

ACCEPTED PLATFORM PRESENTATIONS AAOMPT 2009

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not constitute a peer-reviewed journal publication. The publication of abstracts alerts readers to research that is presently being conducted. It is hoped that the

research presented here in brief will eventually be submitted as full-length manuscripts for review and potential publication.

IMPAIRMENT-BASED MANUAL PHYSICAL THERAPY AND EXERCISE IN PATIENTS WITH PLANTAR HEEL PAIN: A PROSPECTIVE COHORT

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BACKGROUND: Preliminary evidence suggests beneficial outcomes for an impairment-based manual physical therapy approach to treat plantar heel pain. This prospective case series describes the outcomes achieved, the common impairments found and interventions used with this approach. **METHODS:** Sixteen subjects (9 males, 7 females with a mean age 47 ± 9.4 years) with 24 painful heels (mean symptom duration 14.8 ± 17.6 months) participated and received a comprehensive evaluation of the lower quarter and lumbar spine. Manual physical therapy interventions and home exercises were directed at impairments judged to contribute to each patient's heel pain. The Foot and Ankle Ability Measure (FAAM), ankle dorsiflexion range of motion (DF ROM), and Global Rating of Change (GROC) were used as outcome measures. Blinded assessments of the dependent variables were obtained at baseline, 1-week, 1-month, 3-month, and 6-months. **RESULTS:** Significant improvements in FAAM scores ($p < 0.05$) were seen through 6-months. Subjects presenting with $< 10^\circ$ DF ROM at baseline demonstrated

clinically meaningful improvement in DF ROM ($> 5^\circ$) at 1, 3, and 6-months. Further, at least 75% of subjects reported a clinically meaningful change in GROC scores at all follow-ups. The majority of impairments found were in the foot and ankle (50%), but other contributing impairments were also identified and treated in the lumbar spine (20%), hip (18%), neural structures (7%) and knee (2%). **DISCUSSION-CONCLUSION:** Plantar heel pain can be successfully treated using an impairment-based manual physical therapy approach. Further studies should examine the effectiveness of this approach when compared with other treatments for heel pain.

IMMEDIATE EFFECT OF TIBIOFIBULAR JOINT MANIPULATION ON ANKLE DORSIFLEXION RANGE OF MOTION AND STEP DOWN TEST SCORES IN INDIVIDUALS WITH CHRONIC ANKLE INSTABILITY

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BACKGROUND: A positional fault of the tibia and fibula may play a role in chronic ankle instability (CAI). Joint manipulation may restore normal arthrokinematics and motion. The purpose of this study was to determine the immediate effects of a tibiofibular joint manipulation on ankle dorsiflexion range of motion and step down test scores. **METHODS:** Forty-three individuals with

CAI and at least 3° ankle dorsiflexion asymmetry. Changes in ankle dorsiflexion and step down test scores were compared immediately before and after intervention (proximal tibiofibular manipulation, distal tibiofibular manipulation, control). A weight-bearing lunge was used to measure ankle dorsiflexion. Step down test was performed using 5 repetitions. Data were analyzed using a mixed-model ANOVA. **RESULTS:** There was not a significant difference in dorsiflexion between groups across time ($F_{2,40} = .13$, $P = .88$). When all three groups were pooled together, a significant ($F_{1,40} = 38.8$, $P < .001$) increase in dorsiflexion range of motion was identified (Pre= $36.2 \pm 7.8^\circ$; Post= $38.5 \pm 7.7^\circ$). Groups were significantly different over time for step down test scores ($F_{2,40} = 5.72$, $P = .01$). Step down test scores significantly increased ($P = .02$) for the distal tibiofibular manipulation group (Pre= $3.7 \pm 1.4^\circ$; Post= $4.2 \pm 1.5^\circ$), but were not different for the control ($P = .28$) (Pre= $3.4 \pm 1.2^\circ$; Post= $3.2 \pm 1.0^\circ$) or proximal tibiofibular manipulation ($P = .07$) (Pre= $3.9 \pm 1.2^\circ$; Post= $3.3 \pm 1.6^\circ$) groups. **DISCUSSION-CONCLUSION:** Individuals with CAI who received proximal or distal tibiofibular manipulation did not demonstrate immediate changes in ankle dorsiflexion range of motion that differed from controls, but step down test scores were negatively affected by distal tibiofibular manipulation. Repeated interventions performed over time may have additional effects on outcomes.

