

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KEYWORDS: costochondritis, non-cardiac chest wall pain, Manual
Physical Therapy

Background & Purpose: Chest wall pain is one of the most common reasons individuals seek medical attention in the world. It accounts for 7.16 million visits to the emergency room annually in the United States. Only about one third are diagnosed with acute coronary symptoms and the remaining with non-cardiac chest pain. About 30% of non-cardiac chest pain patients are diagnosed with costochondritis. No systematic reviews or clinical trials regarding optimal treatment for costochondritis have been identified. The purpose of this case report is to describe the successful

treatment of a patient diagnosed with non-cardiac chest wall pain and the important role physical therapy plays in easing anxiety. Description: A 29-year-old male presented with left sided anterior chest wall pain that began insidiously about one year prior. His pain was described as a strong ache, rated 6/10 on the Numeric Pain Rating Scale (NPRS). He went to the emergency room on two separate occasions due fear of a heart attack, with negative findings. Significant past medical history included anxiety. Examination revealed: pain with left shoulder combined flexion, adduction and external rotation with overpressure, seated active range of motion (AROM) thoracic left rotation with overpressure and with palpation of the left 4th-6th costosternal joint, hypomobility of the upper thoracic spine and a positive left upper limb neural provocation test with median nerve bias. Interventions included anterior to posterior mobilization at the left 4th-6th costosternal joint, posterior to anterior mobilization to the upper thoracic spine (T2-T7), pectoral stretching for home and education on the mechanical nature of his symptoms. Outcomes: Three physical therapy appointments resulted in improvements in: pain 0/10 at the worst, pain-free AROM thoracic rotation, pain-free left shoulder combined flexion, adduction and external rotation. Negative neural provocation testing was noted. Neck Disability Index Score was 0% and he reported decreased anxiety. Discussion - Conclusions: This case report details the successful treatment of a patient diagnosed with costochondritis. Physical therapy assessment clearly reproduced the patient's pain, which had not occurred in previous medical visits. Earlier multi-modal therapy intervention could have saved unnecessary visits to the emergency department, eased his anxiety and improved his quality of life sooner.

CONTROL ID: 2544965

Platform #5

UTILIZATION OF MANUAL THERAPY TO IMPROVE SENSORY
PERCEPTION OF A THALAMIC STROKE PATIENT: A CASE REPORT

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KEYWORDS: thalamic stroke, parathesias , manual therapy

Background & Purpose: Stroke is a major health issue and the most common cause of long-term disability in the world. Impaired sensation is present in 11-85% of stroke patients. The most frequent cause of a pure sensory stroke (PSS) is a lacunar infarction in the thalamus. The sensory involvement is typically throughout 50% of the body with a clear-cut division down midline. Impaired somatosensation has been linked to longer hospital stays and patient dependence with activities of daily living. The purpose of this case report was to describe the successful management of manual therapy to improve sensory disturbance and abnormal self-perception after a thalamic PSS. Description: A 66-year-old retired female with history of right lucunar thalamic stroke 10 months prior presented to therapy with reports of tingling throughout the left half of her body, a “heavy metal” brace feeling on the left anterior and posterior trunk and left shoulder restriction. Her medical history consisted of type II diabetes and hypertension. She was initially treated at a different facility, for gait and

lower extremity function with minimal improvement. Functional limitations included reaching overhead with the left upper extremity, typing at the computer and preparing meals. Upon exam, thoracic spine & glenohumeral joint (GHJ) were hypomobile with subjective reports of reproduction of the metal brace feeling on the left thoracic spine and rib mobilizations. Manual therapy treatment was directed at the GHJ, thoracic spine, and ribs. She was also given graded motor imagery; left/right laterality training for home exercise program. Outcomes: The patient was treated for six sessions over eight weeks. She admitted to non-compliance with laterality training, which was unchanged at session 6. Using manual therapy to the GHJ, thoracic spine and left ribs, the patient demonstrated “telescoping” (shrinking in size) of the heavy metal brace feeling and decreased paresthesias. Quick DASH scores improved from 45% to 22%. She scored +5 on the Global Rating of Change. She reported a reduced heavy metal brace feeling (8/10 to 5/10). She demonstrated improved left shoulder range of motion, strength, function and decreased paresthesias based on self-drawn body diagram. Discussion - Conclusions: This case describes the use of manual therapy and a multimodal treatment approach to normalize somatosensory deficits in a patient with thalamic stroke. Currently there is no research in this area and future research is needed.

CONTROL ID: 2544717

Poster #62

MANUAL THERAPY DIRECTED AT THE CERVICAL SPINE FOR A PATIENT WITH LATERAL EPICONDYLAGIA: A CASE REPORT

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KEYWORDS: Regional Interdependence, Headache, Manipulation

Background & Purpose: There is growing evidence that supports treatment of the cervical spine in patients with lateral epicondylalgia (LE) in order to produce a greater clinical effect. The purpose of this case report is to describe the outcome of treating only the cervical spine in a patient with LE whom did not respond well to local treatment at the lateral forearm.

Description: A 45-year-old female presented with right lateral forearm pain with passive wrist flexion, resisted wrist extension, and palpable trigger points within the lateral extensor muscles. She had begun to develop these symptoms on the left side. There was no reproduction of symptoms with active cervical motion, but unilateral posterior to anterior (PA) pressures in the cervical spine reproduced shooting arm pain. Radial nerve neural provocation testing was positive bilaterally, reproducing lateral forearm pain. Grip strength was limited to 41 and 48 pounds of force for the right and left hand, respectively. Using grip strength as a comparable sign, a trial treatment of unilateral cervical PAs targeting C5-6 was completed. Grip strength increased bilaterally. A second trial treatment was attempted at the lateral forearm using Mulligan glides, which yielded a decrease in grip strength bilaterally. Thus, further treatment focused on the cervical spine using grade III PA's with an anterior directed force, progressing to grade IV with a medially directed force. A home exercise program directed at postural correction was also issued. Any remaining impairments at the elbow were later addressed. **Outcomes:** The patient's comparable sign of

grip strength improved from 41 to 67 pounds (right side) by her third visit, and from 48 to 60 pounds (left side) by her fifth visit. She no longer demonstrated symptoms with resisted wrist extension and passive wrist flexion. Trigger points were markedly reduced in the extensor muscles. After seven visits, her QuickDash improved from 30% to 0% dysfunction. Patient Specific Functional Scale score regarding grabbing items with her right hand, reaching to a high shelf, and shaking hands, improved from 7.3 to 10. Discussion - Conclusions: This case demonstrated the use of cervical mobilization alone for the treatment of LE when symptoms were reproduced with remote spinal testing and local treatment at the elbow worsened symptoms. This case highlights the clinical reasoning in the successful management of patient whose grip strength increased bilaterally and function improved with an emphasis on the cervical spine.

CONTROL ID: 2544652

Poster #27

THE USE OF LATERAL DISTRACTION MOBILIZATION WITH
MOVEMENT IN THE TREATMENT OF ACUTE LATERAL HIP PAIN IN A
13-YEAR-OLD DANCER

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KEYWORDS: Hip, Mulligan Mobilization with Movement, Lateral
Distraction

Background & Purpose: Manual therapy techniques, including lateral hip distraction with mobilization with movement (MWM) into hip flexion and internal rotation, are supported by the literature in the treatment of hip osteoarthritis. However, there is little to no research looking at the effect of MWM in the treatment of non-arthritic lateral hip pain. The purpose of this study is to look at the effectiveness of utilizing lateral hip distraction with movement into flexion and internal rotation to reduce acute hip pain in a competitive dancer.

Description: A 13-year-old female dancer reported a chief complaint of right lateral hip pain after falling and landing on her buttocks. An anterior-posterior radiographic imaging of the hip was normal. Functional limitations included dancing, ascending stairs, single leg stance, squatting, and laying on right side. The patient had a goal of participating in a dance competition six weeks from the initial evaluation. Findings included limited global active and passive hip range of motion (ROM), with most limitation in flexion and internal rotation, and a positive flexion, adduction, internal rotation (FADIR) test, which both were reproductive of her symptoms. Resisted movement into hip abduction, flexion, internal rotation, and external rotation also reproduced her pain. Her comparable sign at the initial evaluation was active and passive hip flexion.

Outcomes: Lateral joint distraction with passive movement into hip flexion reduced pain from 6/10 to 0/10 on the Numeric Pain Rating Scale (NPRS) with full range of motion, then 5/10 after the joint glide was released. Hip flexion ROM improved from 90 to 120 degrees after the mobilization. The first four therapy sessions started with lateral joint distraction MWM followed by ROM exercises and light strengthening exercises for the hip abductors and extensors. After four physical therapy sessions, the patient had full hip flexion ROM and 0/10 pain on the NPRS with any daily activities. Four more physical therapy sessions were utilized to return the patient to pain

free exercise and return to dance. Discussion - Conclusions: This case demonstrated the use of lateral joint distraction with movement into hip flexion and internal rotation to reduce acute hip pain and allow for pain free exercise in a patient with non-arthritic hip pain. While the research mainly focuses on the use of this technique in individuals with osteoarthritis, it may be considered for a younger population with hip pain. Further research is warranted.

CONTROL ID: 2544559

Platform #18

"ORTHO CLUB": A CASE SERIES OF A STUDENT-LED STUDY GROUP TO PREPARE FOR FIRST CLINICAL EDUCATION EXPERIENCE

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KEYWORDS: education, active learning

Background & Purpose: Educational research suggests faculty-led traditional lecture may be less effective in attaining learning outcomes than student-led active learning (transferring the instructional role from teachers to students). Most studies of student-led learning involve peer-graded, undergraduate courses. The purpose of this report is to describe the outcomes of an optional, student-led study group for physical therapy (PT) students preparing for their first full-time clinical internship. Description:

Second-year Doctor of Physical Therapy (DPT) students determined the format and content of a student-led study group to prepare for their first 8-week clinical internship. The group met for 90 minutes, twice per week for 8 weeks. Thirteen students led instructional sessions related to orthopedic PT, including lecture and laboratory elements emphasizing evaluation and manual therapy. The students' confidence with respect to clinical practice was assessed three times: (1) prior to participation in the study group, (2) after the study group yet prior to internship, and (3) after the student's first evaluation during the internship. Outcomes: Out of a total of 68 classmates, 52 attended at least one session, with an average of 8 sessions attended per student and 29 students per session. Half of students reported being equally or more motivated to participate in the study group compared to required curricular courses. Students who attended felt 67% satisfied with their preparation for internship as a result of the group, and 98% recommended the group to future classes. Seventy percent reported increased confidence in their preparedness for internship as a result of participation in the group. Students also reported increased confidence from time point 2 to time point 3 ($p < 0.001$, Cohen's $d = .28$). Students reported that the study group provided 52% assistance in feeling prepared for internship and 47% assistance in feeling prepared for the first evaluation. Attendance, satisfaction with the study group, and confidence after first evaluation independently predicted assistance from the group for the first internship and the first evaluation. Discussion - Conclusions: The present study suggests that second-year DPT students felt increased confidence in their preparation for their first internship because of a student-led study group. What is more, the present study suggests that increased attendance and satisfaction with their preparation predicted increased belief that the group prepared the students for their clinical

internship.

CONTROL ID: 2544425

Poster #19

THORACIC HYPOMOBILITY IN A BREAST CANCER SURVIVOR WITH
SHOULDER LIMITATION: A CASE REPORT

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KEYWORDS: breast cancer, shoulder pain, thoracic mobilizations

Background & Purpose: Breast cancer (CA) is the most common CA among women with over 2 million survivors in the USA. Shoulder (SH) pain & limited mobility are commonly reported & prevalent 6-12 months after surgery, or years later if untreated, due to protective posturing, pain, or scar tissue. The surgical interventions vary (axillary lymph node dissection (ALND), mastectomy, lumpectomy), with upper extremity weakness & lymphedema common sequelae. Recent studies have shown that thoracic manual therapy (MT) is beneficial in the management of certain SH conditions; however, it hasn't been studied in the breast CA population. The purpose of this case report is to describe the management of SH dysfunction in a breast CA survivor using thoracic MT. Description: A 47-year-old female with history of breast CA, right mastectomy, ALND, chemotherapy & radiation presented with right SH range of motion (ROM)

deficits, limited glenohumeral joint (GHJ) passive accessory motion, most notably in the anterior to posterior direction, & significant functional limitations. Thoracic ROM into extension was limited & hypomobile. She had difficulty reaching overhead, across her body & donning her jacket. Reported pain in the axillary and GH region; 2-3/10 on the Numeric Pain Rating Scale (NPRS). This was her 3rd recurrence of breast CA. Previous physical therapy included MT at the GHJ (passive accessory oscillatory mobilization, active assisted ROM, passive physiologic ROM), scar tissue mobilizations to the anterior right chest wall & self-stretching with little improvement. Initial QuickDASH was 52%. Treatment was then directed at the thoracic spine for both thrust & non- thrust manipulation for six sessions. Outcomes: Patient's thoracic spine was treated with central posterior to anterior (PA) & unilateral (PA) T1-8 to improve right SH AROM and function. Patient's abduction ROM improved from 0-92° to 0-176° in standing, resolution of pain (0/10 on the NPRS), & improved strength after six treatment sessions to the thoracic spine only. Her QuickDASH score improved by 7%. Global Rating of Change score improved from +5 to +6 (possible ceiling affect due to previous the PT gains before these six treatments). Discussion - Conclusions: This case report demonstrated the improvement in shoulder function with MT directed at the thoracic spine. Thoracic mobilizations may be beneficial for breast CA survivors experiencing shoulder restriction. Currently there is little to no research on improved shoulder mobility with thoracic treatment in the breast CA survivor population.

CONTROL ID: 2544424

Poster #3

SHORT-TERM EFFECTS OF THORACIC MANIPULATION ON PAIN
PRESSURE THRESHOLD IN A PATIENT WITH COMPLEX REGIONAL
PAIN SYNDROME: A CASE REPORT

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KEYWORDS: Thoracic Manipulation, Complex Regional Pain Syndrome,
Pain Pressure Threshold

Background & Purpose: Emerging research suggests that thoracic spine manipulation can positively impact centrally mediated sympathetic nervous system (SNS) responses, including pressure pain threshold (PPT). The purpose of this case report was to assess the short-term effects of thoracic manipulation on PPT in a patient with possible Complex Regional Pain Syndrome (CRPS). Description: A 46-year-old male presented nearly four months post-right Achilles tendon repair. He previously had physical therapy elsewhere, utilizing a post-operative protocol. He had complaints of nearly constant, burning, "nerve pain," in the right calf and foot. The orthopedic surgeon had stated concern for possible CRPS. Examination findings consistent with this included darkening of toes, decreased temperature, and hyperhidrosis. Initial Foot and Ankle Ability Measure-ADLs (FAAM ADLs) score was 22/84. Initial treatment provided was to improve ankle dorsiflexion. At the first follow-up, the patient reported burning pain over the dorsum of the right foot. Thoracic manipulation was utilized at the hypomobile segment, resulting in complete abolishment of the burning pain. He was also noted to have improved weight bearing

during ambulation with decreased circumduction. He reported that this relief was maintained up to three days post-visit, at which time he returned to baseline. Based on this response, we began assessing PPT at the third visit. Heel PPT was 3.8 psi. Throughout the session, PPT increased after each manipulation at the thoracic spine. Additionally, the patient had improved abduction of the right toes, and reduced paresthesias. At the fourth visit, gains in PPT maintained, with pre-session PPT at 36.1psi and no pain during assessment. Treatment then included manual therapy in the thoracic and surgical regions, and further improvements in toe abduction were noted. Outcomes: The patient demonstrated improvements in PPT after each thoracic manual therapy technique. Carryover was seen after a week hiatus, where PPT went from 29.1psi to 36.1psi. At the 5th visit, PPT was 52.4psi, showing further carryover. At the 8th visit, FAAM ADLs was 32/84, exceeding the minimal detectable change (5.7). No change in the hyperhidrosis or toe color was observed. Discussion - Conclusions: Thoracic manipulation/manual therapy demonstrated positive improvements in pain, PPT and function in a patient with possible CRPS for improving PPT. Future research is recommended to assess the efficacy of thoracic manipulation on patients with CRPS and other SNS disorders.

CONTROL ID: 2544403

Platform #8

THE EFFECTS OF NEURODYNAMIC MOBILIZATION FOR THE
TREATMENT OF SHOULDER PAIN: A CASE REPORT

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KEYWORDS: Shoulder, Neurodynamics

Background & Purpose: Studies show that treatment consisting of neural tissue management strategies can reduce pain of peripheral neuropathic origin (i.e. carpal tunnel syndrome). However, to date, no studies have examined the use of treatment targeting the radial nerve for shoulder pain. The purpose of this case study is to demonstrate the effectiveness of adding radial nerve neurodynamic mobilizations for a patient with shoulder pain. Description: A 30-year-old male presented to outpatient physical therapy with a four month history of insidious onset and progressively worsening right lateral shoulder pain occasionally radiating to his elbow. He rated pain as 7/10 on the Numeric Pain Rating Scale (NPRS) and denied paraesthesias. QuickDASH scores were 38% and 50% on the ADL and work modules respectively. Physical exam showed pain and limitations in all right shoulder active and passive range (A/PROM). Strength testing was painful, but equal to the uninvolved side. Cervical ROM, joint testing, and Wainner's cervical radiculopathy cluster were all negative for reproduction of right shoulder pain. Neurodynamic testing of the radial nerve was positive for reproduction of shoulder pain and was tender to palpation along its path. Treatment included soft tissue mobilization and radial nerve neurodynamic mobilization. After the first bout of neurodynamic mobilization his pain improved 50% and ROM was full in all planes. Given reproduction of familiar symptoms, and improvement in both pain and ROM with radial nerve targeted treatment, it was concluded that impaired radial neurodynamic mobility was likely the primary contributor. Ongoing treatment included upper and mid thoracic

manipulation with continued neurodynamic mobilization over three weeks. Outcomes: Over four visits, the patient progressed to full, painless AROM in all planes and no longer had symptom reproduction with radial nerve testing. He reported a GROC score of 7+ and final QuickDASH scores of 6.8% and 0% on the ADL and work modules respectively. Discussion - Conclusions: This case report demonstrated this patient with likely peripheral neuropathic shoulder pain responded well to a combination of joint and soft tissue based manual therapy and the addition of radial nerve mobilizations. Although neurodynamic mobilizations have mainly been studied in patients with carpal tunnel syndrome, further research should be done to assess the use of neurodynamic mobilization of the radial nerve for the purpose of reducing shoulder pain of peripheral neuropathic origin.

CONTROL ID: 2544364

Poster #54

USING COMPONENTS OF MECHANICAL DIAGNOSIS AND THERAPY, THE AUSTRALIAN APPROACH, PAIN SCIENCE EDUCATION AND COGNITIVE FUNCTIONAL THERAPY TO TREAT A PATIENT WITH CHRONIC LOW BACK PAIN: A CASE REPORT

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KEYWORDS: Chronic Low Back Pain, Treatment Based Classification, Cognitive Functional Therapy

Background & Purpose: Chronic low back pain (CLBP), one of the most common disorders, is characterized by movement dysfunction and at times fear-avoidant behaviors. There are many approaches to treating CLBP, which often need to be combined. The purpose of this case is to illustrate clinical reasoning in the management of a patient with CLBP and associated fear-avoidant behaviors. Description: A 39-year-old male, presented with an acute flare of left sided CLBP and two-week history of pain radiating into his left lower extremity (LE). Patient reported a disc herniation in his early 20's. Functional limitations were an inability to sit greater than 15 minutes, difficulty bending over to pick up his 18-month old twins, inability to exercise, and avoidance of flexion-based activities. Functional measures were as noted: Oswestry Disability Index (ODI) 48%, Fear Avoidance Beliefs Questionnaire Physical Activity (FABQ-PA) 19, Fear Avoidance Beliefs Questionnaire Work (FABQ-W) 19. Relevant physical exam findings included: limited lumbar flexion active range of motion (AROM) with peripheralization of symptoms, limited lumbar extension AROM with centralization symptoms, altered neurodynamics, L5 myotomal weakness, and L3-L5 hypomobility. The patient was deemed an appropriate candidate using the treatment-based classification (TBC) approach. The patient responded well to a symptom modulation approach utilizing extension-based activities based on Mechanical Diagnosis and Therapy and graded passive mobilization from the Australian approach. He exhibited high fear avoidance beliefs surrounding his CLBP, which had significantly limited his lifestyle for years. As his acute symptoms began to resolve, this component was addressed via a pain education website focused on CLBP, cognitive functional training (CFT) aimed at restoring flexion based activities, and return to a gym routine. Outcomes: After nine visits over six weeks, the patient reported resolution of his symptoms.