A PRELIMINARY CLINICAL PREDICTION RULE: KNEE OSTEOARTHRITIS PATIENTS WHO ARE UNLIKELY TO BENEFIT FROM MANUAL PHYSICAL THERAPY AND EXERCISE

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BACKGROUND: The combination of manual physical therapy and exercise has important benefit for over 80% of patients with knee osteoarthritis. Our objective was to determine predictor variables for patients unlikely to respond to manual physical therapy and exercise. A clinical prediction rule (CPR) to identify patients unlikely to benefit is important for the appropriate use of health care resources.

METHODS: A retrospective combined cohort study design was used. A total of 167 data points from 101 patients (64 women and 37 men with mean age 60.5 ± 11.8 and 63.6 ± 9.3 years, respectively) treated with manual physical therapy and exercise from two previously published clinical trials were analyzed for potential predictor variables. First level analyses determined whether baseline variables could discriminate between groups of patients who achieved a clinically meaningful benefit of 12% improvement in WOMAC scores after 4 weeks of treatment versus those who did not. Binary logistic regression analysis was then used to derive a CPR that eliminated any predictors that did not contribute meaningfully and independently to the multivariate prediction. **RESULTS:** A preliminary CPR was developed from the variables of height, anterior cruciate ligament (ACL) laxity, and patellofemoral pain. A patient with any 2 tests positive who had a pre-test probability similar to the incidence of nonsuccess in this study (17%) yielded a post-test probability of 83% for nonsuccess with this treatment (Positive Likelihood Ratio = 36.7). **DISCUSSION AND CONCLUSION:** Patients unlikely to respond to manual physical therapy and exercise can be determined from simple clinical findings. This rule could improve primary patient management.

ORTHOPEDIC MANUAL PHYSICAL THERAPY FELLOWSHIP TRAINING RESULTS IN IMPROVED CLINICAL OUTCOMES FOR PATIENTS WITH LOW BACK PAIN

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BACKGROUND: Advanced training in Orthopedic Manual Physical Therapy through a credentialed fellowship program is a rigorous experience with the expected result of improved patient outcomes. Previous research on 3rd visit clinical outcomes demonstrated improvement in Modified Low Back Pain Disability Questionnaire (MLBPDQ) scores in the 4th quarter of fellowship training in comparison to the 1st quarter. The purpose of this study was to analyze the clinical outcome measure results of OMPT fellows at the initiation and completion of their yearlong training. **METHODS:** MLBPDQ and Numeric Pain Rating (NPR) scores from patients with low back pain were analyzed retrospectively, and data was divided into quarter years based on the date of the initial visit. Point change in MLBPDQ scores and NPR scores were calculated comparing the final visit to the initial visit, and data from the 1st quarter were compared with those of the 4th quarter. **RESULTS:** Mean change in MLBPDQ in the first quarter at discharge was 4.87 ± 11.8 , while the 4th quarter mean change was significantly higher at 11.95 ± 15 ; $p=0.02$. Mean NPR scores at discharge showed greater improvement in the 4th quarter (3.1 ± 3.29) compared to the 1st quarter (1.9 ± 3.45 ; $p=0.1$). Number of visits, however, was not different between quarters. **DISCUSSION-CONCLUSION:** Results from this study indicate that fellowship training may promote greater effectiveness in treating low back pain. Future research into specific factors mediating improved clinical practice is indicated.

ALTERED SOMATOSENSATION AND COMPLAINTS OF KNEE INSTABILITY IN SUBJECTS WITH KNEE OSTEOARTHRITIS ARE MODULATED BY JOINT MOBILIZATION

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BACKGROUND: Knee osteoarthritis (OA) is a prevalent condition often associated with pain and functional limitations. Although sensation of instability is often reported in these patients, the functional and neurological correlates have been little explored. Manual therapy is an effective treatment of knee OA, but its neurophysiological effects are less known. The purpose of this study was to investigate the effect of joint mobilization on complaints of instability, quantitative sensory testing (QST) findings, and functional step up and over (SUO) task. **METHODS:** 15 subjects (aged 45-75) diagnosed with unilateral tibiofemoral joint OA, without history of total-joint-replacement, neurological/rheumatoid diseases or ligamentous laxity, attended two testing sessions, one week apart. Using a pre-post experimental design, QST, including mechanical detection threshold (MDT), vibration and pain pressure threshold (PPT), was assessed at the medial knee, followed by SUO task utilizing the NeuroCom dual forceplate system. At each session subjects received randomly either oscillatory joint mobilization (Grade III; 2X3 minute interval) or sham intervention. **RESULTS:** Diminished vibratory sense was demonstrated at the affected knee ($p<0.05$). Allodynia at the medial knee was exhibited in 13/15 subjects. Following manual therapy but not sham intervention, subjects reported decreased pain (visual analog scale: 25 ± 26 mm) and sensation of instability, and demonstrated improved stability with SUO (all $p<0.05$). MDT improved and PPT increased ($p<0.05$), but vibration sense was unchanged. **DISCUSSION-CONCLUSION:** Chronic knee OA may result in sensitization of nociceptive pathways resulting in QST changes and increased instability. Joint mobilization may

be effective in modulating somatosensory input and improving functional stability.

MECHANICAL AND THERMAL EFFECTS AFTER CERVICAL OR THORACIC THRUST MANIPULATION IN PATIENTS WITH MECHANICAL NECK PAIN: A PILOT STUDY

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BACKGROUND: Previous studies have investigated mechanical and thermal effects of cervical spine mobilization in patients with neck pain. No study has directly compared differences in mechanical/thermal effects of cervical and thoracic thrust manipulation. Our aim was to investigate changes in pressure pain thresholds (PPT) and heat/cold pain thresholds after the application of cervical or thoracic manipulation in mechanical neck pain patients. **METHODS:** Fifteen women (mean age: 28 ± 6 years) with mechanical neck pain were randomly assigned to group A, which received a cervical spine manipulation or group B, which received a thoracic thrust manipulation. PPT were assessed over the C5-C6 facet joint and the tibialis anterior muscles, and heat/cold pain thresholds over the cervical spine were assessed at baseline and 5 minutes post-intervention by a therapist blinded to the treatment allocation of the patient. **RESULTS:** The ANOVA revealed a significant increase for PPT levels over the tibialis anterior muscle ($F=4.8$; $P=0.045$) but only a trend for PPT over the cervical spine ($F=4.1$; $P=0.07$). No significant changes for heat/cold pain thresholds over the cervical spine (heat: $F=0.7$; $P=0.4$; cold: $F=0.2$; $P=0.6$) was also found. **DISCUSSION-CONCLUSION:** These preliminary data suggests that either cervical or thoracic thrust manipulation has a mechanical, but not thermal hypoalgesic effect in patients with mechanical neck pain. Furthermore, the mechanical hypoalgesic effect seems to be general and not segmental, although further studies are needed.

CHANGES IN PAIN AND CERVICAL RANGE OF MOTION AFTER CERVICAL OR THORACIC THRUST MANIPULATION IN PATIENTS WITH MECHANICAL NECK PAIN: A PILOT STUDY

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BACKGROUND: Previous studies have investigated the effectiveness of cervical or thoracic spine manipulation in neck pain. No study has directly compared differences between cervical and thoracic thrust manipulation. Our aim was to investigate changes in pain and cervical range of motion (ROM) after the application of either cervical or thoracic manipulation in patients with mechanical neck pain. **METHODS:** Twelve women (mean age: 26 ± 8 years) with mechanical neck pain were randomly assigned to 1 of 2 groups: group A received a cervical spine manipulation and group B received a thoracic thrust manipulation. Outcome measures included neck pain (numerical pain rate scale) and cervical ROM. Patients were assessed at baseline and 5 minutes post-intervention by a therapist blinded to the treatment allocation of the patient. **RESULTS:** The Group*Time interaction for the ANOVA test was statistically significant for pain ($F=15.6$; $P=0.003$), indicating greater reduction in the cervical manipulation group. The ANOVA also showed a significant effect for time for flexion ($F=6.5$; $P=0.03$), both lateral-flexions ($F=10.8$; $P=0.007$) and left cervical rotation ($F=5.6$; $P=0.04$). There was no statistically significant Group*Time interaction for ROM indicating that improvements in cervical ROM were similar in both groups. **DISCUSSION-CONCLUSION:** These preliminary data suggest that cervical spine manipulation may be more effective than thoracic spine manipulation for an immediate reduction in pain. The application of either cervical or thoracic manipulation was equally effective in increasing cervical ROM.