NPRS decreased from 8/10 to 0/10. Other outcomes improved: the ODI 4%, FABQ-PA to 6, FABQ-W to 5. At discharge, the patient could sit for greater than one hour, was able to pick up his twins, and returned to the gym performing activities he had not performed in years due to fear of re-injury. Discussion - Conclusions: This case demonstrates the success of using a combined approach of TBC, manual therapy, pain education, and CFT in a patient with CLBP and fear avoidance behaviors. This case highlights the importance of addressing all facets of a patient presentation.

CONTROL ID: 2529294

Poster #28

AN INTEGRATIVE ORTHOPAEDIC MANUAL PHYSICAL THERAPY
APPROACH FOR TREATING A PATIENT WITH PERSISTENT ANKLE
PAIN: A CASE REPORT

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KEYWORDS: ankle pain, regional interdependence

Background & Purpose: Ankle injuries are common to a military population affecting 41.97 per 1000 person-years for women and 33.89 for men.

These injuries can impact military careers, persisting well beyond military service. This case report describes orthopaedic manual physical therapy (OMPT) evaluation and management of persistent lateral ankle pain using a regional and integrative multimodal approach. Description: A 33-year-old woman presented to outpatient physical therapy (PT) with a 13-year

history of right (R) lateral ankle pain. Onset was acute during survival school where she was diagnosed and treated for a R ankle sprain, having three bouts of ankle specific rehabilitation. At evaluation she reported lateral ankle pain and swelling with active motion, walking more than one mile, and riding a bicycle. Pain was 6/10 on Numeric Pain Rating Scale (NPRS). Lower Extremity Functional Scale (LEFS) was 31/80. Examination revealed global hypermobility, immediate loss of balance with eyes closed (EC) R single leg stance (SLS), laxity on anterior drawer, positive R peroneal nerve provocation testing, and positive R slump test. Reflexes and dermatomes were normal and intact bilaterally. Treatment followed an integrative approach taking regional interdependence into account using instrument assisted soft tissue mobilization (IASTM) along peroneal nerve course, lumbosacral manual therapy, neurodynamic mobilization, closed kinetic chain stabilization exercise, and a walking program. Outcomes: Following eight visits of OMPT management over four weeks, her pain improved to 0/10 with walking three miles. Symmetrical EC SLS balance increased to 10 seconds. Her LEFS was 65/80 with remaining deficits due to running tasks. Discussion - Conclusions: This case reported demonstrated the successful outcome for a patient with persistent lateral ankle pain using a multimodal PT approach after three unsuccessful bouts of ankle specific rehabilitation. Military members suffer ankle injuries at rates equivalent to athletes with some having persistent pain and dysfunction beyond military service. Employing an integrative, multimodal approach to persistent ankle pain may be a viable option for these individuals.

CONTROL ID: 2543762

Poster #61

USE OF MULTIFIDUS ISOMETRIC TECHNIQUE FOR ACUTE LOW
BACK PAIN: A CASE REPORT

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KEYWORDS: Multifidus, Isometric, Technique

Background & Purpose: Acute low back can cause functionally limiting pain. Treatment intervention may be difficult for the physical therapist to apply given the irritability and/or severity of the pain. The purpose of this case study is to describe use of the Multifidus Isometric Technique for a patient with sudden onset of low back pain with associated postural deviation and motion limitation. Description: A 26-year-old female reported a sudden onset of right sided lumbar pain while standing from the seated position. Numeric Pain Rating Scale (NPRS) for onset of symptoms was 8/10. The patient had no radicular symptoms. The patient was seen the same day and exhibited a laterally deviated posture that was measured at 15 degrees of left side bending. The patient exhibited 40 degrees of active left side bending and 110 degrees of flexion with no complaints. Right side bending was limited to 5 degrees and extension was limited to 20 degrees with complaints of sharp pain in the right lumbosacral region. NPRS was 6/10 at end range of active right side bending and extension. Neurological signs were unremarkable. Her straight leg raise was 70 degrees on the left and 80 degrees on the right. Tenderness and increased tone were noted over the right multifidus and quadratus lumborum muscles. Oswestry

Disability Questionnaire (ODQ) was 30%. Treatment consisted of using the Multifidus Isometric Technique (four sets of four isometric contractions, holding for 10 second) and soft tissue mobilization to the right multifidus and quadratus lumborum muscles. Outcomes: Immediately following treatment, her left side bending posture was reduced to 5 degrees. Active left side bending increased to 45 degrees and right side bending increased to 40 degrees (increased 35 degrees). Her pain with this improved to 1/10 on the NPRS. Flexion improved to 125 degrees and extension to 30 degrees (increase of 10 degrees). Her pain with this improved to 1/10 on the NPRS. Upon follow-up the next day, the ODQ was reduced to 6%. NPRS was 2/10 at worst and 0/10 at best. All active motions were maintained with NPRS of 1/10 at the end range of motion. Discussion - Conclusions: The case demonstrated the successful use of the Multifidus Isometric Technique for a patient with sudden onset of low back pain with postural deviation and motion limitation. Further research is warranted.

CONTROL ID: 2543754

Poster #36

USE OF CRANIAL SUTURE MOBILIZATION IN TREATMENT OF HEADACHE STATUS POST MOTOR VEHICLE ACCIDENT: A CASE REPORT

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KEYWORDS: cranial, mobilization, headache

Background & Purpose: Physical therapists and other health care professionals frequently treat patients with reports of headache and neck pain after motor vehicle accidents (MVA). Treatment approaches can be variable dependent upon specific presentation of symptoms. In cases when the patient reports “head pain” or headache, outcomes are often inconsistent with treatment only to the cervical spine. There is a paucity of research addressing mobilization to the cranial sutures as an intervention in this scenario.

Description: The patient was a 71-year-old female with complaints of headache over the sagittal suture and neck stiffness. She was in a MVA one-year prior and received subsequent medical intervention (medications, injections) and physical therapy interventions (soft tissue and postural exercises). Upon initial examination, there was gross limitation in cervical range of motion (ROM), limited subcranial mobility, and most significantly, relief of symptoms with mobilization to the sagittal suture.

Outcomes: After five visits of physical therapy, the patient reported 92% subjective improvement in her symptoms, including complete resolution of headache. The Neck Disability Index improved from 46% to 12% disability. Active range of motion improved to the point that she could turn her head while driving without increasing symptoms.

Discussion - Conclusions: This patient demonstrated a significant favorable outcome with physical therapy intervention emphasizing mobilization to cranial sutures. While this was one of a few interventions performed during the five visits, this particular treatment offered the patient the most direct and complete relief of her symptoms. Further research is needed for cranial suture mobilization in the treatment in cases of headache post MVA.

CONTROL ID: 2543707

Poster #32

DIFFERENTIAL DIAGNOSIS OF AN ATYPICAL PRESENTATION OF
LUMBAR SPINE PATHOLOGY: A CASE REPORT

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KEYWORDS: Differential Diagnosis, Knee, Lumbar Spine

Background & Purpose: The physical therapist now assumes a greater role in the diagnostic decision making process for patient management.

Utilizing the presentation of symptoms can guide the clinician to the most appropriate treatment and plan of care. The purpose of this case report is to demonstrate the clinical reasoning to make an accurate differential diagnosis based on the presentation of the patient's signs symptoms and thus more effective and efficient interventions. **Description:** A 64-year-old male who was diagnosed by his family doctor with a left anterior quadriceps strain. The patient was experiencing his pain after two consecutive days of biking 40 miles on a hilly course. His biggest functional limitations were standing, walking and sleeping in bed with legs straight. Objective examination findings included no pain with resisted knee extension, no pain to palpation of left quadriceps, no pain or limitation with standing squat, positive side-lying slump left, pain with lumbar extension and left side-flexion and pain with accessory motion testing on the left upper lumbar spine (L3/4 was most comparable). A physical therapist diagnosis of upper-mid lumbar dysfunction was established.

Treatment included manual therapy directed at the upper lumbar spine,

flexion biased and motor control exercise and patient education regarding graded exposure to activity. Patient was seen a total of six times over a four week time period. Outcomes: The patient's Lumbar Care Connections questionnaire score had improved from 54% at initial examination to 96% at discharge. His Numeric Pain Rating Score decreased from 6/10 at initial examination to 1/10 at discharge with the frequency of pain at discharge being once-twice weekly lasting for less than 30 seconds. The patient resumed all functional and recreational activities without pain at time of discharge. Follow-up at three months revealed that patient's symptoms had not returned. Discussion - Conclusions: This case demonstrated that a thorough subjective and objective examination in combination with careful clinical reasoning determined an appropriate differential diagnosis leading to an efficient and effective episode of care.

CONTROL ID: 2543142

Poster #29

MANUAL THERAPY FOR THORACIC OUTLET SYNDROME
FOLLOWING FIRST RIB RESECTION: A CASE REPORT

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KEYWORDS: Thoracic spine, radiculopathy, Rib resection

Background & Purpose: The differential diagnosis of Thoracic Outlet Syndrome (TOS) is frequently complex and controversial. The lack of a straightforward clinical presentation makes management difficult,

particularly following post-first rib resection and scalenectomy. The purpose of this case is to describe the successful treatment of a patient with symptoms of TOS presenting similar to cervical radiculopathy using manual therapy, therapeutic exercise, and posture correction. Description: A 32-year-old male with a first rib resection in 2013 presented with localized right (R) axillary pain with paresthesia in the region of digits 2-4. Objective examination revealed possible TOS and cervical radiculopathy (CR) as demonstrated by two positive TOS provocative tests, Adson's and upper limb neural provocation (ULNP) 1,2B, and 3 on the R. Two of four positive findings of the cervical radiculopathy cluster with a positive R Spurlings and ULNP 1, 2B, and 3. He demonstrated R upper extremity weakness most significantly with R shoulder internal and external rotation (IR, ER) and sensory deficits to digits 1-3. Interventions consisted of manual therapy, (joint and soft tissue mobilization at cervical, shoulder and thoracic girdle), neural mobility, postural correction and therapeutic exercise (proprioceptive neuromuscular facilitation techniques and general scapular strengthening). Outcomes: Disabilities of the Arm Shoulder and Hand improved from 27.59% to 3.3%, indicating functional improvement. He demonstrated strength gains via manual muscle testing: ER (4-/5 to 4+/5), ER at 90 degrees (3+/5 to 4-/5), and IR 90 at 90 degrees (3+ /5 to 4/5). A positive finding persisted with R ULNP 1, 2B, and 3, but he demonstrated improvements in range of motion before onset of symptoms during ULNP testing, indicating reduced neural provocation. Discussion - Conclusions: This case demonstrated the successful management of a patient several years status post first rib resection with persistent symptoms.

CONTROL ID: 2534247

Poster #52

DIAGNOSIS AND MANAGEMENT OF A PATIENT WITH T4 SYNDROME:
THE USE OF T2 THORACIC MANIPULATION AND NEUROMUSCULAR
RE-EDUCATION TO IMPROVE FUNCTIONAL OUTCOMES: A CASE
REPORT

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KEYWORDS: Manipulation, Thoracic, Syndrome

Background & Purpose: T4 syndrome is a neuromusculoskeletal condition that typically presents with a cluster of symptoms including: paresthesias in a glove-like distribution of the hands, cervical and interscapular pain, and bilateral upper extremity weakness. There are no diagnostic tests for T4 syndrome. This condition is regarded as a diagnosis of exclusion. Current literature suggests that early identification of this condition combined with physical therapy interventions such as manual therapy, stretching, and strengthening can result in decreased medical expenses and symptom resolution. The purpose of this case study is to describe the diagnostic process and interventions utilized for a patient with T4 Syndrome.

Description: The patient was a 38-year-old female with an unremarkable medical history aside from being recently diagnosed with gastroesophageal reflux disease (GERD). She had recently undergone extensive medical testing which was unsuccessful in explaining sudden onset of left sided chest pain. She presented with clinical signs and symptoms consistent with T4 syndrome. Initial interventions included

postural education, spinal thrust manipulations to T4-T8, and thoracic mobility exercises that were not successful in improving the patient's symptoms. Due to the potential to affect the sympathetic outflow above the level of T4, a T2 spinal thrust manipulation was performed on the 4th treatment session. A thoracic paraspinal hold/relax technique was performed on the subsequent session. These techniques yielded a notable increase in exercise tolerance, which allowed the patient to progress through her plan of care. Outcomes: The patient reported decreased bilateral hand paresthesias after the T2 spinal thrust manipulation was performed. She reported a complete resolution of her GERD and left sided chest pain after the subsequent treatment session, which incorporated the thoracic hold/relax technique. Within six weeks, the patient's Upper Extremity Functional Scale score improved from 48/80 to 76/80. Her right and left hand grip strength improved from 18kg and 15kg initially, to 33kg and 29kg respectively. Discussion - Conclusions: This case report describes the clinical reasoning of a patient who presented with T4 syndrome and visceral symptomology. It also describes the successful manual therapy techniques that were used to alleviate the patient's symptoms.

CONTROL ID: 2534073

Poster #45

DELAYED PRIMARY CARE APPLICATION OF OTTAWA ANKLE RULES WITH BUFFALO RULE MODIFICATION TO IDENTIFY A SECONDARY OSSEOUS IMPAIRMENT POST ANKLE FUSION: A CASE REPORT

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KEYWORDS: Ankle, Fracture, Rules

Background & Purpose: An ankle fracture is one of the most common lower extremity fractures with an increase in annual incidence over the last decade. Ankle rules such as the Ottawa Ankle Rule (OAR) and Buffalo Rule Modification (BR) have been developed to identify patients appropriate for imaging studies in an emergency care setting. There are few identified studies in the literature that address the application of these rules individually and in combination or with the addition of other special tests for fracture in an outpatient orthopaedic practice setting. The purpose of this case study is to describe the application of ankle fracture rules in combination with other special tests in an outpatient orthopaedic practice while acting in a primary care provider role. **Description:** A 66-year-old female was seen for four weeks status post right subtalar joint fusion with an uncomplicated course of care. The patient arrived for a scheduled appointment after a two-week vacation with an appreciable decreased stance time on the right limb. She reported a fall while on vacation with immediate swelling and inability to weight-bear. At the time of her appointment (now seven days after falling), she reported pain in malleolar zone and had tenderness on posterior aspect of the distal 6cm of the tibia and fibula. The BR was also adapted with palpation of crest or midportion of the fibula and tibia with positive fibular tenderness only. The bump test was utilized with a resultant positive test. The patient was then referred to onsite radiology. **Outcomes:** The patient returned to the clinic in a walking boot with verification of distal fibular fracture with a prescription to resume

physical therapy in four weeks. Discussion - Conclusions: The application of the OAR and BR, with additional special tests to identify ankle fracture, may be beneficial in a direct access primary care setting to provide appropriate patient-specific care.

CONTROL ID: 2532905

Platform #9

A SYSTEMATIC REVIEW OF ORTHOPAEDIC MANUAL THERAPY
RANDOMIZED CLINICAL TRIALS QUALITY

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KEYWORDS: CONSORT, Risk of Bias, Manual Therapy

Background & Purpose: The CONSORT statement is used to improve the accuracy of reporting within randomized clinical trials (RCTs). The Cochrane Risk of Bias (RoB) tool was designed to assess the risk of bias within RCTs. To date, no evaluation of the quality of reporting and risk of bias in orthopaedic manual therapy (OMT) has been published. The

purpose of this study was to conduct a systematic review and meta-analysis of RCTs in the OMT literature from January 2010 to June 2014 in order to determine if the CONSORT checklist and Cochrane RoB assessment tools: (1) are reliable; (2) have improved the reporting and decreased the risk of bias in RCTs in the OMT literature; (3) differ based on journal impact factor (JIF); and (4) scores are associated with each other. Methods: Relevant RCTs were identified by a literature review from January 2010 to June 2014. The identified RCTs were assessed by two individual reviewers utilizing the 2010 CONSORT checklist and the RoB tool. Agreement and a mean composite total score for each tool were attained in order to determine if the CONSORT and RoB tools were reliable and varied by year and impact factor. Results: A total of 72 RCTs in the OMT literature were identified. A number of categories within the CONSORT and RoB tools demonstrated Prevalence-Adjusted Bias-Adjusted Kappa (PABAK) scores of less than 0.20 and from 0.20 to 0.40. The total CONSORT and RoB scores were correlated to each other ($r = 0.73$; 95% CI 0.60 to 0.82; $p < 0.0001$). There were no statistically significant differences in CONSORT or RoB scores by year. There was a statistically significant correlation between both CONSORT scores and JIF ($r = 0.64$, 95% CI 0.47 to 0.76; $p < 0.0001$), and between RoB scores and JIF ($r = 0.42$, 95% confidence interval 0.21 to 0.60; $p < 0.001$). There was not a statistically significant correlation between JIF and year of publication. Discussion - Conclusions: Our findings suggest that the CONSORT and RoB have a number of items that are unclear and unreliable, and that the quality of reporting in OMT trials has not been improving over recent years. Improvements in reporting are necessary to allow advances in OMT practice.

CONTROL ID: 2545899

Platform #27

EXAMINING THE HYPOALGESIC CHANGES FOLLOWING SPINAL
THRUST MANIPULATION: A SYSTEMATIC REVIEW AND META-
ANALYSIS

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KEYWORDS: Spinal Manipulation, Manual Therapy, Pain

Background & Purpose: Spinal manipulative therapy (SMT) is commonly used across many professional disciplines for the treatment of musculoskeletal disorders, and a simple search yields an increasing number of scientific publications examining its associated effects. The aims of this review were to provide a concise summary of the hypoalgesic effects of manipulation since publication of a similar review in 2012 and make recommendations supporting evidence-based practice. Methods: A systematic search of the literature was performed using CINAHL, PsycINFO, SPORTDiscus, MEDLINE, PubMed, and UIC SUMMON databases from May 2011- May 2016. Search terms were all inclusive related to SMT and pain. The methodological quality of each study was examined and effect size estimates were calculated using meta-analysis software. Results: A total of 759 studies were identified through the search. 11 studies were included for appraisal, and 10 were appropriate for meta-analysis, all of which estimated the effects of SMT on clinical participants. Medium to large estimates of effects sizes were observed in all but three

papers. Discussion - Conclusions: While the exact mechanisms by which SMT exerts hypoalgesic effects remain unknown, the current evidence supports the use of this intervention for pain reduction in individuals with cervicogenic headache, neck, shoulder or acute low back pain.

CONTROL ID: 2545703

Platform #36

DISTRACTION MOBILIZATION OF THE MCP JOINT: IN-VIVO
ASSESSMENT OF MOVEMENT AND FORCES

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KEYWORDS: mobilization, metacarpalphalangeal joint, reliability

Background & Purpose: Similar to other joints, manual mobilization (MM) of the metacarpalphalangeal (MCP) joint can be integrated into treatment of individuals with MCP pain or immobility to improve function. However, the location of tendons and specialized joint structures in the MCP joint support the need for careful attention to MM movement and force.

Currently research is not available to support the reliability of MCP MM or to assess the amount of movement during MCP MM. The purpose of this study was to 1) measure the amount of proximal phalanx (PP) distraction that occurred during MM; 2) determine if those measurements were reliable; and 3) quantify the compressive forces on the PP during the MM.