DO BETWEEN SESSION CHANGES PREDICT OVERALL GLOBAL PERCEPTION OF IMPROVEMENT AND FUNCTIONAL IMPROVEMENT IN PATIENTS WITH SHOULDER IMPINGEMENT SYNDROME SEEN FOR FORMAL PHYSICAL THERAPY?

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BACKGROUND: The prognostic value of between-sessions change during Physical Therapy (PT) interventions is mixed. The purpose of this study was to determine whether initial between-sessions changes were prognostic for final improvement in global report of change (GRoC) and functional improvement. **METHODS:** The study included 55 patients (31 males, and averages of 52 years/age, Deyo-score=0.18, 1.5 bouts of recurrence, 240 days duration) seen for formal/standardized PT intervention after a diagnosis of shoulder impingement. Treatment duration ranged from 1–12 weeks. Analyses included Biserial correlation of between sessions changes of the GRoC (5 point change) with the ASES change score and Kendall Tau correlation of the between-sessions changes of the GRoC with the final reported GRoC (5 point change-last reported visit), and obtainment of the ASES-MCID (6.5 points). **RESULTS:** We found no significant correlation of the between-sessions changes of the GRoC and the MCID of the ASES ($r=0.09$; $p=0.53$), and the change score of the ASES ($r=0.13$; $p=0.39$). There was a moderate correlation between the between-sessions changes of the GRoC and the final reported GRoC ($r=.48$; $p<0.01$). **DISCUSSION-CONCLUSION:** These results suggest 1 of 3 possible findings: (1) the construct of the GRoC may not be related to the constructs of the ASES; (2) the validity of the GRoC and/or the validity of the ASES in capturing improvement of one's condition is questionable; (3) between-session changes are not prognostic in patients with shoulder impingement and should not dictate treatment decision making.

MODIFICATION OF TRADITIONAL MUSCLE ENERGY TECHNIQUES FOR TREATMENT OF BACKWARD SACRAL TORSION IN WOMEN WITH CLINICAL HYPERMOBILITY: A NOVEL APPROACH

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BACKGROUND: Women have a higher incidence of sacro-iliac joint (SIJ) pain and dysfunction, and a higher incidence of hypermobility than men. Existing textbooks explain the use of muscle-energy techniques (MET) to effectively treat SIJ dysfunction. However, no literature addresses modifications specific to hypermobile individuals. The purpose of this investigation was to examine a novel approach using MET principles to treat SIJ pain related to Backward Sacral Torsion (BST) dysfunction in women with clinical hypermobility. **METHODS:** A retrospective case series (n=5) was performed on consecutive clients who fit the following inclusion criteria: clinical hypermobility as determined by the presence of 5 or more signs on a detailed Beighton Scale screening, and BST dysfunction determined by the physical therapist-gathered history and manual evaluation. The novel treatment technique incorporated common components found in traditional MET: spinal extension, counter-rotation of the trunk/pelvis and reciprocal inhibition, but was completed in standing vs. the traditional side-lying position. Outcome measures included pain scores, ROM, repeated palpation measures and quality of life questions. **RESULTS:** All clients achieved a near pain-free state, improved motion and reported higher quality of life. Compliance with self-corrections was enhanced after the novel technique was introduced. There were no adverse effects reported using this modified technique. **DISCUSSION-CONCLUSION:** This approach achieved positive results in this patient sample. Future investigations should focus on: (1) use in a larger population sample; (2) validation of this approach as an alternative MET; and (3) comparative studies with traditional forms of MET used by physical therapists.