Methods: Twenty-two subjects participated. Force transducers were attached to the palmar surface and to the dorsal surface of the PP (PPP and PPD, respectively) to record compressive grip forces during MM. An ultrasound (US) transducer was placed over the dorsal MCP joint. Using the US, the position of the PP was recorded at rest and as a single examiner applied a grade one, a grade two and a grade three distraction. Mobilizations were repeated three times. Distraction movements of the PP were determined by measuring the position of the PP in reference to the metacarpal. Compressive grip force was determined by measuring the mean force during the US imaging. Results: Mean distraction for grades 1, 2 and 3 were 1.51, 2.38 and 3.19 mm respectively. All values were significantly different. Although repetition did not significantly affect movement, Intraclass Correlation Coefficients (ICCs) for movement ranged from 0.313 to 0.611. Mean compressive grip force on the PPP for grades 1, 2 and 3 were 0.25, 1.19 and 3.64kg respectively. Mean compressive grip force on the PPD for grades 1, 2 and 3 were 0.21, 0.38 and 0.60kg respectively. ICCs for force values ranged from 0.845 to 0.952. Qualitatively, synovial fluid movement was easily identified during distraction MM in several subjects. Discussion - Conclusions: This research supports the ability of a clinician to differentiate three grades of distraction MM in the MCP and to grip the PP with a consistent force. However, multiple repetitions of MM are likely needed to provide a consistent average movement as the ability to repeat the same MM in a single subject was minimally acceptable. The observation of the hydrostatic changes during the distraction MM presents a model that may assist in further eliciting the pathways used to produce the positive effects of MM.

CONTROL ID: 2540851

Platform #11

IMPAIRMENT-BASED VERSUS CLASSIFICATION-BASED PHYSICAL THERAPY FOR ACUTE AND SUBACUTE LOW BACK PAIN: A RANDOMIZED CONTROLLED TRIAL (NCT02060617)

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KEYWORDS: clinical reasoning, intervention, low back pain

Background & Purpose: A number of classification systems and clinical prediction rules to subgroup patients with low back pain (LBP) have been described. However, there is debate over the extent to which such systems should be used, especially at the expense of clinical expertise using impairment-based (IB) exams. The purpose of this study is to compare the effectiveness of an IB model for treating LBP versus classification-based (CB) therapy. **Methods:** 23 patients (50±13 years, 57% female) with LBP lasting less than 90 days were block-randomized using a computer-generated randomization sequence to receive either IB or CB treatment. IB therapy prescribed specific treatments for specific impairments. CB therapy used the Treatment-Based Classification System. Primary outcomes were Modified Oswestry Disability Questionnaire (ODQ), Numeric Pain Rating Scale (NPRS), Global Rating of Change (GRC), and proportion of successful outcomes. Secondary outcomes included duration of care (DoC), number of visits, home exercise program (HEP)

compliance, ongoing treatment, and adverse event data. Outcomes were assessed at 4 weeks & 6 months. Results: Both groups improved over time in ODQ ($h^2=0.129$, $p<0.001$) and NPRS ($h^2=0.258$, $p<0.001$). No G^2 significant group-by-time interactions were found for ODQ ($h_G=0.014$, $p=0.0279$) or NPRS ($h_G=0.048$, $p=0.298$), even after adjusting for covariates. Median GRC was +5-+6 in both groups. There were equal proportions of successful outcomes in each group. Secondary outcomes differed only in HEP sessions per week at 4 weeks (5.3 ± 1.1 IB vs. 10.1 ± 1.6 CB, $p=0.023$). DoC was just short of significance (18 ± 4 days IB vs. 28 ± 5 CB, $p=0.124$). These differences did not correlate with primary outcomes. DoC correlated with HEP frequency at 6 months ($r=0.472$, $p=0.023$). Discussion - Conclusions: No significant differences in outcomes were observed between IB and CB groups. Failure to recruit our full sample ($n=50$) limited our findings. Based on effect sizes, it is unlikely that significant and clinically meaningful differences would have been detected. This follows a trend in the evidence that while many treatments for LBP are effective, no treatment has proven superior to others. One explanation is that nonspecific interventions such as therapeutic alliance, communication style, and patient centeredness may be more important than the specific treatment. As all interventions were performed by the primary author, nonspecific factors were likely similar in both groups. Future research should further address these factors.

CONTROL ID: 2540766

Poster #58

THE IMMEDIATE EFFECT OF MANUAL THERAPY DIRECTED AT THE

THORACOLUMBAR JUNCTION ON SACROILIAC MOBILITY

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KEYWORDS: Thoracolumbar Junction, Sacroiliac Joint, Thoracolumbar Fascia

Background & Purpose: This study evaluates the efficacy of manual therapy to the thoracolumbar junction (TLJ) on sacroiliac joint (SIJ) dysfunction. The protocol included mechanical, neuromuscular and motor control intervention to the TLJ. One published case study suggests a potential association between manual therapy at the TLJ and its therapeutic effect on the SIJ. A pilot study was conducted to evaluate this association in a larger population. The effectiveness of this treatment may be attributed to changes in tension through the thoracolumbar fascia (TFL). Tests performed before and after treatment established a possible connection between the TLJ and SIJ. Methods: This is a pilot open-label uncontrolled study with 18 patients, 18-49 years old (6 males, 12 females). Subjects presented with lumbosacral and/or lower extremity dysfunction. Treatment was administered in a single visit. It consisted of a high-velocity low-amplitude thrust gapping the TLJ, muscle energy for rotation at the TLJ, and proprioceptive neuromuscular facilitation pelvic patterns. Pre and post testing included: TLJ rotation range of motion measured in sitting with goniometer, TLJ rotational spring test for joint mobility, vertical compression test (VCT) to assess load transfer through the axial skeleton, and SIJ spring and standing motion tests. Pain in the lumbosacral region

was not part of the inclusion criteria. Therefore the more reliable SIJ pain provocation testing was not used. Pre and post measurements were compared to determine treatment efficacy. Results: Paired sample t-tests were completed to determine statistical significance. Immediately following treatment, there was statistically significant improvement in range of motion at the TLJ (Mean prior=32.4°, SD=12.3°, Mean post=44.7°; SD=12.9°; $t(17)=-9.8$, $p<0.001$). All patients had improved mobility testing of the TLJ and VCT. Spring testing at the SIJ improved in 94% of patients. All other SIJ motion tests showed statistically significant improvement. Discussion - Conclusions: These results suggest a correlation between the TLJ and SIJ. The treatment targets the mechanical ability of the TLJ to transfer load and dissipate torsion. The net neurophysiological benefit of the treatment likely stems from altering the tension of the TFL, allowing for improved load transfer between the TLJ and the SIJ. This was a pilot study with a small sample size and future studies are required to further assess its efficacy and to better determine long-term effects of this treatment.

CONTROL ID: 2540181

Platform #38

THE EFFECTIVENESS OF MANUAL PHYSICAL THERAPY
INTERVENTIONS IN PEDIATRIC PATIENTS WITH ANTERIOR HIP
PAIN: A RETROSPECTIVE STUDY

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KEYWORDS: Pediatric, Anterior hip pain, Manual therapy

Background & Purpose: Young athletes experience hip and groin pain with an incidence rate of up to 70%. Manual therapy (MT) can be a beneficial addition to physical therapy (PT) for many conditions. No studies have assessed the effectiveness of MT in combination with PT treatment in young patients with anterior hip pain. The primary aim of this study was to assess the benefit of adding MT to PT care in pediatric patients with anterior hip pain. Secondary aims were to assess the relative risk of adverse reactions when MT is used in the pediatric population, and to report the type and frequency of MT used in young patients with anterior hip pain. **Methods:** Two-hundred and one patients' charts from 2010-2015 were reviewed (mean age = 14.2 ± 2.2 years; 74% female; mean weeks to referral = 22.3 ± 29.0 ; mean initial pain = 6.8 ± 1.7). 74 patients (37%) were treated with MT as part of their PT care. Of those patients, 22% had manipulation, 62% had joint mobilization, 31% had instrument assisted soft tissue mobilization, 24% had soft tissue mobilization, 30% had muscle energy, 8% had manual stretching, and 12% had myofascial release. PT was pragmatic and progressed at the therapist's discretion. The dependent variables were change in functional outcome measure, pain efficiency (change in pain \div number of visits), attendance rate, compliance, and adverse reactions. The covariates were duration of symptoms and initial level of pain. An analysis of covariance was performed to assess the primary aim. **Results:** Mean reduction in pain was similar between groups (MT = 4.9 [95% CI 4.3-5.7] and no MT = 5.0 [95% CI 4.5- 5.5]). The mean pain efficiency was significantly less if MT was not performed (MT = 0.6 [95% CI 0.5-0.7]), no MT = 0.8 [95% CI 0.71-0.90] $p=0.1$). The average number of visits was significantly different between groups (MT = 9.4 ± 3.9

sessions, and no MT = 7.6 ± 5.2 sessions, $p=0.009$). There were 18 adverse reactions noted (mild = 17, moderate = 1), with no significant difference in risk noted between groups ($p=0.503$). Discussion -
Conclusions: The addition of MT to PT care was not beneficial for this patient population. There was no increased risk of adverse reactions with the use of MT. Limitations of this study included the inability to report change in function due to lack of documentation. Also, the skill of the manual therapist and appropriateness of its use were not controlled. The idea that MT may be beneficial for young patients with anterior hip pain should be questioned and assessed with a randomized controlled trial.

CONTROL ID: 2545065

Platform #28

CURRENT DECISION MAKING OF PHYSICAL THERAPISTS IN THE MANAGEMENT OF PATIENTS WITH FOOT DROP SECONDARY TO NERVE ROOT COMPROMISE DUE TO ACUTE LUMBAR DISC HERNIATION: A SURVEY STUDY

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KEYWORDS: Foot drop, Lumbar

Background & Purpose: Conservative management is recommended for acute lumbar disc herniation (LDH) and radiculopathy, though specifics for

LDH and foot drop are unknown. Current guidelines regarding early magnetic resonance imaging (MRI) for LDH and radiculopathy are varied. Physical therapy practice patterns regarding imaging referral decisions for LDH and foot drop have not been examined. The primary purpose of this study was to examine association of physical therapist (PT) professional experience level with referral decisions regarding MRI, neurosurgical consult, and initiation of formal physical therapy for two hypothetical cases involving PT examination of a patient suggesting clinical diagnosis of foot drop due to LDH. A secondary purpose of this study examined if there was an association between severity of myotomal deficit due to LDH and likelihood of referral for each of the three respective categories. Lastly, identical clinical scenarios were compared both with/without MRI findings to confirm clinical diagnosis of LDH to examine MRI results were associated with PT referral for neurosurgical consult. Methods: 16,626 members of the Orthopaedic Section of the American Physical Therapy Association were surveyed. Multivariable logistic regression examined the association between demographic characteristics and clinical questions. Results: 13.2% (n=2172) members responded. Years of clinical experience and type of PT degree influenced the likelihood of several referral decisions, though specialist certification did not. "FAAOMPT" certification was associated with decreased likelihood of referral for MRI and neurosurgical consult. Greater myotomal deficit was correlated with greater likelihood of referral for MRI and neurosurgical consult and lower likelihood of initiating PT ($p < 0.0001$). Positive imaging confirming LDH was associated with increased likelihood of referral for neurosurgical consult ($p < 0.0001$). Discussion - Conclusions: Results suggest that demographic characteristics, greater myotomal deficit, and availability of MRI may influence clinical decisions regarding foot drop due to LDH. Further,

fellowship training may influence referral decisions more strongly than other professional characteristics. Results support current evidence that early MRI may be associated with greater future healthcare utilization. Results suggest the need for further research regarding optimal timelines and appropriate plan of care decisions for patients with this diagnosis.

CONTROL ID: 2579921

Platform #17

EMPLOYER VALUE AND PERCEIVED PERFORMANCE OF PHYSICAL THERAPISTS WHO ARE FELLOWSHIP TRAINED COMPARED TO THOSE WHO ARE NON-FELLOWSHIP TRAINED

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KEYWORDS: Fellowship, Education, Value

Background & Purpose: To describe employer perceived performance and value of fellowship-trained physical therapist employees (FTPTs), and to identify whether perceptions were different in outpatient vs. non-outpatient settings or private vs. non-private practice outpatient settings. Methods: Employers of FTPTs responded to a survey asking their perceptions of how their FTPTs perform compared to their non-fellowship trained PTs with equal years of experience. Employers rated perceptions of performance/value on a 5-point Likert scale (1="substantially less," 2="less," 3="same," 4="exceeds," 5="substantially exceeds"). If employers indicated inability to make a comparison between employee types, their data were excluded from analyses. Frequency analyses and Mann-Whitney U tests were performed. Significance was set at $p < 0.05$. Results: As part of a larger study, 69 survey responses were analyzed. 7 stated they were unable to make a good comparison between employee types; therefore their data were excluded in analyses related to performance and/or value. The practice setting of employers were 49 (71%) not private vs. 20(29%) private practice and 56 (81%) outpatient vs. 13 (19%) not outpatient. The mean (SD) of the employers perception of FTPT's performance/value are as follows: Quality of Patient Care [4.15(.63)]; Patient Outcomes [4.03(.79)]; Application of EBP [4.42(.62)]; Communication with Peers [3.77(.78)], with Other Providers [3.94(.79)], and with Patients [3.75(.81)]; Ability To Meet Productivity [3.57(.85)]; Leadership in the Organization [3.84(.79)], in the Community [3.66(.71)], in the Profession[4.15(.73)]; Teaching in the Workplace [4.40(.72)] and in the Community [4.07(.78)]; Ability to Contribute to Performance Improvement [3.95(.80)]; Marketing [3.60(.68)]; Involvement in Scholarly Work [4.14(.80)]. There were no differences between perception of FTPTs in private versus non private practice settings, but there was a difference in

the perception of FTPTs in achieving “Patient Outcomes” between outpatient and non-outpatient settings [4.09(.79) and 3.40(.55), $p=.047$, respectively]. Discussion - Conclusions: Our results suggest that employers perceive FTPTs to perform at a higher level than non- FTPTs. Further, FTPTs in the outpatient setting are perceived to achieve better patient outcomes compared to non- FTPTs. No responses indicate that FTPTs perform at a lower level than non-FTPTs. This information is important to stakeholders in decisions regarding fellowship training, employment opportunities, and hiring decisions.

CONTROL ID: 2544321

Platform #26

A COMPARISON OF TWO THORACIC MANIPULATION TECHNIQUES TO IMPROVE NECK PAIN IN DENTISTRY STUDENTS

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KEYWORDS: thoracic spine manipulation, dentistry students

Background & Purpose: Neck pain is a significant problem within dentistry. More than 50% of practicing dental professionals experience work-related pain and more than 70% of dental students report musculoskeletal pain by their third year of school. The purpose of this study was to compare the

short-term effects of two different thoracic spine thrust manipulation techniques on neck range of motion, pain, and self-reported disability in a sample of dental students experiencing neck pain. Methods: The primary outcome measures used were the Neck Disability Index (NDI) and the Numeric Pain Rating Scale (NPRS). The secondary outcome measure used was the Shortened Disabilities of the Arm, Shoulder and Hand Questionnaire (QuickDASH). The participants were randomized into supine or seated thoracic spine manipulation techniques and applied two times at each session to the upper restricted thoracic spine segment. After receiving the manipulation, participants were taught six neck mobility exercises to perform for their home exercise program (HEP). Participants returned for two follow-up visits that included completing the outcome measures, range of motion (ROM) reassessment, and to receive the same thoracic manipulation (supine or prone) received on their initial visit. At the fourth visit, participants returned for reassessment without intervention. Results: Twelve participants were screened; seven dentistry students qualified for the study. There was a statistically significant difference between pre and post scores for the NDI ($p < 0.04$) and NPRS Best ($p < 0.04$). There were no significant differences between the pre and post scores for the NPRS Current ($p = 0.123$), NPRS Worst ($p = 0.34$), QuickDASH Full ($p = 0.29$), QuickDASH Work ($p = 0.27$), and QuickDASH Sport ($p = 1.00$). Discussion - Conclusions: This study demonstrates that supine and seated thoracic spine thrust manipulation results in significant short-term reductions in pain and disability in dental students with neck pain. Both supine and seated thoracic spine thrust manipulation yielded immediate effects of increased cervical range of motion and pain relief. Overall, the data indicate after participants received either the supine or seated thoracic spine thrust manipulation there was an improvement on

the NDI and NPRS score, implying the participant had increased function and decreased pain. Physical therapists can choose which thoracic spine technique is best suited for the patient.

CONTROL ID: 2544266

Platform #10

DOES PHYSICAL ACTIVITY CHANGE FOLLOWING ONE PHYSICAL THERAPY TREATMENT IN PATIENTS WITH CHRONIC LOW BACK PAIN?

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KEYWORDS: Low back pain, physical activity, chronic pain

Background & Purpose: Low back pain has a lifetime point prevalence of 80%. Low back pain can cause persistent disability if it becomes chronic. Decreased physical activity (PA) is among one of the leading causes of disability in those suffering from chronic low back pain (CLBP).

Manipulation, exercise, and education have all been shown to be effective in improving self-report outcomes in patients with CLBP. The purpose of this study is to determine if physical therapy (PT) interventions that include spinal thrust manipulation, exercise, and education also have an effect on improving physical activity. Methods: Subjects with CLBP were recruited from a publically funded, hospital-based outpatient physical therapy clinic.

Subjects were evaluated by physical therapists with two-six years of experience, all of who were Fellows or enrolled in a manual therapy program. Subjects were then provided with an accelerometer to wear in order to establish baseline PA level over one week. No PT intervention was conducted at the first visit. At the one-week follow-up one, treatment of spinal joint thrust manipulation, exercises, education, and home program was provided. Subjects then wore the accelerometers for another week to gather post intervention PA levels. Results: There were 11 subjects, 8 women and 3 men with mean age 50.6 (9.1) and mean BMI 30.12 (4.47). Subjects wore the accelerometers for 12.11 (2.03) hours/day and 11.89 (2.52) hours/day at baseline and follow-up, respectively. One tailed, paired t-tests with significance level set at .05 were performed to compare the baseline and post-treatment session: steps per day and percentages of time spent performing sedentary, light, and moderate to vigorous PA per day. After one treatment session there was a significant decrease in time spent performing sedentary activities ($p = 0.023$) and a significant increase in time spent performing light activities ($p = 0.04$). There were no significant changes in number of steps taken per day nor time spent performing moderate to vigorous PA per day. Discussion - Conclusions: One session of PT may shift the PA profile of patients with CLBP who receive education, exercise, and manual therapy. This PA shift is small, but may indicate that just one session of PT may increase daily PA levels. The mechanism is not exactly known, but may be postulated due to a multitude of psychological and neurophysiological effects including education, exercise, and manual therapy.

Platform #14

PROPOSED CLASSIFICATION SYSTEM FOR ADVERSE EVENTS IN
DRY NEEDLING BASED ON RECENT LITERATURE

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KEYWORDS: Dry needling, Adverse events

Background & Purpose: Dry Needling (DN) has the potential to reduce pain while improving flexibility/function in clients with discrete, irritable point(s) in muscle or fascia. A solid filament needle is inserted into the trigger point (TrP) with the aim of releasing the spasm/tension. Despite the recent popularity of TrPDN in research and clinical practice, little is known about adverse events (AE) related to DN. Our first aim was to summarize the type, severity, and prevalence of AE associated with DN. The secondary aim was to determine if standardized reporting of AE was needed and make documentation suggestions. Methods: A detailed literature search related to DN and AE was conducted using MEDLINE database; limiters included English language and time period from 2000-2015. Articles that mentioned AE related to DN were reviewed. AE data including type, severity, body region, and prevalence were extracted along with DN technique and practitioner experience. Results: The search generated 196 hits; 28 articles matched the inclusion criteria and 24 were retained. Types of AE reported ranged from post-needling soreness to

hematoma to pneumothorax. AE were noted in all body regions including head/neck, upper extremity, trunk, and lower extremity. Correlation of AE severity to technique and practitioner experience was unsuccessful due to lack of data and common terminology. Discussion - Conclusions: Inconsistent reporting and lack of consensus regarding what constitutes AE resulted in indeterminate data on severity or prevalence related to specific events. In order to address these inconsistencies and to provide a platform for AE reporting, we devised a classification system for AE related to DN. Our system categorizes AE as mild, moderate, or major based on multiple factors: severity, expected duration and nature. According to the novel system, AE were observed as mild in 11/24 studies, moderate in 2/24, and major in 1/24; no AE were observed in 10/24 studies. The scope of AE associated with DN is not fully known at present. Physical therapists are in an ideal position to consciously monitor and document DN treatment parameters, results, and AE. We suggest use of a consistent classification system for AE based on severity, expected duration, and nature that will allow for proper interpretation of the risks and relative merits of DN. Additionally, we propose that DN documentation include DN technique, practitioner experience, treatment outcomes, and AE to further promote safe and effective practice.

CONTROL ID: 2543651

Platform #19

STUDENT ORTHOPAEDIC MANUAL PHYSICAL THERAPY
ASSOCIATION IN AN ENTRY-LEVEL DOCTOR OF PHYSICAL
THERAPY PROGRAM: MODEL FRAMEWORK AND PERCEPTIONS

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KEYWORDS: SOMPTA, education

Background & Purpose: Student led communities of practice are becoming increasingly common in the education of healthcare professionals.

However, there is no research regarding the development of student orthopaedic manual physical therapy associations (SOMPTA). The University of Michigan-Flint (UM-Flint) Physical Therapy program created an Orthopaedic Special Interest Group (Ortho SIG) in 2014 and transitioned to a SOMPTA to foster the professional development of entry-level physical therapy students and faculty members. The purpose of this study was to explore perceptions about the UM-Flint Ortho SIG/SOMPTA, specifically its perceived value, and impact on the development of orthopaedic manual physical therapy clinical skills and decision-making.

Methods: 104 entry-level doctor of physical therapy students and 13 faculty members completed an anonymous and voluntary survey via e-mail.

Survey collection was completed using Qualtrics survey software.

Analyses were performed using IBM SPSS version 20. Frequencies were recorded to determine attendance, year in school, perceptions of the group, and professional memberships. Kruskal-Wallis One-Way ANOVA was used to compare both the perceptions of attenders to non-attenders, as well as student and faculty perceptions. The alpha level of significance was set at $p = 0.05$. **Results:** Statistical analysis indicated that 95% of students who attended the Ortho SIG found it to be a valuable experience

outside of the classroom and 70% of the students reported increased confidence in clinical decision making and orthopaedic knowledge. Additionally, 95% believed it would help them become a better physical therapist and 63% reported increased confidence with performing orthopaedic tests & measures. Faculty and students (93.2%) believed that attendance of other healthcare professions would add value to events.

Discussion - Conclusions: This study is the first to describe a framework for a SOMPTA in an entry-level doctor of physical therapy program. The perceptions of students and faculty highlight this valuable extracurricular activity. Additionally, SOMPTA sessions can be a platform for interprofessional collaboration. The SOMPTA model established by the UM-Flint program may provide a successful framework that could be used by other programs.

CONTROL ID: 2543606

Platform #24

PERSISTENT DEFICITS IN CERVICAL SPINE MOBILITY AND JOINT POSITION ERROR POST- CONCUSSION: A CASE FOR CERVICAL SPINE SCREENING DESPITE NEAR RESOLUTION OF NEUROCOGNITIVE SYMPTOMS

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KEYWORDS: concussion, joint mobility, joint position error

Background & Purpose: An estimated that 2 million sports and recreation concussion injuries occur annually in the United States. Most concussive events involve stress to the cervical spine that is akin to a whiplash injury. While patients with whiplash often exhibit changes in cervical spine joint mobility and kinesthetic awareness, these impairments remain unexplored following concussion. Our purpose was to explore both cervical spine mobility and sensorimotor function in individuals who had a concussive event within the previous year. We hypothesized that subjects post-concussion would exhibit differences in cervical spine joint position error and joint mobility from their non-concussed peers despite low neurocognitive symptoms. Methods: Twenty-five subjects (16 females) who had a medically diagnosed concussion (PC) and/or met the definition of a concussive event (PC group mean=157 +120 days post-concussion) and 26 healthy non-concussed peers (NC group: 18 females) were tested. The Post-Concussion Symptom Scale (PCSS) quantified residual symptoms. All subjects completed standardized cervical joint position error (JPE) tests in multiple neck motions with eyes closed using a head mounted laser. Data for JPE was quantified as distance from starting target to end-test position in cm on a target spaced 0.9m from the patient. A seven cm distance is equivalent to the 4.5 degrees used to discern normal performance. Cervical spine segmental mobility was assessed using a 3-point ordinal scale. Pain with segmental cervical spine mobility was recorded. Respective examiners were blinded from cervical spine joint mobility or JPE results. Data were compared with independent t-tests ($\alpha = 0.05$). Results: The PC group had minimal symptoms (PCSS mean=7.9+8.8). Post-concussed (PC) individuals demonstrated a difference in average distance from target in the JPE tests compared to non-concussed (NC) individuals (PC=7.4±1.9cm; NC=5.5±1.1cm; $p < 0.001$). Subjects in

the PC group with pain during joint mobility testing (n=15) had worse JPE (Painful=8.1±1.8 cm, No-pain=6.3±1.6 cm; p=0.02) and reduced average lower cervical spine joint mobility compared to subjects without pain (Painful=0.66±0.22, No Pain=0.87±0.19; p=0.02, Normal=1.0). Discussion - Conclusions: Cervical spine sensorimotor deficits persist in people following a concussion even after concussive symptoms are nearly resolved. Pain during joint mobility testing was common and associated with the greatest JPE and a generalized restriction in lower cervical spine joint mobility.

CONTROL ID: 2543420

Platform #37

GLENOHUMERAL MANUAL MOBILIZATION VERSUS SELF-MOBILIZATION: A COMPARISON OF MOVEMENT AND FORCE

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KEYWORDS: Self mobilization, manual mobilization, glenohumeral joint

Background & Purpose: Manual mobilization (MM) techniques are employed during treatment sessions to decrease pain, increase motion and improve function. To facilitate a continuation of these positive effects, patients can be taught self-mobilization (SM) techniques. However, no studies are available to support utilizing the MM and SM interchangeably. The purpose of this study was to compare 1) movement that occurred

during three grades of inferior glenohumeral (GH) MM with movement that occurred during a SM; and 2) forces used during three grades of inferior GH MM with forces used during a SM. Methods: Nineteen healthy adults participated. In a supine position, the dominant arm was placed in 55 degrees of abduction and 30 degrees of horizontal adduction. An ultrasound (US) transducer was placed over the superior GH joint. US images were taken at rest and as a grade 1, a grade 2 and a grade 3 inferior MM were applied through a hand held dynamometer. This process was repeated three times. The subject was then asked to perform a SM of the GH joint. While sitting at the end of a table, the subject held on to a floor mounted force tensiometer and was instructed to lean away from the tensiometer. US images were taken at rest and when the subject reported feeling a maximal stretch in the GH joint. Image was used to measure the position of the humeral head in reference to the superior aspect of the acromion. Forces were recorded from the hand held dynamometer during MM and from the force tensiometer during SM. Results: Mean movements during Grade 1, Grade 2 and Grade 3 MM were 0.67mm, 2.15mm and 3.04mm respectively. All were significantly different. The mean movement during SM was 0.92mm, which was not significant different from the movement during a Grade 1 MM. Forces used during Grade 1, Grade 2 and Grade 3 MM were 33.8N, 93.4N and 134.0N respectively. All were significantly different. The mean force used during SM was 40.0N, which was not significantly different from the force used during a Grade 1 MM. Discussion - Conclusions: Even with instructions to provide a maximal stretch, movement and forces during SM of the GH joint were similar to a grade 1 MM. Activation of shoulder musculature may need to be measured to determine if relaxation around the GH joint could improve movement with SM. Clinicians should be aware that SM does not appear to reproduce

the movement associated with grade 2 and grade 3 MM. Prescribing a home program utilizing SM may not have similar effects to the higher grades of therapist performed MM.

CONTROL ID: 2540778

Platform #15

PHYSICAL THERAPISTS' KNOWLEDGE AND CONFIDENCE APPLYING INFORMED CONSENT PRIOR TO PERFORMING A SPINAL MANIPULATION

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KEYWORDS: informed consent, spine, manipulation

Background & Purpose: Informed consent requires an agreement to treatment with the understanding of its benefits and risks, and also encompasses ethical implications of patient autonomy and decision-making. The purpose of this study is to assess current outpatient orthopedic physical therapists' (PTs) knowledge, confidence and utilization of informed consent when performing spinal manipulations. Methods: Twenty-eight outpatient orthopedic PTs with less than 1 year to 29 years of experience were anonymously surveyed via an online survey website. Participants completed a 12-question survey. Responses were collected as free response, multiple-choice/check-all that apply, or a 5-point Likert scale. Results: When responding to the question "I am confident in my ability to explain the benefits of spinal manipulations," 25 participants

marked “agree” or “strongly agree.” Only 15 participants, however, marked “agree” or “strongly agree” for a similar question regarding risk explanation. Seven out of seventeen PTs who perform cervical manipulations indicated “always” informing patients about the risk of a cerebrovascular incident. None of the participants who perform thoracic and/or lumbar manipulations indicated “always” informing patients of a rib fracture or cauda equina syndrome, respectively. Twenty participants either “agree” or “strongly agree” with the following statement, “I am confident with the meaning of informed consent.” All but three participants explicitly described that informed consent includes communication of both risk and benefits. Additionally, six participants added that it provides the patient with an opportunity to “agree” to treatment, and three participants included that it allows patients to make their own decision regarding a manipulation. There did not appear to be any correlation between responses and experience.

Discussion - Conclusions: Although PTs have an accurate understanding of informed consent, several do not always fully explain the risks associated with spinal manipulations specifically in the thoracic and lumbar regions. This may be attributed to a lack of confidence with risk communication. Appropriate utilization of informed consent is essential for not only professional medical liability, but also to promote a collaborative relationship between clinicians and patients. Education regarding the role of informed consent, especially regarding risk communication, should be emphasized when training in spinal manipulation techniques.

CONTROL ID: 2540468

Platform #25

CERVICAL STABILIZATION EXERCISES IN PEOPLE WITH NECK PAIN

FOLLOWING CONCUSSION: A CASE SERIES

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KEYWORDS: Cervical stabilization, Neck Pain, Concussion

Background & Purpose: Concussion is a medical diagnosis, which often results in referral for physical therapy (PT). There are three major classes of post-concussive clinical presentation: physiologic, physical and vestibular. Complaints related to concussion include headache, neck pain, dizziness, poor balance, and impaired performance in their activities of daily living. The purpose of this study was to assess the efficacy of a cervical spine stabilization exercise program (CSEP) in PT for people following a concussion. Cervical stabilization exercises promote controlled stability in the neck, which can improve the quality of life for these individuals with suspected ligamentous laxity. **Methods:** A retrospective chart review was conducted on four patients who were diagnosed with a concussion and had complaints of neck pain. All four were found to present with a physical post concussive presentation. Patient A was an 18-year-old male injured while playing soccer when another athlete's fist struck him in the head, causing his head to whip and strike his shoulder. Patient B was a 23-year-old female with neck related dizziness who sustained a concussion and neck pain 1-year prior while heading a ball in soccer. Patient C was a 25-year-old female who sustained a concussion

and neck related dizziness following a MVA in which her head struck the steering wheel when bumped from behind by a car traveling at 5 mph. Patient D was a 16-year -old female volleyball player presenting after two injuries. She was hit in the nose by another player's hand, and 10 days later made head contact with another player during volleyball. Two physical therapists were involved with examination and treatment of the patients. PT intervention included a cervical spine stabilization exercise program. Outcome measures assessed at beginning and end of physical therapy included the Neck Disability Index (NDI), the Visual Analog Scale (VAS) for pain, and the Dizziness Handicap Inventory (DHI). Results: The patients included in this study demonstrated between 20%-100% improvement in NDI scores, 22.2%- 100% improvement in DHI scores, and 60%-100% improvement in VAS scores. All four patients displayed an improvement in self-reported functional ability after receiving treatment for a minimum of three weeks. Discussion - Conclusions: CSEP is a safe and appropriate treatment strategy for patients experiencing neck pain post-concussion. Further research should investigate the efficacy of CSEP compared to other conventional PT treatment.

CONTROL ID: 2535678

Platform #7; Platform #34

DRY NEEDLING THE RHOMBOID MAJOR: CONSIDERATIONS FOR POSITIONING

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KEYWORDS: safety, diagnostic ultrasound

Background & Purpose: One complication associated with Dry Needling (DN) is the inadvertent piercing of the pleura that holds the lungs to the inside of the chest wall, which can lead to lung collapse. Being able to estimate the distance from skin to the chest wall and not inserting the needle any further than that estimate might lower the chances of harming the lung tissue. Therefore, the purpose of this study was to measure, with diagnostic ultrasound, the distance from skin to chest wall at the level of rhomboid major, with the subject in two different prone positions. We assessed for differences by stratifying the subjects by body composition and sex. **Methods:** Thirty college-aged subjects were measured for weight and height. For all ultrasound measurements, the subject lay prone on a treatment table with the arms positioned along the trunk, head non-rotated and slightly lowered. Using diagnostic ultrasound we visualized the rhomboid major, ribs 5 and 6 and the underlying pleura, just medial to the vertebral scapular border. Two four-second videos were taken and stored for later analysis. This procedure was repeated on the contralateral side and in two different positions, with and without towel under the shoulder. **Results:** The average distance (right and left) from skin to the pleura at the rhomboid major level was 2.5 cm (SD 0.5) without towel and 3 cm (SD 0.6) with towel, from skin to 5th rib 1.9 cm (SD 0.4) and 2.3 cm (SD .5) and skin to 6th rib 1.6 cm (SD 0.4) and 2 cm (SD 0.5) respectively; the differences between the two positions are highly significant ($p < 0.0001$). Body composition distances from skin to pleura, skin to rib 5 and skin to rib 6 were all significantly different between subjects with BMI < 25 compared to subjects with BMI > 25, regardless of position (p-values between 0.05 and

0.0005). Distances from skin to pleura were significantly different between women and men regardless of position, but the distance between skin and 5th rib was only significant in the prone position without towel (p-values between 0.001 and 0.05); there was no difference in the distance from skin to 6th rib between the sexes. Discussion - Conclusions: When performing DN to the rhomboid major it is safer to put a towel underneath the shoulder, because it increases the distance between skin and pleura by about 0.5 cm. The higher the BMI, the greater the distance from skin to chest wall. Women have on average smaller distances from skin to the pleura, but not to the 5th or 6th rib.

CONTROL ID: 2535489

Platform #4:

DOES TIMING OF CARE INFLUENCE PATIENT REPORT AND COST OUTCOMES IN PATIENTS SEEN THROUGH DIRECT ACCESS?

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KEYWORDS: Direct Access, Costs, Outcomes

Background & Purpose: Delayed access to physical therapy is known to negatively impact self-reported outcomes. Patients may have delays in referral to a physical therapist, or may be provided initial care options that

are not optimal for their problem (e.g., imaging, opioids). These delays also result in increased costs when compared to a physical therapist-first option. What is unknown is whether timing of care from the incidence of first symptoms influences outcomes or costs in patients who receive direct access physical therapy. The purpose of this study was to evaluate the influence of timing of care on patient report and insurance costs. Methods: The study involved 280 patients with neck and/or back pain who received guideline oriented care by physical therapists over a 2 year period in a direct access environment. The data were derived from a dataset that also included physician-first options for care. For all patients, patient report outcomes for pain, disability, depression, quality of life, and, after negotiations with Blue Cross/Blue Shield for access to claims data, costs for care were captured. Timing of care was categorized as 1) early (<90 days) and 2) late (>90 days). An Analysis of Covariance (ANCOVA) was used to evaluate all outcomes, with controls for baseline measures of depression, quality of life, pain and disability. Results: There were no significant differences at baseline for pain, disability, quality of life, age, gender, referral of symptoms, recurrence history, or report of widespread pain. Those with late timing of care had significantly higher levels of depression. ANCOVA modeling showed that statistically significantly worse outcomes were reported for those with late timing (>90 days) for disability ($p<0.01$), quality of life ($p<0.01$), and pain ($P<0.01$). Those with late timing required more visits ($p<0.01$) and incurred more total costs (mean of \$2806 versus \$1428; $p<0.01$). Discussion - Conclusions: Our study found that timing of care is still essential, even when the first point of care involves a physical therapist who applies treatment based on guideline oriented principles. Even after control for baseline characteristics, notable differences were present in outcomes for a number of recovery-based

constructs; as well as overall costs for care. This suggests that timing is as critical an issue as the caregiver and that physical therapists are not immune to the conundrum of delayed care.

CONTROL ID: 2530768

Poster #47

MANAGEMENT OF GREATER TROCHANTERIC PAIN SYNDROME
UTILIZING A REGIONAL INTERDEPENDENCE OMT APPROACH WITH
FUNCTIONAL EXERCISE: A CASE REPORT

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KEYWORDS: Greater trochanteric pain syndrome, Gluteal tendinopathy,
Regional interdependence

Background & Purpose: Evidence suggests that gluteal tendinopathy may be a contributing factor in greater trochanteric pain syndrome (GTPS). Unfortunately, the literature does not sufficiently inform an orthopaedic manual therapy (OMT) approach for this pain syndrome. In light of this, it may be beneficial to look to the evidence for treatment of similar conditions of the upper extremity. Research shows that treatment of upper extremity tendinopathies may be most effective if delivered within a regional interdependence model. While similar findings have yet to be demonstrated in the treatment of GTPS, a regional interdependence approach may also be beneficial with this patient population. The purpose of this case study is to report on a successful treatment of GTPS with an

impairment-based OMT approach incorporating regional interdependence. Description: A 51 year-old female presented with an eight-month history of left lateral hip pain. The Numeric Pain Rating Scale (NPRS) was 5-7/10 and the Lower Extremity Functional Scale (LEFS) of 22/80. The Patient Specific Functional Scale (PSFS) of 2/10 (standing, squatting, and walking). Findings consistent with GTPS included a report of pain over the greater trochanter, pain while lying on the left side, concordant pain on hip abduction strength testing & single LE stance (SLS) test and positive FABER. Lumbar spine mobility testing found hypomobility and local pain. Manual therapy was initiated using a regional interdependence approach with non-thrust & thrust techniques to the noted lumbar spine impairments. An immediate retest of hip abduction strength resulted in substantial improvement with decreased pain. At visit two, the patient reported a drop in NPRS to 3-5/10 within 24 hours of her first visit. Future visits included impairment-based non-thrust and thrust OMT to the spine and hip. Over a total of eight visits, a test- retest model confirmed progressive improvements with NPRS scores, hip/spine mobility, SLS pain, squatting performance and walking tolerance. Exercises included lumbar spine stabilization, hip ROM exercises, hip abduction strengthening, and a pool routine. Outcomes: Treatment spanned four weeks. Her final NPRS was 0-1/10 ad LEFS was 58/80. The PSFS was 9/10. 12- week follow up outcomes were noted: NPRS 0/10, LEFS 63/80, and 10/10. Discussion - Conclusions: This case demonstrated improvements in pain and function when treating a patient with GTPS with OMT directed at impairments of the spine and hip in conjunction with exercise.

CONTROL ID: 2545921

Poster #57

MULTIMODAL APPROACH TO TREAT IDIOPATHIC HEEL PAIN: A
CASE REPORT

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KEYWORDS: Pelvis, heel pain

Background & Purpose: Idiopathic heel pain can be difficult to manage conservatively. Heel pain can have biomechanical and neurophysiological contributions, especially as the rear foot can be affected by pelvic and sacral dysfunction during weight bearing. The purpose of the study is to describe the clinical reasoning in patient with idiopathic heel pain.