EFFECTS OF A LUMBOPELVIC JOINT MANIPULATION ON QUADRICEPS ACTIVATION OF INDIVIDUALS WITH PATELLOFEMORAL PAIN SYNDROME

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BACKGROUND: Interventions applied at the lumbopelvic region may improve quadriceps force output and activation for individuals with patellofemoral pain syndrome (PFPS). The purpose of this study was to determine changes in quadriceps force and activation following lumbopelvic joint mobilization/manipulation in individuals with PFPS. **METHODS:** Forty-one individuals with PFPS ($x \pm SD$; age=25.2 \pm 7.9yr; ht=174.5 \pm 11.9cm; mass=78.3 \pm 16.9kg) were used in this single-blind randomized control trial. Quadriceps force and activation were measured using the burst-superimposition technique. Participants were randomized to either lumbopelvic joint manipulation (Grade V), 1 minute lumbar passive range of motion (Grade II), or prone on elbows (sham) for 3 minutes. A two-way mixed model ANOVA was used to compare changes in quadriceps force and activation between groups over time (pre, post 0, 20, 40, 60 min). **RESULTS:** Maximal voluntary isometric contraction (MVIC) ($F_{5.33,101.18} = .65, P = .74$) and central activation ratio (CAR) ($F_{4.84, 92.02} = .38, P = .86$) values were not different between groups across time. When groups were pooled, there were significant differences across time for MVIC ($F_{2.67, 92.02} = 5.03, P = .004$) and CAR ($F_{2.42, 92.02} = 3.85, P = .02$). Quadriceps force output did not change following intervention ($P = .11$), but decreased at the 20-60 minutes post-intervention ($P < .04$). All groups demonstrated decreased quadriceps activation immediately following intervention ($P < .001$), but subsequent measures were not different than pre-intervention levels ($P > .09$). **DISCUSSION-CONCLUSIONS:** Interventions applied at the lumbopelvic region do not immediately affect quadriceps force output or activation. Local muscle fatigue may have been responsible for decreased force output and

activation over the course of the testing session

QUANTIFICATION OF LUMBAR MULTIFIDUS MUSCLE THICKNESS PRE AND POST SPINAL MANIPULATION: AN ULTRASOUND IMAGING COHORT

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BACKGROUND: A subgroup of patients with low back pain has been shown to benefit from spinal manipulation. Recent evidence suggests spinal manipulation may improve activation of the lumbar multifidus (LM). The purpose of this study was to document changes in LM anterior to posterior thickness post manipulation in patients meeting a manipulation clinical prediction rule. **METHODS:** The design was a prospective cohort of 15 subjects (9 males, 6 females). The dependent variable was percent thickness change of the L4/5 and L5/S1 LM during an arm lift task measured on ultrasound using a parasagittal view. Secondary outcome measures included the Oswestry Disability Index, Numeric Pain Rating Scale, and Global Rating of Change. Outcome measures were taken at pre, immediately post, 1-day and 1-week post manipulation. Repeated measures ANOVAs compared percentage thickness change in the LM before and after manipulation. **RESULTS:** Subjects demonstrated increased LM thickness changes on the symptomatic side of pain that exceeded the minimal detectable change. Significant LM thickness changes were noted at the L4/5 and L5/S1 levels from pre to post manipulation ($p < .05$) but not at one week ($p = 0.771$). Day 1 changes were significant at the L4/5 level only ($p < .05$). Secondary outcomes were all significantly improved at 1 week. **DISCUSSION-CONCLUSION:** This cohort demonstrated improvements in muscular function of the LM and clinical outcome measures post manipulation. The immediate LM thickness changes observed might suggest a temporary improvement in muscular function. Further research is required.

CLINICAL OUTCOMES FOLLOWING A STANDARDIZED PROTOCOL OF ORTHOPAEDIC MANUAL PHYSICAL THERAPY AND EXERCISE IN INDIVIDUALS WITH HIP OSTEOARTHRITIS

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BACKGROUND: Current evidence suggests that an impairment-based orthopaedic manual physical therapy (OMPT) approach to hip osteoarthritis (OA) is an effective intervention strategy. The objective of this study was to describe short and long term outcomes observed in individuals with hip OA treated with a pre-selected, standardized set of best-evidence OMPT and therapeutic exercise (TE) interventions. **METHODS:** A prospective cohort of fifteen subjects (9 males, 6 females, mean age: 52 ± 7.5 years) with unilateral hip OA received an identical protocol of OMPT and TE interventions. Subjects attended 10 treatment sessions over an 8-week period for OMPT interventions and performed the TE as a home program. **RESULTS:** Baseline to 8-week follow up outcomes were as follows: Harris Hip Scale scores improved from $60.3 (\pm 10.4)$ to $80.7 (\pm 10.5)$, Numerical Pain Rating Scale scores improved from $4.3 (\pm 1.9)$ to $2.0 (\pm 1.9)$, hip flexion range of motion (ROM) improved from 99 degrees (± 10.6) to 127 degrees (± 6.3) and hip internal rotation ROM improved from 19 degrees (± 9.1) to 31 degrees (± 11.5). Observed improvements at 8-weeks reached statistical significance ($p < .05$) for all measures and were maintained at 26-week follow up. Mean Global Rating of Change (GROC) scores for the 8-week and 26-week follow up were $+5 (\pm 2)$ and $+3 (\pm 4)$ respectively. **DISCUSSION-CONCLUSION:** Improved outcomes observed following a pre-selected, standardized treatment protocol were similar to those observed in previous studies involving impairment-based OMPT and TE for hip OA. Future studies might directly compare the two approaches.