Description: A 54-year-old female was evaluated for idiopathic right heel pain. She reported that her symptoms began almost 18 months ago without known trauma and has gradually increased. Her current Numeric Pain Rating Scale (NPRS) was 6-8/10. Segmental mobility testing demonstrated mild hypo-mobility in extension and right side bending of L5/S1. Notable findings include: positive Laslett's sacroiliac joint (SIJ) provocation cluster (4/5) and to dynamic right SIJ palpation testing, and tenderness with palpation to the right inferior lateral angle of sacrum. The right sacral base position was noted to be in unilateral sacral flexion.

Windlass testing for plantar fasciopathy was negative, though she did report tenderness to palpation of the medial plantar nerve. Straight leg testing with ankle dorsiflexion and eversion was positive at 40 degrees. Initial treatment was focused on improving pelvic mechanics with muscle energy techniques and pelvic manipulative techniques. Soft tissues

techniques to the plantar fascia and nerve flossing to the medial plantar nerve were administered. Progressive core and hip stability exercises were performed with manual therapy techniques to target static and dynamic pelvic stability. Outcomes: Significant improvement in pain levels (NPRS: 0-2/10) was reported after seven visits. The tenderness on palpation of the sacral region and medial plantar nerve improved as well. Lower Extremity Functional Scale increased from 42/80 to 64/80. Discussion - Conclusions: While it is acknowledge that the evidence on reliability of assessing specific sacral dysfunctions is lacking, clinicians may benefit from examining the biomechanical pelvic chain and neural mobility in the absence of local etiology of heel pain. The case demonstrated the successful management of patient with idiopathic heel and negative clinical findings for plantar fasciopathy. Clinical reasoning drove the decision to focus interventions on restoring the pelvic and sacral mechanics, as well as improvement in neural mobility.

CONTROL ID: 2545916

Poster #34

SUBOCCIPITAL MOBILIZATION AND DEEP NECK FLEXOR
ENDURANCE TRAINING TO RESOLVE A 20-YEAR HISTORY OF
MIGRAINE HEADACHES: A CASE REPORT

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KEYWORDS: migraine, suboccipital, CCFT

Background & Purpose: Literature on effectiveness of physical therapy for successful long-term relief of chronic migraine headache (CM) symptoms is less common than cervicogenic headaches. Accurate differential diagnosis of CM and identification of impairments is needed for appropriate treatment. The purpose of this case study highlights immediate effectiveness of restoring suboccipital mobility and deep neck flexor (DNF) endurance to resolve a debilitating 20-year history of CM symptoms.

Description: A 42-year-old female reported suffering from a 20-year history of incapacitating CM symptoms occurring 12 days per month. She described severe (8/10 on the Numeric Pain Rating Scale [NPRS]), fronto-temporal pulsating pain, photophobia, and nausea preventing participation in daily/recreational activities. Menstruation increased symptoms. She denied paresthesia, painful unlimited cervical movement. Hypomobility was noted with a right (R) C1 lateral glide C1. Decreased length/tenderness were found in the bilateral sternocleidomastoid (SCM). She had poor recruitment of the DNF via the Craniocervical Flexion Test (CCFT): 21 mmHg with pain significant SCM activation. Her initial Neck Disability Index (NDI) was 40%. Interventions included a left lateral glide C1, myofascial release to SCM, DNF endurance training progression, and postural education. Outcomes: At the 2nd visit, her NPRS was 4/10. CCFT increased to 22 mmHgx2" with pain and minimal SCM activation. By the 8th visit, patient was CM symptom/pain free for three weeks and began cardio exercise. Her CCFT was 22-24-26 mmHgx10" pain free without SCM activation. Further, she reported no CM during menstruation for first time in 10 years. She was discharged after 10 visits and had been without CM symptoms for two months. Her NDI decreased to 5%. She demonstrated slight tenderness/tightness SCM. Her CCFT was 22-24-26-

28 mmHg \times 10". R lateral glide C1 was slightly hypomobile and pain free. She participated in rigorous dance classes without symptoms. At 8-month follow up, she continued to be symptom-free and unrestricted in daily or recreational activities. Discussion - Conclusions: This case reported described the complete resolution of CM symptoms utilizing suboccipital joint mobilization, SCM myofascial release, and DNF endurance training. Differential diagnosis to determine specific impairments, appropriate treatment and proper education facilitated this patient's elimination of long-standing CM symptoms and allowed her to achieve a higher level of pain free function.

CONTROL ID: 2545874

Platform #41

CASE SERIES: CHRONIC PATELLAR TENDINOPATHY TREATED WITH MULTIMODAL APPROACH INCLUDING ASTYM WITH 6 AND 12-MONTH FOLLOW-UP

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KEYWORDS: Anterior Knee Pain Syndrome, Manual Therapy, IASTM

Background & Purpose: Patellar tendinopathy affects approximately 5% of runners, or 1 in 20 military personnel. Reoccurrence is common in this condition (up to 72%) with one of the top predictive factors being previous occurrence. The purpose of this study was to describe the effects of a regional interdependent impairment-based approach to evaluation and

treatment of chronic patellar tendinopathy (CPT) with 6 and 12-month follow-ups. Description: Three patients were referred with a diagnosis of RPT (≥ 3 previous episodes) and an inability to complete the running component of US Air Force (USAF) fitness test. Initial physical therapy evaluation revealed common impairments including limited active and passive range of motion (ROM): knee flexion (FL) (106.7 ± 2.5), internal tibial rotation (ITR) (4 ± 2.8) and ankle dorsiflexion (DF) (8 ± 1.6). Decreased lower extremity flexibility was noted, iliopsoas (IP), rectus femoris (RF) and triceps surae (TS) most pronounced. Moderate pain was noted ($4.6/10 \pm 0.5$) on the Numeric Pain Rating Scale (NPRS). The Lower Extremity Functional Scale (LEFS) had an average $48/80 (\pm 2.9)$. Identified soft tissue impairments were treated with Astym. Mobilization with movement (MWM) for ankle DF, MWM/taping for ITR, IP/RF/TS stretching, and a single leg balance progression were included. The home exercise program consisted of ITR/DF self-mobilization and IP/RF/TS stretching. A six week progressive walk to run program was also initiated post-rehab. Outcomes: The patients were treated a mean of $8 (\pm 0.8)$ times over six weeks. All demonstrated clinically significant improvement in the LEFS: $23.7 (\pm 2.1)$. Pain decreased to $0/10$ on the NPRS for all patients. Lower extremity AROM improved for FLEX, ITR, and DF AROM. Improvement continued at 6-month follow-up: LEFS increased $31.7 (\pm 0.5)$ and was maintained at 12-month follow up $29 (\pm 1.6)$. None of the patients required further care or reported recurrence of symptoms at the 6 or 12-month follow-ups. All were able to successfully participate in running component of USAF fitness test twice during the 12 months. Discussion - Conclusions: All studies report effects at cessation of episode of care, but few follow-up at 12-months to determine if recurrence of symptoms have occurred. This case series suggests that an appropriately directed multi-modal care may

help to prevent further episodes of CPT. Further research is needed to validate this hypothesis.

CONTROL ID: 2545848

Poster #56

ATYPICAL CLINICAL PRESENTATION OF RAPIDLY PROGRESSING AVASCULAR NECROSIS OF THE FEMORAL HEAD: A CASE REPORT

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KEYWORDS: avascular necrosis, AVN, imaging

Background & Purpose: Femoral head avascular necrosis (AVN) is influenced by disrupted blood supply resulting in progressive collapse and joint degeneration. This case highlights the need for comprehensive differential diagnosis and continual reassessment, and the integration of musculoskeletal imaging into physical therapy (PT) practice. Description: A 51-year-old male was evaluated two weeks after onset of left lateral hip and buttock pain at an urgent care facility. Radiographs were completed and read as normal. He received an intra-articular hip injection with nominal improvement. Given persistent pain at four weeks, he sought assessment by an orthopedist who referred him to PT. This began the subsequent week. Clinical findings were consistent with gluteal

tendinopathy. The patient initially responded to manual therapy and exercise for two sessions. However, following international travel two weeks after the PT evaluation, he described increased pain and decreased function without any associated injury or activity level change.

Reassessment revealed worsening symptom irritability and hip range of motion and a new onset of night pain. Now, symptoms were unchanged with joint mobilization and exercise. Given a worsening clinical presentation, he was referred to an orthopedist, and further PT care was deferred. Outcomes: Left hip magnetic resonance imaging (coronal STIR) was obtained twelve weeks following onset demonstrating abnormal femoral head and acetabular contour, extensive bone marrow edema, complex joint effusion and femoral head flattening. In comparison, the bone marrow signal in the right hip was normal with low signal in the right proximal femur and acetabulum. He was diagnosed with femoral head avascular necrosis. Repeat radiographs performed at eighteen weeks demonstrated absence of the superior portion of the femoral head with flattening, concurrent superior and lateral femoral migration, and a bone fragment. He underwent a left total hip arthroplasty seven months following initial onset and recovered optimally. Discussion - Conclusions: This case describes a rapid progression of femoral head AVN in the absence of characteristic risk factors or trauma and the integration of musculoskeletal imaging into clinical PT practice.

CONTROL ID: 2545828

Poster #35

ACCELERATED RECOVERY FROM CHRONIC LOW BACK PAIN, WITH THE ADDITION OF PELVIC FLOOR STRENGTHENING, FOR A

PATIENT PARTIALLY MEETING THE CRITERIA OF LUMBAR
STABILIZATION IN A TREATMENT BASED CLASSIFICATION
APPROACH FOR LOW BACK PAIN MANAGEMENT

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KEYWORDS: Lumbar stabilization, pelvic floor training, core stabilization

Background & Purpose: The management of chronic low back pain (CLBP) continues to be very challenging. Per published research, patients meeting the lumbar stabilization classification who have LBP display the following characteristics in a treatment based classification (TBC) approach: age less than 40 years, straight leg raise (SLR) greater than 90°, positive prone instability test and positive aberrant movement signs. The purpose of this case study was to assess the effects on pain and disability of the addition of pelvic floor retraining for a patient with CLBP with a partial presentation matching the TBC for lumbar stabilization. Description: A 42-year-old nulliparous female was evaluated for CLBP and pain in the left lower extremity (LE) when walking long distances. Pain on the Numeric Pain Rating Scale (NPRS) was 5/10 at rest; Oswestry index score (ODI) was 22%. No impairments in ranges of motion (ROM) were noted in the lumbar spine or hips bilaterally. Aberrant movement with altered lumbo-pelvic rhythm was noted in returning to neutral from lumbar flexion. SLR ROM was 90° and 95° for the right & left LEs. The prone instability test was negative (2/4 criteria for classification into lumbar stabilization.) Manual examination of accessory movements in the lumbar spine was pain free. Initial treatment consisted of lumbar stabilization in supine and quadruped

positions. Pelvic floor retraining with the external palpation method was introduced at the 4th session. Progressive advances were made in the lumbar stabilization and pelvic floor training based upon tolerance and response. Outcomes: Over 9 sessions her pain was reduced to 0/10 (NPRS). Oswestry improved to 12% with complete resolution of her LBP and L LE symptoms in walking. The first 4 visits emphasized lumbar stabilization management resulting in pain reduction to 3.5/10 (NPRS), but with continued pain in her L LE in walking. Introduction of pelvic floor training at the 4th session resulted in reduction of her pain to 0/10 (NPRS) after 2 sessions. Treatment sessions were suspended upon her request and ability to independently manage her symptoms after 9 sessions. Discussion - Conclusions: There is substantial evidence for treatment of lumbar instability with spinal stabilization. Pelvic floor retraining is utilized intermittently on patients with chronic low back pain. This case highlights the successful management of pain with the combination of these interventions for patients with CLBP. This approach has the potential to accelerate outcomes, but requires further study.

CONTROL ID: 2545758

Poster #7

MANAGEMENT OF INSIDIOUS KNEE PAIN WITH HVLA THRUST
MANIPULATION TO THE THORACOLUMBAR SPINE AND
NEUROMOBILIZATION: A CASE REPORT

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KEYWORDS: Peripheral neuropathic pain, Neurodynamics, Manual therapy

Background & Purpose: Research has shown peripheral neuropathic pain can sometimes present like a common musculoskeletal disorder (i.e. lateral epicondylalgia). However, more clinical research describing patients with peripheral lower extremity neuropathic pain presentations mimicking a musculoskeletal disorder is warranted. The following case study describes a patient with a unique presentation of insidious left knee pain. Description: A 27-year-old male presented with complaints of constant anteromedial left knee pain which began insidiously two weeks prior to seeking treatment. He reported a dull ache at rest and occasional sharp pains during rest and functional activities. Initial examination revealed pain markedly limiting a squat ($\leq 50\%$ full range) and pain rising from a seated position. Knee range of motion (ROM) testing with overpressure was unremarkable. Both a seated slump test and prone knee bend produced pain in the left knee, but not the patient's concordant sign. Retesting squatting while maintaining cervical flexion to sensitize the nervous system decreased the depth of his squat and increased the intensity of pain in his knee. Screening the thoracolumbar spine revealed moderate limitations in left rotation and right lateral flexion with pain/stiffness in the thoracolumbar spine. Joint play testing with unilateral posterior to anterior (PA) over the left spinal segments of T10-L1 and right T9-10 were hypomobile and painful. Notably, a unilateral PA at T11 on the left reproduced the patient's left knee concordant sign. Treatment on day one included a PA HVLA thrust manipulation performed in supine, repeated end-range left rotation active ROM in sitting, and instruction on how to perform a neurodynamic slider

technique in the seated slump position. Outcomes: The patient attended four sessions over a three-week period. After the first visit, the patient reported that the constant ache in his left knee was abolished. Complete resolution of his knee pain during functional activity occurred gradually over the remaining sessions. A three-month follow-up revealed no left knee pain and full return to prior activity level without limitation. Discussion - Conclusions: This case highlights the clinical reasoning and successful management of knee pain with thoracic manual therapy and neurodynamic interventions. Further research into the relationship between neuropathic pain in the lower extremity and spinal manual therapy is warranted.

CONTROL ID: 2543395

Poster #20

CONSERVATIVE MANAGEMENT OF EXERCISE INDUCED LEG PAIN: A CASE REPORT

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KEYWORDS: CHRONIC EXERTIONAL COMPARTMENT SYNDROME, COMPARTMENT SYNDROME

Background & Purpose: Exercise induced leg pain has several possible causes including medial tibial stress syndrome, stress fracture, popliteal artery entrapment, common peroneal nerve entrapment, and chronic exertional compartment syndrome (CECS). CECS is a commonly

diagnosed overuse injury in runners and ball sport participants. Patients typically present with complaints of progressive, tight, and constricting exertional pain in the anterior compartment of the lower leg. Pain symptoms arise predictably at a specific time, distance, or intensity and typically resolve with rest. CECS is difficult to treat conservatively; many patients electing surgical decompression of the affected compartment. This case report describes a comprehensive conservative treatment program to reduce lower leg pain and symptoms during running. Description: An 18-year-old female athlete presented with primary complaint of exercise induced right lower leg pain that was reproduced with thirty seconds of running. The patient reported superficial throbbing pain arising at the anterolateral tibia with "tightness" in the anterior compartment. Pain and symptoms arose at predictable levels of exertion and decreased with rest. Examination revealed biomechanical abnormalities in quiet stance and gait including increased bilateral pronation and hip internal rotation with occasional foot slap on the right. Muscle strength testing revealed bilateral weak hip abductors, hip extensors, and right hip external rotators. The patient underwent eight physical therapy sessions that included lower extremity strengthening exercises, manual therapy applied to the talocrural joint and tibialis anterior, and six gait retraining sessions focused on increasing stepping cadence and hip flexion during running. Outcomes: Foot and Ankle Ability Measure (FAAM) scores on the Activities of Daily Living subscale increased from 54.8% to 81.0% and 96.4% at four and eight weeks, respectively. FAAM-Sports subscale scores increased from 14.3% to 39.3% and 71.4% at four and eight weeks. Lower Extremity Functional Scale scores increased from 46/80 at baseline to 65/80 at four and 75/80 at eight weeks. Pain-free running time increased from 30 seconds to over 15 minutes at eight weeks. Discussion - Conclusions:

This case report describes a comprehensive conservative treatment program combining established interventions with gait retraining for a patient with exercise induced leg pain. Clinically significant functional improvements were achieved in addition to an increase in pain-free running time.

CONTROL ID: 2542336

Poster #13

ROLE OF UPPER CERVICAL SPINE IN MANAGEMENT OF A PATIENT PRESENTING WITH JAW PAIN: A CASE REPORT

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KEYWORDS: temporomandibular disorder, upper cervical spine, hypomobility

Background & Purpose: There is a close biomechanical relationship between the cervical spine and the temporomandibular joint (TMJ). Of note, sufficient craniocervical mobility, particularly occipital flexion, is necessary to allow proper TMJ rotation and translation. While many clinicians focus on intervening at the TMJ directly, some evidence suggests that it is vital to evaluate the cervical spine. The purpose of this case report is to demonstrate the importance of evaluating and treating the upper cervical spine in the management of a patient whose chief complaint was jaw pain. Description: A 32-year-old female graduate student

presented to physical therapy (PT) with left sided jaw, neck, and upper trap pain. She complained of pain with opening her mouth, chewing, and biting, but her greatest functional limitation was sitting and studying because pain increased after approximately 15 minutes of sitting. Upon examination, the patient presented with left TMJ hypermobility, impaired mandibular motor control, upper cervical and thoracic hypomobility, poor deep neck flexor recruitment, and poor sitting posture. Intervention consisted of manual therapy, patient education, postural training, and therapeutic exercise that included deep neck flexor training and scapular strengthening. Manual therapy included soft tissue mobilization, thoracic manipulation, and grade III mobilization to atlanto-occipital, atlanto-axial, and C2 joints. No treatment directly targeted the patient's TMJ. Outcomes: The patient was seen for nine total visits over five weeks. Her worst pain on the Numeric Pain Rating Scale reduced from 10/10 to 3/10. Neck Disability Index score improved from 18% to 10%. This change was not clinically significant, but it can be argued that this outcome measure did not capture the patient's chief complaint of jaw pain. She also demonstrated symmetrical mandibular opening and normal upper cervical segmental mobility. The patient was comfortable with discharging from PT at this point having met her goal of reduced pain and improved ability to study. Discussion -

Conclusions: The case demonstrated the successful management with intervention initially focused on addressing the impairments in the patient's neck. After improving mobility of the upper cervical spine, particularly the OA joint, and training deep neck flexor motor function, the patient's TMJ biomechanical function restored. As the patient's pain and function improved, the treatment approach never warranted specific TMJ intervention.