EFFECTS ON PAIN AND PRESSURE PAIN SENSITIVITY OF MANUAL TREATMENT OF THE CERVICAL SPINE IN PATIENTS WITH MYOFASCIAL TEMPOROMANDIBULAR DISORDERS

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BACKGROUND: The purpose of this study was to investigate the effects of joint mobilizations directed at the cervical spine and exercises targeting the deep cervical flexor muscles on pain and pressure pain sensitivity in patients with temporomandibular disorders (TMD). **METHODS:** Nineteen patients (14 females), 19-57 years old, with TMD participated in the study. All patients received a total of 10 sessions over a 5-week period (twice/week). Treatment consisted of interventions directed at the cervical spine. Outcomes were collected at baseline, 48 hours after the last treatment and at a 12-week follow up period and included bilateral pressure pain threshold levels (PPT) over the masseter and temporalis muscles, active pain-free mouth opening (mm), and current level of pain (VAS). Repeated measures ANOVAs were used to examine the effects of the intervention on each outcome measure. Within-group effect sizes were also calculated. **RESULTS:** The ANOVA revealed significant differences between baseline and both the 48 hours post- as well as the 12-week follow-up period ($P < 0.001$) for bilateral changes in PPT over both muscles and for current pain and active pain-free mouth opening ($P < 0.001$). There was no significant difference between the 48 hours post and 12-week follow-up ($P > 0.7$). Within-group effect sizes were large ($d > 0.8$) for both follow-up periods in all outcomes. **DISCUSSION-CONCLUSION:** Physical therapy treatment directed at the cervical spine may result in improvements in pain

and PPT in patients with TMD. However, future randomized clinical trials are necessary to determine if a cause and effect relationship exists.

PROGNOSIS FOLLOWING ACUTE WHIPLASH ASSOCIATED DISORDER: DEVELOPMENT OF A NEW CLINICAL TOOL

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BACKGROUND: Whiplash associated disorder (WAD) is a widespread and costly problem. There is no consensus regarding optimal treatment and these individuals often develop chronic morbidity. We describe the development of a screening tool that incorporates biological, anatomical and psychosocial factors, aimed at identifying the level and nature of risk of poor recovery after acute WAD. **METHODS:** The screening tool is based on a comprehensive model of barriers to recovery. Items were generated through consultation with experts across various fields. A five member panel of physiotherapists with extensive orthopaedic expertise reviewed, reduced and scaled the items. Psychometric properties, including reliability of the physical assessment, and predictive validity of individual items and subscales, were evaluated in a cohort of sub acute neck pain sufferers. **RESULTS:** After item generation and reduction, a prototype tool consisting of 100 self-report and 19 physical assessment items was developed. The self-report tool was acceptable to patients and clinicians. Inter-rater reliability of the physical assessment items ranged from slight (ICC 0.25) to substantial (ICC 0.91). Preliminary predictive validity results reveal that the tool is able to predict outcomes across various constructs, in keeping with theoretical hypotheses. **DISCUSSION/CONCLUSION:** A prototype screening tool was constructed based on sound theoretical and empirical support for risk of chronicity after acute injury. Early psychometric properties are promising. While preliminary, the tool has shown ability to predict long-term outcomes based on acute presentation. The tool stands to become a useful instrument for intervention planning in people with acute WAD.

MANUAL PHYSICAL THERAPY COMBINED WITH PERTURBATION EXERCISES IN THE MANAGEMENT OF KNEE OSTEOARTHRITIS: A PROSPECTIVE COHORT