CONTROL ID: 2542327

Poster #14

USE OF UPPER CERVICAL MOBILIZATION AND BALANCE TRAINING
AFTER CREATING PATIENT BUY- IN WITH ELPYS MANEUVER TO
REDUCE SYMPTOMS OF NON POSITIONAL VERTIGO: A CASE
REPORT

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KEYWORDS: Vertigo, dizziness, upper cervical

Background & Purpose: Reports of dizziness and vertigo are common complaints seen in physical therapy practice. Physical therapists are educated on the various causes and types of vertigo and use clinical decision making to determine the best plan of care as well as create patient buy-in. This case report is to show that patient expectation is an important area therapists must address early in care. Description: A 74-year-old male presented with a seven month history of dizziness with cold chills occurring twice weekly that would last for 1-5 minutes without warning or trigger. He reported sharp neck pain with rotation, rated at worst 8/10 on the Numeric Pain Rating Scale. Following the initial onset of symptoms, he spent two days in the hospital; all testing was negative. Past medical history included vertigo after an episode of discitis; he reported his current symptoms did not behave in the same manner as his previous episodes. He denied difficulty with swallowing, speaking, aggravation with salt intake, or vomiting. Examination revealed forward head, rounded shoulders postural assessment. Cervical extension and left extension

quadrant created dizziness and neck pain. Upper cervical mobility testing revealed limitations, which reproduced dizziness as well as pain. Tandem Romberg noted poor postural stability. Testing for Benign Paroxysmal Positional Vertigo (BPPV) was negative. His Dizziness Handicap Inventory (DHI) was 12. Likely due to his physician interaction and his expectation, and even after specific education about his examination findings, he requested to have Epley's maneuver completed. Outcomes: This patient was treated first with the Epley's maneuver per his request. After failure to change his symptoms, he was treated for three more visits with an emphasis on upper cervical spine manual therapy, vestibulo-ocular reflex training, and balance training. Upon discharge he reported 90% improved with no episodes of dizziness and 1/10 neck pain. He demonstrated a stable tandem Romberg test and a DHI of 0. His cervical motions and mobility testing no longer caused pain or dizziness. Discussion - Conclusions: Patient expectation and beliefs heavily impact our treatment planning. Despite negative testing for BPPV, a treatment technique was attempted which ultimately changed the patient's belief. Rather than attempting additional unsuccessful education, his beliefs were dependent on failure of his expected treatment. The patient was much more open to an alternative treatment approach, with a resultant successful outcome.

CONTROL ID: 2537121

Poster #43

THE USE OF WITHIN AND BETWEEN SESSION CHANGES TO GUIDE TREATMENT FOR A PATIENT WITH NON-SPECIFIC UPPER QUARTER SYMPTOMS: A CASE REPORT

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KEYWORDS: within and between session, case report, non-specific upper quarter

Background & Purpose: Non-specific upper extremity (UE) symptoms in a glove-like distribution are commonly attributed to thoracic outlet syndrome (TOS) and/or T4 syndrome. However, both conditions have few evidence-based diagnostic tests and a firm diagnosis is challenging. Thus, clinical decision-making (CDM) and patient progress relies heavily on the use of reassessment of impairments within and between sessions. The purpose of this case report is to demonstrate the use of within and between session changes after manual interventions to guide the CDM in a patient with non-specific UE symptoms. Description: A 39-year-old male reported constant coldness, heaviness, and numbness in a glove-like distribution in the left UE after experiencing pain with pull-ups five months ago. Initial Disabilities of the Arm, Shoulder, and Hand (DASH) was 37.5%. Numeric Pain Rating Scale (NPRS) was 4/10. Examination revealed C5-C7 myotomal weakness, C8-T2 dermatomal hypersensitivity to pinprick, positive Roo's test, hypomobility in the cervicothoracic spine and first rib, and asymmetrical motion with upper limb neurodynamic (ULND) median nerve testing. These impairments were reassessed after each intervention to guide between and within session decisions. In this case, a first rib non-thrust mobilization produced minimal change in symptoms; therefore, intervention shifted to the spine. Non-thrust mobilization of C7 produced small within session gains; however, intervention at T1 improved his

impairments within and between sessions. Subsequently, a T4 thrust manipulation was performed but had minimal within session gains. T1 non-thrust mobilization was repeated and improvement continued. Adjunct treatments included therapeutic exercise and postural education.

Outcomes: After four visits of treatment focused on the cervicothoracic junction, his neurological exam and Roo's test were normal and ULND mobility improved. His UE symptoms also resolved and pull-ups were asymptomatic. His DASH improved to 2.5% and NPRS to 0/10, meeting the minimal clinically important difference. Discussion - Conclusions: Reassessment of impairments both within and between sessions guided clinical reasoning to determine the optimal manual intervention. When presented with non-specific UE symptoms and an unclear diagnosis, within and between session changes can guide CDM.

CONTROL ID: 2545205

Platform #32

UNILATERAL LUMBAR MOBILIZATION IN A PATIENT WITH BILATERAL PSEUDORADICULAR SYMPTOMS AND ASSOCIATED QUANTITATIVE SENSORY ASSESSMENT IMPROVEMENT: A CASE REPORT

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KEYWORDS: Pseudoradiculopathy, Lumbar, Lower extremity

Background & Purpose: Spine related lower extremity pain (SRLEP)

occurs in 25% of the general population and is commonly diagnosed as lumbar radiculopathy (LR). LR arises due to insult of the spinal nerve root resulting in neurological alterations (e.g. myotomal weakness, sensory deficits in a dermatomal pattern and diminished deep tendon reflexes). Research suggests not all SRLEP conditions are neuropathic in nature given reports of pain without neurological loss in strength, sensation or reflexes. Rather, SRLEP may be a result of altered nociceptive input from somatic structures (i.e. spinal articulations). Chronic SRLEP due to persistent somatic pain without motor or sensation dysfunction has been termed pseudoradiculopathy, a presentation in central sensitization (CS). The purpose of this case report is to describe the spinal manual therapy (SMT) management of a patient with bilateral (B) SRLEP and associated Quantitative Sensory Testing (QST) changes with CS resolution.

Description: A 65-year-old female presented with a one-year history of right (R) posterolateral hip pain and pain throughout her left (L) calf pain following a fall on stairs. Symptoms worsened with ambulation and ascending/descending stairs. Lumbar active range of motion (AROM) reproduced low back and R hip pain. Neurological exam failed to demonstrate lower quarter myotomal, reflex or sensation deficits. B lower extremity (LE) symptoms were elicited with R unilateral posterior-to-anterior (UPA) assessment at L3. QST assessment revealed a non-dermatomal decrease in mechanical detection threshold (MDT) and vibration detection threshold (VDT) in her L distal LE, which coincided with her painful area. SMT included grade III R UPA mobilizations at L3.

Outcomes: The patient was seen for seven visits over seven weeks. Improved VDT from 3 Hz to 4.16 Hz (quantitative tuning fork) and MDT from 0.16g to 0.04g (with von Frey monofilaments testing) at her distal L LE were noted. Lumbar AROM in all planes was pain-free with B LE

symptom resolution. Global Rating of Perceived Change score was reported at “+5.” Discussion - Conclusions: This case highlights the clinical reasoning and the use of SMT in a patient with chronic SRLEP. Subclinical sensory findings, illuminated through QST, indicated pseudoradiculopathy. In a patient with B SRLEP, associated improvements in VDT and MDT in the involved areas also indicate decreased CS with application of SMT.

CONTROL ID: 2545057

Poster #12

A MANUAL THERAPY AND MOVEMENT SCIENCE INTEGRATED
APPROACH FOR THE TREATMENT OF AN ACUTE KNEE INJURY: A
CASE REPORT

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KEYWORDS: Manual Therapy

Background & Purpose: Trauma, dysfunctional movement patterns, or repetitive overloading in poor postures can result in increased stresses on the knee leading to pain. Acute injuries of the knee can result in loss of mobility and functional abilities. The purpose of this case report is to describe the effect of manual therapy integrated into a movement science approach on an individual with an acute knee injury. Description: A 50-year-old female presented to physical therapy with acute medial knee pain

following squatting at work. The patient's impairments included local and regional joint mobility dysfunctions, movement systems impairment syndromes at the hip and knee, and decreased muscle strength of hip and foot musculature. The patient was treated six times over a two week period with an integrated approach of manual therapy to local and regional joints, neuromuscular re-education exercises for the identified movement system impairment syndromes, functional activities, and patient education and empowerment. Outcomes: Outcome measures included the Numeric Pain Rating Scale (NPRS), Patient Specific Functional Scale (PSFS), and the Fear Avoidance Beliefs Questionnaire for Physical Activity (FABQ-PA) and Work (FABQ-W). After six physical therapy sessions, the NPRS improved from 9/10 during ambulation to 0/10. The PSFS improved from an average of 2.3/10 to 9.67/10 (2/10 to 10/10 for squatting, 4/10 to 10/10 for putting full weight on leg, 1/10 to 9/10 for climbing a ladder). The FABQ-PA improved from 21 to 0/24, and the FABQ-W improved from 23 to 6/42. The patient was able to return to full function at work and was released from medical care. Discussion - Conclusions: An integrated approach of manual therapy and movement science directed exercise is effective in decreasing pain, disability, and fear, as well as improving function in a patient with an acute knee injury.

CONTROL ID: 2545039

Poster #18

PASSIVE PHYSIOLOGICAL MOBILIZATION FOR SUCCESSFUL
MANAGEMENT OF CHRONIC SUBACROMIAL IMPINGEMENT
SYNDROME: A CASE REPORT

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KEYWORDS: Shoulder, Joint Mobilization, Impingement

Background & Purpose: Shoulder pain affects 16-21% of the population; subacromial impingement syndrome (SIS) accounting for 44-60% of these cases. Although accessory joint mobilization to the glenohumeral joint (GHJ) has been established as an effective treatment for SIS, there is limited literature for passive physiological mobilization. Posterior capsular tightness promotes anterior glide of the humeral head during movements requiring GHJ internal rotation (IR) resulting in limited hand behind back (HBB) motion. Passive physiological IR may provide an oscillatory stretch to the posterior shoulder allowing for greater motion by biomechanical or neurophysiological means. This case report highlights passive physiological IR as a component of an orthopedic manual physical therapy (OMPT) approach for successful management of chronic SIS.

Description: A 56-year-old male presented with a 7-year history of right anterior shoulder pain of insidious onset. He reported 7/10 pain on the Numeric Pain Rating Scale with overhead and HBB motion limiting his duties as a carpenter. He demonstrated limited flexion, abduction and IR. GHJ anterior to posterior hypomobility was appreciated on the affected side. Accessory mobilization to the GHJ led to restoration of flexion and abduction, however, IR limitation did not change. Passive physiological IR mobilization was initiated in two bouts of five minutes of grade III producing a within-session change of HBB from sacral base to L2 spinous process. This, combined with sustained stretching of posterior shoulder structures independently by the patient led to normalization of the patient's IR in

order for him to reach his tool belt. Outcomes: Between visit one and four, the patient's HBB remained at sacral base with 3/10 pain. Between visit five and visit 10, after initiation of passive physiological IR mobilization, the patient's HBB improved from sacral base to L2. By discharge, the patient had equal and pain free IR, abduction and flexion bilaterally. His Quick Dash improved from 29.% to 4.5%. He reported a Global Rating of Change of +7. Discussion - Conclusions: This case described the successful treatment of a patient with chronic SIS. Clinical reasoning guided the use of passive physiological mobilization which correlated with full restoration of pain-free IR motion when the patient otherwise plateaued with manual therapy intervention. Further research is needed to examine the effectiveness of passive physiological mobilization in the management of internal rotation deficit in SIS.

CONTROL ID: 2545034

Poster #5

THE ADDITION OF MOTOR CONTROL EXERCISE FOR THE HIP, WITH AVOIDANCE OF ANKLE/FOOT COMPENSATIONS, AS PART OF AN IMPAIRMENT-BASED APPROACH FOR RECURRENT LOW BACK PAIN IN A HIGH SCHOOL FOOTBALL ATHLETE: A CASE REPORT

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KEYWORDS: Low back pain, Motor control

Background & Purpose: There is evidence to support the potential influence of the hip joint in low back pain (LBP). The research suggests

that examination and management of the lumbar spine and hip is warranted for successful functional improvement. The purpose of this case is to describe the inclusion of motor control training at the hip in a patient with long-standing, intermittent LBP who had failed to maintain functional improvements from previous physical therapy management. Description: A 16-year-old male football athlete with recurrent history of LBP had been treated in the same clinic previously. He had LBP that was successfully improved with stabilization activities after the patient was found to meet the stabilization classification of the treatment-based classification system. The current episode of LBP had no specific mechanism of injury and included pain in the lower lumbar area, posterior left (L) hip and lateral thigh. Initial Numeric Pain Rating Scale (NPRS) was 8/10. The Oswestry Disability Index (ODI) score was 28%. Examination demonstrated normal lumbar and hip active range of motion (AROM) except painful lumbar extension limited to 50% and pain with L hip extension. Pain was produced with central posterior-to-anterior assessment at L4/L5, but mobility was normal. Motor control testing in prone and sidelying of bilateral hips demonstrated overall weakness with the L lower extremity (LE) worse than the R LE. Management included dry needling, low grade mobilization of the lumbar spine for pain control, and motor control exercises targeted for the L hip (i.e. exclude the ankle balance strategy by use of a standard rolling stool while the patient performed isometric arm activities). The patient's home exercise program focused on proper training of the deep hip stabilizers after thorough review and practice in clinic. Outcomes: The patient was seen two times the initial week and one time per week for the following three weeks for a total of five visits. Discharge information was obtained one month after the patient's final visit. At that time, the patient reported 0/10 on the NPRS and ODI score was 0%. He had returned to all

competitive athletic activity and weight lifting without pain or difficulty.
Discussion - Conclusions: In this case, the patient demonstrated an excellent response with the inclusion of motor control training of the hip specifically designed to limit ankle/foot compensations at one month. Further research should continue to investigate the relationship of the hip in cases of LBP.

CONTROL ID: 2545021

Poster #17

SOFT TISSUE AS A PERIPHERAL DRIVER OF CENTRAL
SENSITIZATION IN A PATIENT WITH PAINFUL UNILATERAL
CONDYLAR HYPERPLASIA: A CASE REPORT

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KEYWORDS: TMJ, Condylar Hyperplasia, Soft Tissue Mobilization

Background & Purpose: An estimated 7-68% of adolescents experience one symptom of temporomandibular disorder (TMD). Adolescents with TMD report increased school absences and a propensity toward aggressive behavior. Literature supports treatment of TMD with joint and soft tissue intervention, with both peripheral and central mechanisms evident. Currently, there is no evidence suggesting which treatment approach is most efficacious for the subset of patients with painful condylar hyperplasia (CH). The purpose of this case report is to describe the clinical

reasoning behind selecting a soft tissue orthopedic manual physical therapy (OMPT) approach to successfully manage chronic unilateral CH.

Description: A 19-year-old female presented with a 10-year history of bilateral mandibular pain and left-sided frontal headache. She reported decreased ability to eat, talk, chew and smile. She noted grinding her teeth. The patient demonstrated 15 mm of lateral excursion at rest with comfortable jaw opening of 20mm. Joint assessment of the temporomandibular joint (TMJ) and cervical spine recreated the patient's familiar jaw and head pain. PPT was 14.7 kPa on the left masseter compared to 41.2 kPa on the right. OMPT treatment began with 5 minutes of grade 3+ unilateral posterior to anterior joint mobilization to C2 and grade 3+ inferior glide to the TMJ. After increasing the patient's pain complaint, lower grade mobilization was attempted the next visit with the same results. Clinical reasoning was utilized to modify the working hypothesis from joint derangement to myofascial dysfunction secondary to bruxism leading to central sensitization causing widespread pain changes with joint and soft tissue assessment. Outcomes: Between visit one and three the patient's pain decreased from 8/10 to 5/10 with 5mm change in comfortable opening. With soft tissue mobilization, between visit four and eight, the patient's pain decreased to 1/10 with PPT improving from 14.7 kPa to 70.6 kPa and comfortable opening increasing 9 mm from initial evaluation. The patient no longer complained of frontal headache.

Discussion - Conclusions: This case describes the successful treatment of a patient with painful unilateral CH. Clinical reasoning lead to the use of soft tissue mobilization to address the patient's masseter as the peripheral driver to the patient's central sensitization. This case report suggests the use of clinical reasoning to identify the peripheral driver in chronic painful CH in order to achieve successful outcomes utilizing OMPT.

CONTROL ID: 2533679T

Poster #16

MANAGEMENT OF A PATIENT WITH ACUTE LOW BACK PAIN USING
THE TREATMENT BASED CLASSIFICATION MODEL AND TRIGGER
POINT DRY NEEDLING

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KEYWORDS: Treatment Based Classification, Acute Low Back Pain,
Trigger Point Dry Needling

Background & Purpose: The primary purpose of this case report is to describe the outcomes of adding trigger point dry needling (TPDN) to manual therapy interventions for treatment of acute low back pain (LBP) in a subject meeting the criteria for the manipulation classification.

Description: A 66-year-old male referred to physical therapy for left LBP and left groin pain for two weeks. Physical examination findings supported the diagnosis of mechanical low back pain including hip joint mobility limitations. Objective findings included negative sacroiliac joint provocation testing, negative neurodynamic testing, limited hip range of motion, segmental lumbar hypomobility, palpable trigger points (TPs) in the gluteals, adductor magnus and psoas major, and hip weakness. Initial Numeric Pain Rating Scale (NPRS) was 7/10. Initial Oswestry Disability Index (ODI) score was 40%. Session one treatment included TPDN to the lower gluteal fibers, posterior adductor magnus, and psoas major on the

ipsilateral side. Hip range of motion (ROM) measurements normalized and his pain reduced by 2 points on the NPRS. On session two, the patient reported a 3-point reduction on the NPRS at onset. Treatment during session two included TPDN to the lumbar multifidi and paraspinals at L4-5 followed by a neutral gapping manipulation to left L4-5 facet joints. He was also prescribed a walking regimen that included forward walking and side-to-side stepping. At session three, he had a 2/10 pain on the NPRS. Treatment during this session included TPDN to the upper gluteus maximus and posterior gluteus medius. The following exercises were prescribed: prone gluteal sets for isolation of each group, prone press up with gluteal sets upon full extension, and deep squatting with TRX upper extremity support. At session four, the subject reported 0/10 pain and an ODI of 5%. Outcomes: After four sessions denied pain; no objective impairments or functional limitations were noted. His ODI scored from 40% to 5%. Follow up phone calls were performed at 1, 2, 4, 8, and 12-weeks post treatment and the patient reported no pain or disability at any time. Discussion - Conclusions: This case report demonstrated the successful use of manual therapy, including TPDN, in the treatment of acute low back pain. Initial interventions focusing on soft tissue mobility were performed to reduce hip impairments prior to manipulation. Further research is needed to investigate the sequencing of treatment for patients who meet the manipulation classification.

CONTROL ID: 2528747

Poster #60

A MULTI-MODAL APPROACH TO REHABILITATION POST A SACRAL RESECTION DUE TO SACRAL CHORDOMA: A CASE REPORT

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KEYWORDS: Chordoma, Manual Therapy, Musculoskeletal Management

Background & Purpose: A rare malignant tumor, sacral chordoma, mandated an en bloc resection of the sacrum requiring discussion of patient management post partial sacrectomy and the long-term functional impact of conservative rehabilitation. No current literature is available regarding rehabilitation post-operatively. **Description:** A 66-year-old male electrician underwent a two-stage partial sacrectomy. Post-operatively, patient had difficulty with ambulation, transfers, activity of daily living tasks, and balance due to severe and irritable pain. He rated his pain at 5-9/10 in the left foot and posterior superior iliac spine (PSIS) region on the Numeric Pain Rating Scale (NPRS). Treatment emphasized manual therapy to improve mobility of the hips and lumbar spine, flossing techniques to reduce neural provocation of sciatic nerve pathway, manual lymph drainage to decrease edema of lower extremities, soft tissue mobilization with a trial of dry needling, work-related activities and conditioning, and neuromuscular re-education utilizing contract-relax techniques for various impairments. **Outcomes:** A total of 39 outpatient visits were utilized due to confounding factors of his conditions, including spinal stenosis, history of prostate cancer, dehiscence of posterior wound, and hospitalization eight weeks post-operatively due to possible infection. **Focus on Therapeutic Outcomes (FOTO)** measured a 42-point change after four months of rehabilitation. Overall, he responded well to interventions, yet experienced

sensitivity with dry needling of buttock and quadratus lumborum on visit 38. He also suffered a confirmed insufficiency fracture of remaining sacrum at some time during his recovery, which may have contributed to pain in PSIS region. Upon completion of this episode of care, he returned to work independently, extremity edema resolved, and balance improved. Average pain was rated 2/10 on the NPRS and 7-8/10 (NPRS) in the left foot due to neurogenic pain. Discussion - Conclusions: Rehabilitation was successful following a partial sacrectomy utilizing a regional interdependence model and multi-modal approach to the hips, pelvis, and lumbar spine. A clinically meaningful difference was found on the NPRS and FOTO. Functionally, the patient has been able to walk, drive, and work independently over the course of one year since his initial surgery. Additional research is needed regarding rehabilitation post-operative in order to provide focused and valuable outcomes to the patient long-term.