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BACKGROUND: Osteoarthritis (OA) is the most common joint disease reported worldwide and a leading cause of disability. Many impairments, including proprioception and balance, have been identified in this population. A manual physical therapy approach has been shown to be highly effective for improving function and decreasing symptoms associated with knee OA. The purpose of this study was to: (1) observe the outcomes of patients treated with perturbations combined with manual physical therapy; and (2) describe commonly found impairments. **METHODS:** 15 subjects (mean age 54) with mean baseline Western Ontario and McMasters (WOMAC) osteoarthritis index scores of 111.1 (+/- 26.4 95% CI) received perturbations while performing balance exercises as an adjunct to an impairment-based manual physical therapy program. Treatment occurred twice a week for four weeks, with three and six month follow-up. **RESULTS:** There were significant improvements from baseline to six months for all primary outcome measures. Mean WOMAC scores at three (56.6 +/- 31.6) and six (60 +/- 32.6) months demonstrated 49% improvement, exceeding the minimally clinically important difference (MCID) of 12%. Additionally 69% of subjects reported significant improvement in Global Rating of Change (GRC) at six months (≥ 3). All secondary dependent variables improved significantly from baseline to 4 weeks. **CONCLUSIONS:** The findings of this cohort are consistent with prior clinical trials. Patients with knee OA consistently derive large benefit from a manual physical therapy program. Adding perturbation exercises may contribute to functional gains. Further research is needed to evaluate the benefits of perturbation exercises in this population.

MANUAL PHYSICAL THERAPY OF THE WRIST IN TYPE I COMPLEX REGIONAL PAIN SYNDROME OF THE UPPER EXTREMITY: PRETEST-POSTTEST STUDY OVER A PERIOD OF FOUR YEARS

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BACKGROUND: Complex Regional Pain Syndrome (CRPS) type I is characterised by regional impairments such as poorly-controlled pain and movement restrictions. In the hands, movement restrictions are often found in the joints of the (meta-) carpus. This study investigated whether elimination of the movement restrictions could reduce the level of pain and increase joint mobility of the hand. **METHODS:** This study included 19 patients, meeting the Bruehl criteria, referred to the Pain Treatment Department of the Refaja Hospital, Stadskanaal, the Netherlands. All patients had been medically treated previously, according to the Dutch guidelines for CRPS. Measurements (AROM and VAS) were taken at baseline (T1), after the last treatment session (T2) and at four years follow-up (T3). Therapy consisted of manual translational mobilization techniques of the affected wrist joint and performed within the individual patient's pain threshold. Treatment was once every two weeks, with a maximum of eight treatment sessions. Patients were instructed to perform active dorsiflexion and palmarflexion of the wrist joint three times a day and to use the affected arm and hand in their daily activities. **RESULTS:** After a maximum of three treatment sessions we found 12 patients with a complete recovery of mobility and complete disappearance of the pain, and minimal clinically important change in AROM (8 patients) and VAS (16 patients) in both T1-T2 and T2-T3. **CONCLUSIONS:** Translational mobilization techniques may possess therapeutic value in CRPS type I of the upper extremity, without a neuropathic pain component.

IMMEDIATE AND SHORT-TERM EFFECTS OF GRASSROOTS TRAINING ON CLINICAL INSTRUCTORS' ATTITUDES IN PERFORMING AND SUPERVISING THRUST JOINT MANIPULATIONS AT THE SPINE

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BACKGROUND: According to APTA's Manipulation Education Manual, clinical instructors (CI's) are an extension of the academic institution and expected to provide opportunities for students to develop skills across the manual therapy spectrum, as allowed by the CI's skills. However, Boissonnault and Bryan reported the "availability and scope of these clinical opportunities are limited". The Hardin-Simmons University Physical Therapy Department sponsored a Thrust Joint Manipulation (TJM) course to enhance their CI's didactic knowledge and psychomotor skill level, and to judge the success of this training for future use and student placement. **METHODS:** An eight-hour workshop (4-hour lab, 2-hour didactic, 2-hour pre-reading) was provided to 14 of the program's CI's covering eight TJM techniques. A repeated measure ANOVA (SPSS 17.0) was computed comparing a six-question (15-point Likert scale) questionnaire provided immediately before/after the instruction and at 30-day post-instruction, to determine what changes occurred with the CI's confidence in performing/supervising TJM to the thoraco/lumbosacral regions. The instructor was fellowship trained in Orthopedic Manual Therapy and an AAOMPT Fellow. **RESULTS:** A statistically significant difference was demonstrated when comparing after instruction to before instruction, in knowing when and how to perform TJM and to supervise a student in the performance of TJM: When (Thoracic $p=.007$, Lumbosacral $p=.012$); How (Thoracic/Lumbosacral $p=.006$); Supervise (Thoracic $p=.001$, Lumbosacral $p=.004$). **DISCUSSION-CONCLUSION:** Significant short-term learning effect occurred following a program focusing on repetitive psychomotor skills and pertinent literature review. While national resources are available through AAOMPT, the grassroots effect cannot be underestimated by allowing faculty to pair strong students and CI's.