CONTROL ID: 2528388

Poster #26

AN ORTHOPAEDIC MANUAL PHYSICAL THERAPY APPROACH FOR
TREATING LOW BACK PAIN IN A PATIENT WITH MARFAN
SYNDROME: A CASE REPORT

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KEYWORDS: manipulation, Marfan syndrome, Mechanical Diagnosis and
Therapy

Background & Purpose: Marfan syndrome is an autosomal-dominant disorder of the connective tissue resulting in changes to the cardiovascular system, eyes and skeleton. Incidence is 1 in 9800. Common abnormalities of the skeleton include joint arthritis, chronic joint laxity, tall stature, arachnodactyly, pes planus, scoliosis and dural ectasia. Low back pain is three-times as common in those with Marfan syndrome compared to the general population. However, the safety or efficacy of physical therapy intervention for low back pain in patients with Marfan syndrome has not been established in the literature. This case study report describes the use of a force progression including manipulation in the successful treatment of a patient with low back pain and Marfan syndrome. **Description:** A 45-year-old woman with Marfan syndrome presented to outpatient physical therapy with right-sided nonspecific low back pain of insidious onset one-month prior. As a result of her pain she had difficulty bending forward, sitting, doing laundry, and standing for prolonged periods. Her Oswestry Disability Index indicated moderate disability at 40%. Range-of-motion (ROM) loss was moderate for flexion, nil for extension, and minimal for side gliding- in-standing right and left. Pain was rated 9/10 at worst, 0/10 at best, and 5/10 on average using the Numeric Pain Rating Scale. Repeated motion testing revealed a directional preference for flexion, improving both intensity of symptoms and lumbar flexion ROM. Treatment followed a force progression guided by symptomatic response and based on McKenzie's Mechanical Diagnosis and Therapy. Force progression was taken through joint manipulation. Other interventions included posture correction and strengthening exercises. **Outcomes:** Following eight visits of physical therapy over the course of three weeks, the patient no longer had any pain, had full lumbar ROM in all directions, was independent in managing her symptoms, and returned to her baseline ODI score of 10% as she has

always avoided lifting. Her primary goal of doing laundry without pain was achieved. Discussion - Conclusions: This patient with Marfan syndrome and low back pain was successfully treated with an approach that included repeated motions, manual therapy including manipulation, posture correction, and strengthening exercises. Lumbar manipulation appeared to be beneficial and did not result in any adverse events. Determination to use manipulation was based upon her symptomatic response during a force progression.

CONTROL ID: 2574976

Poster #55

CORRECTING ALTERED LOWER BODY MECHANICS IN A COLLEGE ATHLETE WITH A CHRONIC UCL INJURY: A CASE REPORT

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KEYWORDS: UCL injury, Pitching, biomechanics

Background & Purpose: Ulnar collateral ligament (UCL) tears and associated Tommy Johns surgical intervention from excessive and poor quality pitching has increased immensely—with more college and professional pitchers undergoing the surgery in 2014 alone than in the 1990s as a whole. Faulty mechanics developed at young ages are often well engrained by the late adolescent years and the minimal healing ability

of the largely avascular UCL often leads to delayed safe return to sport. The purpose of this case is to highlight the effect of addressing faulty lower body mechanics in the treatment of a college-age baseball pitcher with chronic UCL injury. Description: A collegiate athlete presented to an outpatient orthopedic physical therapy clinic for treatment of UCL sprain approximately six weeks post-injury and platelet-rich plasma injection. Diagnostic imaging testing revealed chronic ligamentous microtrauma. Impairments at evaluation included proximal stabilizing strength deficits, myofascial trigger points throughout the dominant upper extremity, improper pitching form, and inability to pitch in game conditions due to severe pain. Interventions included addressing strength deficits throughout the body, dry needling, and sport-specific biomechanical training with pitching form analysis and correction. Outcomes: Conventional DASH, the Sport-Specific scale on the DASH, and the Numeric Pain Rating Scale improved beyond both the minimally clinically important difference and minimal detectable change over the 12 weeks of treatment. At 24-week follow up, conventional DASH scores decreased from 34.20% to 3.33% disability while sport-specific DASH scores decreased from 100% to 31.25% disability. Although initially unable to compete due to high pain levels, the subject is currently completing his pitching role full-time with 1/10 maximum pain. Discussion - Conclusions: The approach used in this case report provided an innovative approach to conservative UCL partial tear treatment. Dry needling of both contractile and non-contractile tissue in combination with retraining of faulty mechanics may encourage chronically injured ligamentous tissue healing for safe return to sport.

Poster #10

AN EVIDENCE-BASED APPROACH FOR CHRONIC CERVICOGENIC HEADACHE: A CASE REPORT

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KEYWORDS: Headache, Cervicogenic, Manual Therapy

Background & Purpose: While cervicogenic headaches (CGHs) make up 2.5–4.1% of the patients with headaches world-wide, CGHs can cause a negative effect on quality of life (QOL) on an individual. The purpose of this case report is to demonstrate how physical therapists (PTs) using an evidence-based approach for the differentiation and treatment of a patient population to optimize outcomes. Description: The patient presented in this case is a married 24-year old Caucasian female employed as a music teacher. She reported a primary complaint of right-sided headaches that began as muscular tension in the right posterior cranio-cervical and supraclavicular regions. She reported a four to five year history of chronic headaches. She stated she only had a maximum of two days of relief from previous care provided by other healthcare professionals. The Patient Specific Functional Scale (PSFS) was 3/10 (work without pain, driving car without pain, singing without pain). The patient initially had an average pain of 5/10 on the Numeric Pain Rating Scale, a positive Flexion-Rotation Test (FRT), limitations in cervical active range of motion (AROM) (45 degrees of right rotation before headache presented), and impaired deep neck flexor (DNF) endurance. Interventions included manual therapy (non-thrust manipulation) directed at C1/2 on right, Mulligan mobilization with

movement, thrust and non-thrust manipulation to upper-mid thoracic spine, DNF, and postural exercise and patient education regarding sustained positions. She was seen a total of five times over three weeks. Outcomes: At discharge, the patient had 0/10 for pain, normal FRT, cervical AROM pain free and within normal limits, and improved DNF endurance. She denied limitations in her ability to fulfill her duties at work. Her PSFS was 10/10 at three months post discharge. Patient was symptom-free at one-year post discharge. Discussion - Conclusions: Physical therapist intervention for patients with CGHs can be both efficient and effective compared to other interventions. It is important to rule out more ominous causes of headache prior to the initiation of manual therapy intervention. This case demonstrated the utilization of best evidence in a patient with chronic CHG who had successful resolution and maintained these gains one year later.

CONTROL ID: 2544694

Poster #37

MANUAL THERAPY OF THE STERNOCLAVICULAR JOINT IN A
PATIENT WITH CLAVICULAR PAIN AND APPARENT
ACROMIOCLAVICULAR JOINT PATHOLOGY

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KEYWORDS: Joint Mobilization, Shoulder, Sternoclavicular Joint

Background & Purpose: Acromioclavicular (AC) joint pathology often result from a fall with the arm at the side. In addition, this mechanism may cause sternoclavicular (SC) dysfunction. SC joint movement is important for normal scapulohumeral mechanics. However, as SC joint pathology is less common than glenohumeral or AC joint injuries, it is often overlooked. The purpose of this case report was to demonstrate the benefits of SC joint mobilizations to treat clavicular pain and normalize joint mechanics in a patient with apparent AC joint pathology. Description: A 75-year-old female presented to physical therapy with pain through the mid shaft of her right clavicle. She reported falling toward the right with her arm at her side in November; consulted with her physician in March, two weeks prior to the physical therapy evaluation. Radiographic imaging was negative for a clavicular fracture or AC joint dislocation, but an AC joint sprain was suspected. Aggravating activities included quilting, household activities, and laying on her right side. She reported pain with horizontal adduction, but had minimal AC tenderness and no apparent laxity. Patient's most comparable sign was scapular retraction. Initial treatments targeted the AC joint since the patient presented with signs and symptoms consistent with AC joint pathology; postural strengthening was performed below 90 degrees. On the third visit, SC joint mobilizations were used including inferior glide of the clavicle. Outcomes: Her symptoms did not improve with taping of the AC joint or postural strengthening below 90 degrees. Following grade III SC joint non-thrust mobilizations, the patient reported decreased pain through the mid-shaft of the clavicle and improved activity tolerance at home. Her comparable sign improved to no pain with scapular

retraction. Numeric Pain Rating Scores improved from 8/10 to 0/10. QuickDASH scores improved from 34% to 14%. Discussion - Conclusions: This case demonstrated the use of SC joint mobilizations for a patient with clavicular pain who presented with apparent AC joint pathology. Using clinical reasoning, interventions targeting the SC joint versus continuing with AC joint for treatment gave in-session improvement and return to activities immediately after.

CONTROL ID: 2544669

Poster #15

UTILIZATION OF MULLIGAN SELF SNAG FOR A PATIENT WITH MECHANICAL NECK PAIN AND A CERVICAL FUSION

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KEYWORDS: Mechanical Neck Pain, Mulligan SNAG, Cervical Fusion

Background & Purpose: The benefit of Mulligan self Sustained Natural Apophyseal Glides (SNAG) has shown effectiveness with cervicogenic headaches and dizziness. Research is lacking for the effectiveness of SNAG for chronic neck pain without complaints of headache or dizziness and in patients after a cervical fusion. The purpose of this case report is to

support the use of self SNAG for long-term management of neck pain in a patient with a cervical fusion. Description: A 64-year-old female was referred to physical therapy with insidious onset of right-sided neck and scapular pain, but denied headaches. Aggravating activities included sitting 2-3 hours; pain was worse after work and less when not working. Her job required eight hours of sitting daily. Pain improved within 10 minutes upon lying on her back. She had a C5-7 fusion six years ago. Slight but temporary relief gained with non-steroidal anti-inflammatories and muscle relaxants. Her posture revealed moderate forward head and rounded shoulders. She had increased muscle tone in right levator scapulae (LS) and hypomobility at C3-4 and the upper thoracic spine. The comparable sign was active right rotation limited to 30 degrees. She was treated with C3-4 right-sided unilateral grade III & IV posterior-to-anterior mobilizations, deep friction massage to LS, and contract-relax exercises. Manual therapy also used to gain mobility of her thoracic spine. Deep neck flexor exercise, scapular retraction, and self SNAG at right C3-4 into right rotation were given for home exercise. Outcomes: Over four treatment sessions, patient had improvements in comparable sign of right rotation from 30 to 70 degrees and the Care Connections Neck score from 75% to 100%. Numeric Pain Rating Scale improved from 4/10 to 0/10. She stated that the use of the self SNAG provided the greatest relief of symptoms and she had stopped doing her other exercises. When contacted two months after discharge, she reported minor neck pain 1-2 times per week with prolonged sitting. However, after performing the self SNAG technique, she continued to gain relief of symptoms and was able to control her condition. Discussion - Conclusions: This case report demonstrated the successful use of self SNAG for management of mechanical neck pain in a patient with a cervical fusion. The Mulligan self SNAG technique allowed her to

manage her symptoms independently without requiring other follow-up, medication, or continued physical therapy intervention. Further research is needed related to the use of SNAG in other populations.

CONTROL ID: 2544654

Poster #6

A MULTI-MODAL APPROACH INCLUDING MANUAL THERAPY, DRY NEEDLING, AND EXERCISE FOR THE MANAGEMENT OF GREATER TROCHANTERIC PAIN SYNDROME: A CASE REPORT

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KEYWORDS: Greater trochanteric pain syndrome, Dry needling

Background & Purpose: Greater trochanteric pain syndrome (GTPS), pain along the posterior/lateral greater trochanter and lateral thigh, has limited evidence-supported management recommendations. GTPS makes up 1.8 out of 1000 annual primary care visits. Compared to exercise and loading strategies, there is scarce evidence for the support of manual therapy and dry needling for GTPS. The purpose of this case is to describe a multi-modal approach for a patient diagnosed with GTPS consisting of manual therapy, dry needling, and exercise which included collaboration with a student physical therapist. Description: A 72-year-old male was referred for an eight-month history of insidious left lateral hip pain and weakness limiting walking and standing. Gait assessment demonstrated a

Trendelenburg pattern. Initial Numeric Pain Rating Scale (NPRS) was 7/10 without pain medication; initial Lower Extremity Functional Scale (LEFS) was 27/80. The patient demonstrated equal range of motion (ROM) bilaterally with pain provoked during end-range internal rotation (IR) with overpressure. Pain was also provoked with resisted muscle testing into hip external rotation (ER) and abduction. Initial management included instrument assisted and manual soft tissue mobilization to the gluteus maximus and gluteus medius, hip joint long axis and lateral distraction mobilization, and exercise focused on low intensity strengthening, functional activity training, balance, and motor control for eight visits. During the subsequent four visits, the program included the addition of dry needling to the gluteus maximus, gluteus medius, and piriformis with focus on the insertional portions at the greater trochanter. Outcomes: The patient was seen two times per week for six weeks. After the initial eight visits, NPRS rating was reduced to 2/10 with standing and walking; LEFS score improved to 55/80. After 12 visits, NPRS was 1/10 and LEFS improved to 61/80. His gait no longer demonstrated a Trendelenburg pattern. Discussion - Conclusions: Conservative management of GTPS is not well supported in current literature. In this case, a program consisting of manual therapy, dry needling, and exercise was used successfully with significant functional improvement and pain reduction reported by a geriatric patient with chronic symptoms. Future research for patients with GTPS is warranted.

CONTROL ID: 2529927

Platform #29

DRY NEEDLING AND INTRAMUSCULAR ELECTRICAL STIMULATION

IN THE TREATMENT OF A PATIENT WITH FOOT DROP AFTER MULTIPLE LUMBAR SPINE SURGERIES: A CASE REPORT

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KEYWORDS: Dry Needling, Foot Drop

Background & Purpose: A growing body of research describes the benefits of dry needling alone; however, there is little evidence for the combined use of dry needling with intramuscular electrical stimulation (DNIES) and no current evidence for DNIES in patients with radiculopathy. The purpose of this case report is to describe an DNIES in a patient with foot drop due to lumbar radiculopathy. **Description:** A 35-year-old male presented post multiple spinal surgeries (lumbar microdiscectomy, three subsequent surgeries for discitis) and left (L) foot drop status post the final surgery (0/5 dorsiflexion [DF] strength). Other co-morbidities included non-active osteomyelitis and progressive foraminal stenosis (L4-S1).

Electromyographic studies demonstrated partial axonal loss of muscles innervated by the L4, L5, & S1 nerve roots. DNIES was introduced approximately 14 months post-operatively when other traditional interventions (surface neuromuscular electrical stimulation, taping for facilitation, utilization of an ankle-foot orthosis, & strengthening) had failed. **Outcomes:** At the first session, needles were inserted into the L4 tibialis anterior and L4-5 multifidi. Intramuscular electrical stimulation was used on each site individually, as well as being linked to contract simultaneously. Immediately following this treatment, DF improved from 0/5 to 2+/5. Taping was used to facilitate DF between sessions; however, there was no

carryover between sessions. The same treatment was repeated, but included extensor digitorum longus; DF improved from 0/5 to 2+/5 post treatment. At the third visit, the patient initially demonstrated 1/5 activation of tibialis anterior and extensor digitorum. After five sessions of DNIES, pragmatically expanding the muscles targeted to include extensor hallucis longus in visits four and five, the patient was able achieve active DF to neutral. Functionally, the patient was able to clear his foot during gait for 3 steps before becoming fatigued. Discussion - Conclusions: Since all the chosen muscles for DNIES work to counter-act a drop-foot presentation it was considered that the combined effect of the stimulus within this myotome generated the functional change in neuromotor performance. Though the results could be attributed to natural recovery and causation cannot be determined, this case report demonstrated the use of DNIES in a patient with lumbar radiculopathy. Further research should be done to assess the efficacy of using DNIES in the treatment of radiculopathies and to determine the best protocol for management.

CONTROL ID: 2529457

Poster #42

IMPAIRMENT BASED MANAGEMENT OF INSIDIOUS UNILATERAL
FOOT DROP WITH UNKNOWN CAUSE: A CASE REPORT

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KEYWORDS: Exercise, Impairment, Manual Therapy

Background & Purpose: Foot drop is a physical impairment commonly encountered in physical therapist practice and has been associated with central or peripheral nervous system disorders. Often the underlying dysfunction is identified through physical examination, diagnostic imaging, or laboratory testing. Interventions targeting physical impairments have demonstrated benefit for patients experiencing foot drop. The purpose of this case report is to highlight the impairment based management of an apparently healthy 50-year-old female with rapid onset left lower extremity (LE) weakness and sensation changes without definitive medical diagnosis.

Description: A 50-year-old female with insidious onset of left foot drop and LE numbness presented to the Emergency Department and received medical screening including brain & complete spinal magnetic resonance imaging, and laboratory procedures. All failed to identify a cause. Five days after symptom onset patient presented for outpatient physical therapist evaluation. Lower Extremity Functional Scale (LEFS) was 29/80 and the Numeric Pain Rating Scale (NPRS) was 3/10. While mild weakness (4/5) was noted on the left LE (hip flexion, extension, abduction & knee flexion, extension & ankle plantarflexion), pronounced strength deficits (3-/5) to the left ankle dorsiflexion, eversion, inversion, great toe extension were noted. Impaired light touch sensation to the left common, deep & superficial peroneal nerve and sural nerve distribution was noted. Allodynia was present in the left lateral femoral cutaneous distribution. Deep tendon reflexes brisk (3+) bilaterally; Clonus, Babinski, and Hoffman's tests were negative. Slump sit testing revealed limitation in left knee extension with pain reproduction in mid-thoracic spine and lateral left thigh. Examination of thoracic spine identified localized hypomobility and pain during posterior-anterior pressures between T6 and T10.

Outcomes: The patient participated in 13 sessions over eight weeks. Impairment based interventions included: thoracic thrust and non-thrust manual therapy (T6-T10), neurodynamic mobilization, postural training exercises, and strengthening exercises for trunk and left LE. Her LEFS increased to 75/80; her NPRS decreased to 0/10. No presence of altered sensation was found. She returned to all normal daily activities without limitation. Discussion - Conclusions: This case highlights the successful impairment based management of unilateral foot drop in the absence of a definitive medical diagnosis.

CONTROL ID: 2544339

Poster #41

THE EFFECTS OF A STRONG THERAPEUTIC ALLIANCE ON FEAR-AVOIDANCE BEHAVIOR IN A PATIENT WITH A DISTAL RADIUS FRACTURE: A CASE REPORT

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KEYWORDS: Therapeutic Alliance, Fear-Avoidance, Biopsychosocial

Background & Purpose: Research shows that a biopsychosocial approach to therapeutic practice can guide clinical decisions and be a prognostic indicator. This approach can identify fear-avoidance behavior in patients who fail conservative treatment. Patients may also show changes in pain perception and learned helplessness, affecting their functional activities. Evidence suggests that a therapeutic alliance (TA) between patient and

physical therapist has a positive impact on treatment outcomes. However, the relationship between TA and fear-avoidance behavior is unclear. The purpose of this case report is to show significant improvements in fear-avoidance behavior and functional outcomes through a strong TA.

Description: A 68-year-old female with a left distal radius fracture failed conservative treatment and underwent an ORIF. Her initial wrist range of motion (ROM) was 20° flexion, 30° extension, and 40° supination. Her wrist Focus on Therapeutic Outcomes (FOTO) = 37/100 and Fear Avoidance Belief Questionnaire–Physical Activity (FABQ-PA) = 14/24. Her worst pain = 5/10 and best pain = 2/10 on the Numeric Pain Rating Scale (NPRS). She was unable to push on her hand from sitting to standing, carry items, and brush her hair. She was hesitant to use her left hand due to pain and stiffness and was apprehensive of "hands on" treatment. The therapist recognized and addressed her fears through an extensive subjective interview that included patient education on pathology, rehabilitation, and potential outcomes. As a result, the patient's level of confidence in the therapist increased and she was able to tolerate manual therapy and therapeutic exercises. Outcomes: After nine visits over four weeks, the patient's wrist ROM improved to 45° flexion, 45° extension, and 85° supination. Her worst pain = 3/10 and best pain = 2/10. A satisfaction survey on a 5-point Likert scale ranging from "very dissatisfied" to "very satisfied" revealed a change in TA. Patient responded "very satisfied" to all questions including her experience with the therapist, her involvement in setting goals, level of respect shown to her, and treatment outcomes. Her FOTO score = 55/100 and FABQ-PA score = 8/24. Despite persistent pain the patient's abilities improved in all functional ADLs. Discussion -

Conclusions: This case report demonstrated a patient's improved fear-avoidance behavior, pain and function with management that included

developing a strong TA. Further research in this area is warranted.

CONTROL ID: 2544035

Poster #30

USE OF THORACIC MANUAL THERAPY IN THE SUCCESSFUL
MANAGEMENT OF A PROFESSIONAL CYCLIST WITH NEURAL
MECHANOSENSITIVITY AND IMPAIRED POWER OUTPUT: A CASE
REPORT

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KEYWORDS: Thoracic Pain, Neuromobilization, Joint Mobilization

Background & Purpose: Thoracolumbar pain, the most common complaint causing professional cyclists to seek medical attention, can limit a cyclist's ability to maintain efficient postures and generate power. Sustained thoracolumbar flexion during cycling loads the posterior spinal and neural structures potentially increasing neural mechanosensitivity. Utilization of the Thoracic Slump Test (TST), which closely mimics the cyclist's posture, has not been studied in this population. The purpose of this case report is to describe the utilization of the TST and manual therapy in the successful management of an elite cyclist with pain, reduced power output and neural mechanosensitivity. Description: A 49-year-old female professional cyclist

with no significant past medical history presented with a two-month history of decreased power output, left lower thoracic pain, and left anterior hip pain after 20 minutes of cycling, sprints and uphill climbs. Significant evaluation findings included: decreased painful thoracic extension, limited left hip flexion active and passive range of motion (ROM), and thoracic spine (T9) hypomobility with joint accessory exam. A positive TST revealed limited left terminal knee extension (TKE) ROM (-75 versus -20 degrees right TKE) and thoracic pain symptom reproduction. Treatment included hip and thoracic thrust/non-thrust mobilizations, therapeutic exercise and neural mobilization in the TST position.. Outcomes: She was treated for six sessions over eight weeks. The Numeric Pain Rating Scale scores improved from 8/10 to 2/10, Global Rating of Change increased from +2 to +7, and Patient Specific Functional Scale from 6 to 8. The TST was asymptomatic with left knee ROM improvement from TKE (-75 to 0 degrees). Left hip flexion active ROM improved from 120 to 140 degrees. Power output improved from 250w/kg to 287w/kg and cycling training tolerance was no longer limited by pain, time or race event. Discussion - Conclusions: The TST, which mimics the cyclist's posture and reproduced the concordant pain, guided the decision to use neural mobilization and thoracic manual therapy in the treatment. Neural mechanosensitivity may lessen force generation if the cyclist cannot efficiently assume cycling postures and maximize TKE during the power phase of the pedal stroke. This case study suggests the potential importance of the TST in the evaluation of cyclists and the role of manual therapy in efficiently resolving thoracolumbar pain and impaired power output.

CONTROL ID: 2544005

Poster #44

CENTRAL SENSITIVITY AS REFERRED CHEST PAIN: A CASE REPORT

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KEYWORDS: central sensitivity, thoracic, manipulation

Background & Purpose: Central sensitivity occurs when nociceptive threshold is lowered due to prolonged exposure to noxious stimuli. Pain referral may eventually occur outside the region of the initial injury, mimicking other pathological conditions. The purpose of this case is to discuss clinical reasoning behind a broader diagnostic category than normal, the decision to use thoracic mobilization and manipulation to reduce pain sensitivity, and issuing exercise and education for home management. Description: The patient was a 29-year-old male engineer with an "intermittent strain or tear" over the right buttock and intermittent sharp pain in the sternum and left pectoral areas. The medical diagnosis was "costochondritis, chest pain" with a gradual onset over six months. He reported having physical therapy for the right hip pain, which ended two months earlier with pain reduction. The patient was using both topical (Pennsaid) and oral (Meloxicam) non-steroidal anti-inflammatory medications for pain relief. Thorough history and subjective examinations were performed leading to a diagnosis of central sensitivity after the seated slump test provoked both sternal and right buttock pains. The patient also

noted left sterno-costal tenderness, sternal pain with thoracic flexion and left rotation, and pain while holding a 5- lb. weight at 90 degrees in the left hand while standing. Flattening was noted between T2 and T10.

Interventions included anterior-posterior (AP) left sterno-costal mobilization (third rib), home exercise training and education, and thrust manipulation over the T3 vertebra at the end of each of the patient's three sessions.

Outcome measure scores were obtained at the beginning of each session and immediately after the manipulation was performed. Outcomes:

Outcome scores included the Numeric Pain Rating Scale (NPRS) and Global Rating of Change (GRoC). By the end of the three sessions the patient reported a GRoC score of +5, a four level reduction on the NPRS, and had not had medication in ten days. Each treatment session the patient reported complete pain relief after receiving thoracic manipulation.

Discussion - Conclusions: The patient reported having right hip tightness and the sensation of dorsal foot pressure the night after the first session, and left lateral hip fatigue the next day. This may be an indication that the patient's prior hip pain contributed in part to his pain presentation.

Regardless, considering how central sensitivity can alter pain perception is important for differential diagnosis and treatment.

CONTROL ID: 2543934

Poster #39

PHYSICAL THERAPY MANAGEMENT FOLLOWING SIMULTANEOUS
BILATERAL TOTAL KNEE ARTHROPLASTY: A CASE REPORT

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KEYWORDS: total knee arthroplasty

Background & Purpose: Simultaneous Bilateral Total Knee Arthroplasty (bTKA) is one option for treatment of severe knee osteoarthritis (OA); however, it has been a source of debate when comparing it to other surgical options, such as unilateral TKA and staged bTKA. Research has shown that all options produce positive functional outcomes, but considering which option is best is specific to the patient presentation. Studies also revealed similar clinical measures two years post-op TKA when comparing unilateral TKA, bTKA, and healthy controls. The purpose of this study is to describe objective measures and an existing functional outcome measure, the Lower Extremity Functional Scale (LEFS), following physical therapy (PT) intervention for simultaneous bTKA. **Description:** The patient was a 76-year-old male who presented four weeks status post simultaneous bTKA, where a PT evaluation revealed impairments of overall knee range of motion (ROM), strength and gait mechanics. PT intervention included soft tissue mobilization to peri-patellar superficial fascia, scar tissue, and distal quadriceps and iliotibial band structures; joint mobilization to tibiofemoral articulations, particularly anterior-to-posterior accessory glides with rotation into restrictions; lower extremity strengthening focusing on posterior chain initiation along with eccentric training of the quadriceps; and proprioceptive neuromuscular facilitation (PNF) techniques to increase reciprocal pelvic motion during gait. **Outcomes:** LEFS and active ROM of bilateral knees were the main outcomes used. The patient's LEFS score was 12/80 at four weeks status post simultaneous bTKA. Following five weeks of PT intervention, the LEFS was 49/80, which showed a clinically important difference.

Significant gains in active ROM of bilateral knee flexion were also noted (right knee: 111° to 128°; left knee: 113° to 131°). Discussion -
Conclusions: This case report demonstrated positive outcomes following a simultaneous bTKA, including a return to functional activities, such as stair ambulation and walking long distances. Future research should follow long-term clinical outcomes of all surgical options for knee OA, as well as identify ideal characteristics of candidates for simultaneous bTKA.

CONTROL ID: 2543699

Poster #33

AN EVIDENCE-BASED APPROACH TO TREATING A FEMALE WITH
CHRONIC LOW BACK AND HIP PAIN: A CASE REPORT

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KEYWORDS: Low Back Pain, Post-Partum, Manual Therapy

Background & Purpose: Low back pain (LBP) is a common diagnosis seen by physical therapists. While the source of symptoms may not always be determined, the behavior of symptoms can be utilized to help determine the most appropriate treatment. The purpose of this case report is to examine a movement and evidence-based approach for treating a patient one-year post-partum with chronic hip and LBP. The symptoms were present prior to pregnancy and worsened after pregnancy. The low back and hip symptoms limited her daily and recreational activities. Choice of

treatment was based on the subjective and objective findings and relevant evidence. Description: A 26-year-old female who presented with right-sided LBP and right lateral hip/buttock pain one-year post- partum. Extension and right side flexion were most reproductive of her LBP and hip symptoms. She had a positive Active Straight Leg Raise (reproducing her LBP and hip pain). Laslett's sacroiliac provocation testing was also positive: sacro-iliac joint compression/distraction, sacral thrust and thigh thrust were all positive for her right-sided LBP. Gaenslen's reproduced both her lumbar and hip symptoms. A motor control exercise program was initiated based on Laslett's evidence that corresponded to the patient's symptom presentation. The exercise program was progressed from open chain to closed chain to functional activities. Grade III right rotational non-thrust manipulation directed at the low lumbar spine allowed the motor control program to be performed with less discomfort. Additionally, the utilization of Leukotape running posteriorly from the iliac crest diagonally across the sacrum was utilized to further enhance the motor control exercise program. Outcomes: The patient demonstrated improvements in functional tasks, specifically tasks involving lifting or carrying her child. The patient scored a 3.3/10 on the Patient Specific Functional Scale at initial evaluation and improved to 8.3/10 upon discharge (tasks included standing, running and carrying her child) without her LBP or hip pain reported. At three months post discharge the patient was back to all activities without pain. Discussion - Conclusions: This case report demonstrated how the findings from a thorough subjective history, objective examination, and relevant evidence can lead to the most appropriate intervention strategy. Selection of the most appropriate functional tool is important in determining success.

CONTROL ID: 2540178

Poster #63

SUCCESSFUL MANAGEMENT OF A PATIENT WITH NECK AND LEFT SHOULDER PAIN PRESENTING WITH COMBINED MUSCULOSKELETAL AND NEUROLOGICAL IMPAIRMENTS

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KEYWORDS: cervical fusion, cerebrovascular accident, Physical Therapy.

Background & Purpose: There is little evidence regarding management of patients status post CVA with concurrent neck and shoulder pain. The purpose of this case is to describe an orthopaedic manual physical therapy (OMPT) management approach to a patient with cervical and left (L) upper extremity (UE) impairments secondary to musculoskeletal and neurological etiologies. Description: A 56-year-old female presented with chronic neck pain, L UE pain and weakness which was exacerbated lifting boxes one month prior. Past medical history included: two cervical fusion surgeries (C5/6/7 in 2010, C3/4 in 2015), L shoulder labral tear confirmed by MRI, and a CVA affecting the L UE six months prior. The extent to which each event affected her presentation could not be determined; therefore an impairment based OMPT approach was utilized. Baseline shoulder active range of motion (AROM) was: flexion 0-122, abduction 0-83, external rotation 0-54, internal rotation 0-48 degrees. Cervical AROM was: flexion 0-40, extension 0-20, rotation L/R 0-30/40 degrees. Shoulder manual muscle testing (MMT) was grossly 4-/5. Arthrokinematic impairments were noted with glenohumeral scaption and thoracic extension. Supine upper

limb neural provocation test (ULTT) provoked symptoms at 80 degrees elbow flexion. She did not have any contraindications for thoracic OMPT. Non-thrust techniques did not change her functional status so prone thoracic extension thrust manipulation (cervical spine neutral) was performed from T3-T10 for the first 4 visits. The next four visits included glenohumeral non-thrust mobilizations. Manual UE neural sliding was performed each visit. Exercise included active UE scaption, thoracic extension/rotation movements, scapular strengthening, and self-nerve sliding. Advice regarding ergonomics and optimal body mechanics was provided. Outcomes: The patient had eight visits over six weeks. Cervical/shoulder AROM and ULTT mobility were within functional limits. Shoulder MMT improved to 4+/5 and was pain-free in all planes. Numeric Pain Rating Scale improved from 6/10 to 0/10. Neck Disability Index score improved from 18% to 4%. Disabilities of the Arm Shoulder and Hand score improved from 31.6% to 5.8% disability. Discussion - Conclusions: This case demonstrated the successful management of patient with combined musculoskeletal and neurological impairments using a regional, impairment based OMPT management approach. Further examination of combined approaches for complex orthopaedic/ neurological patients is recommended.

CONTROL ID: 2535013

Poster #53

LUMBAR MANIPULATION AS AN ADJUNCT TREATMENT TO THE MULTIMODAL CONSERVATIVE MANAGEMENT OF A PATIENT WITH FEMOROACETABULAR IMPINGEMENT: A CASE REPORT

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KEYWORDS: FAI, manual therapy, manipulation

Background & Purpose: Femoracetabular impingement (FAI) is a morphological condition that predisposes young, active adults to early hip osteoarthritis and labral tears. Sources favor surgical interventions due to patients having higher expectations to return to prior level of activities. The evidence on the use of hip joint mobilizations and/or exercise in the management of intra-articular hip pathologies is limited and inconclusive. The purpose of this case report is to describe the use of lumbar spine manipulation (LSM) as an adjunct intervention in the conservative management of FAI. **Description:** A 40-year-old male presented with insidious right anterolateral hip pain. Imaging findings revealed bilateral CAM type deformities and mild right hip osteoarthritis. He was an avid runner, but had become sedentary due to increase in symptoms and psychosocial stressors. Given the patient's high prior level of function, the progressive nature of FAI, and the patient reported fear avoidance behavior, a multimodal approach was taken. In addition to LSM, oscillatory hip mobilizations, therapeutic exercise, and a home exercise program (HEP), the patient was educated on activity modifications to minimize offending hip positions, the hypoalgesic benefits of exercise, and the usage of graded activity to progress towards return to prior activity levels. **Outcomes:** The patient was seen for ten sessions over eight weeks. Upon discharge, he achieved ten minutes of pain-free jogging, increase in right

hip flexion range of motion, as well as significant improvements in hip pressure pain threshold and pain decrease with squatting. The change in Lower Extremity Functional Scale (LEFS) score was not significant.

Discussion - Conclusions: The patient in this case consistently demonstrated post manipulation improvements in outcomes with carryover between sessions; however, there continued to be a discrepancy between the patient's outcome measures and his LEFS scores. The patient was able to reinitiate pain-free jogging, but had not attempted higher-level activities such as running, hopping, and cutting that could have contributed to the minimal change to his LEFS score. In the three-month follow up, the patient reported minimal right hip symptoms. The patient did report occasional flare-ups that he managed by performing the HEP.

CONTROL ID: 2533325

Poster #21

ORTHOPEDIC MANUAL THERAPY IN THE TREATMENT OF ACUTE ONSET UPPER EXTREMITY NERVE ENTRAPMENT SYNDROME FOLLOWING A MAMMOGRAM: A CASE REPORT

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KEYWORDS: Entrapment syndrome, Neurodynamics, manual therapy

Background & Purpose: Nerve entrapment syndromes in the upper extremity are recognized and treated with increased regularity. Onset can be traumatic or insidious, and compression may occur at one or several

anatomical sites on the nerve path. The purpose of this case report is to describe an impairment-based, multimodal treatment approach in managing an individual with acute upper extremity nerve entrapment following a mammogram. Description: A 53-year-old female presented with a one-month history of right shoulder pain and numbness in a median nerve distribution post-mammogram. The patient described excessive pressure over the anterior rib cage above/below the breast during the procedure, accompanied by a test position of full frontal plane shoulder flexion with internal rotation. Initial Numeric Pain Rating Scale (NPRS) was 5/10, Disabilities of the Arm, Shoulder, and Hand (DASH) was 29%, and a positive Upper Limb Neural Provocation Test (ULTT-A) very early in the testing range. Pain symptoms were reproduced with end-range shoulder flexion or abduction, while numbness was constant. Cervical exam was negative with the exception of mild increased scalene tone on the right. Differential diagnosis of nerve entrapment site was pectoralis minor, costoclavicular space, or scalene musculature (thoracic outlet). Manual therapy intervention included thrust manipulation to thoracic spine and right ribs of T2-5, scapular mobilization and proprioceptive neuromuscular facilitation (PNF), first rib mobilization, soft tissue treatment to scalenes and pectoralis minor, as well as neurodynamic mobilization with median nerve bias. Exercise in clinic and Home Management Program (HMP) included scapular stabilization, cervical and pectoral stretching, first rib mobilization, and neural mobilization. Outcomes: The patient was seen for five visits. At discharge and 6-month follow-up patient reported the NPRS improved from 5/10 to 0/10. DASH score reduced from 29 to 0. She had full pain-free shoulder range of motion and complete resolution of neural provocation testing. Thoracic and rib manipulation with treatment to pectoralis minor resulted in the greatest benefit, showing 50% reduction in

numbness, full resolution of shoulder pain, and 50% improvement in neurodynamic testing within three visits. Discussion - Conclusions: This case highlights the successful management of a patient presenting with acute onset UE nerve entrapment. Interventions included an impairment-based, multimodal treatment approach including orthopedic manual therapy.

CONTROL ID: 2540787

Poster #64

**A MANUAL THERAPY AND MOVEMENT SCIENCE INTEGRATED
APPROACH FOR THE TREATMENT OF TEMPOROMANDIBULAR
DISORDER: A CASE REPORT**

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KEYWORDS: Temporomandibular Disorder, Manual Therapy, Movement Science

Background & Purpose: Temporomandibular disorder (TMD) is a complex problem with possible contributions from joint and muscular dysfunctions, central neurological sensitization, and psychosocial factors. Manual therapy for patients with TMD has been shown to be beneficial, but there is a lack of evidence to support a movement systems approach for TMD. Physical therapists are trained to identify impairments within the human movement system that contribute to dysfunction. From a movement

systems perspective, impaired movement of the spine and scapula may negatively affect the temporomandibular joint. The purpose of this case study is to describe the effect of a manual therapy and movement systems integrated treatment approach for a patient with TMD. Description: A 41-year-old female was punched in the left side of her face and presented to PT in the acute phase. Immediate imaging was negative. Notable past medical history included six-year chronic neck and left-sided jaw pain status post motor vehicle accident with resultant cervical fusion surgery of C5/6. Clinical exam revealed negative cervical instability and vertebral basilar artery testing. She reported severe pain (10/10 on the Numeric Pain Rating Scale [NPRS]) and difficulty opening her mouth, chewing and talking - rated 2/10 on the Patient Specific Functional Scale (PSFS). Movement systems impairment syndromes of cervical extension with rotation and scapula insufficient upward rotation were identified. The patient was treated for 10 visits over 4 weeks with manual therapy to the TMJs and the subcranial, cervical and thoracic spine, movement systems-based motor control exercises for the deep cervical flexors, scapular upward rotators, diaphragm, and biopsychosocial patient education. Outcomes: Over the ten visits, the TMJ Disability Index improved from 77/120 to 2/120. The Neck Disability Index improved from 24% to 0% disability. Fear Avoidance Belief Questionnaire -physical activity subscale improved from 19/24 to 0/24. The PSFS improved to 10/10 for opening the mouth, chewing, and talking. The NPRS improved to 0/10 pain with movement and at rest. At a six-month post-discharge survey, the patient reported she was pain free and fully functional. Discussion - Conclusions: This patient was able to achieve full and pain free function from a physical therapy treatment approach that integrated manual therapy for local and regionally-interdependent joint dysfunctions with a movement systems

approach.