

stability, and vertical jump time. The study adhered to strict methodological protocols, ensuring blinding of participants, researchers, and statistical analysts.

**Results:** Participants in the intervention group exhibited a significant reduction in knee valgus angles compared to the control group. Furthermore, analysis of force and vertical jump time indicated a possible increase in GM activation in the intervention group, suggesting an improvement in neuromuscular control. CoP analysis revealed more stable weight distribution and reduced postural sway, indicating greater postural control with the use of the insole. These results support the potential biomechanical benefits of using infracapital insoles in individuals with dynamic knee valgus.

**Conclusion:** This study provides evidence that a 2 mm infracapital insole can contribute to the correction of dynamic knee valgus, increase GM strength, and improve postural stability by modifying the CoP distribution. These findings suggest that insoles may be a valuable tool for addressing lower limb biomechanics in individuals at risk for knee malalignment. Future studies should explore long-term effects and clinical applications in rehabilitation settings.

**Implications:** The results of this study have significant implications for physical therapy practice, rehabilitation, and injury prevention. The use of a simple, noninvasive intervention such as an infracapital insole may help optimize lower limb biomechanics, reducing injury risk, improving functional performance, and enhancing postural control. These findings may inform clinical guidelines for the treatment of dynamic knee valgus and provide a basis for future research in sports science and orthotic interventions.

**Keywords:** Dynamic knee valgus, Gluteus medius, strength, insoles

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## RELIABILITY, STANDARD ERROR OF MEASUREMENT, AND MINIMAL DETECTABLE CHANGE OF PAIN PROCESSING ASSESSMENTS IN THE SHOULDER REGION

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**Background:** Assessment of pain processing is essential to understand underlying mechanisms, personalize treatments, and improve rehabilitation. Pain processing mechanisms, including pressure pain thresholds (PPT), temporal summation, and conditioned pain modulation (CPM), play a crucial role in understanding pain sensitivity and modulation in both clinical and research settings. Reliable assessment of these measures is essential for accurately evaluating pain responses and guiding treatment strategies. However, the consistency of these measurements in asymptomatic individuals remains a critical factor in ensuring their validity for broader applications.

**Objectives:** To assess the reliability, reliability, standard error of measurement (SEM), and minimal detectable change (MDC) of Pressure pain thresholds (PPT), temporal summation, and Conditioned pain modulation (CPM) in asymptomatic individuals.

**Methods:** This is a cross-sectional study. This study was approved by Ethics Research Committee. Two assessment sessions were conducted for assessment of test-retest reliability with an average interval of  $3.80 \pm 1.69$  days. PPTs were assessed with a digital algometer (AlgoMed®, Hörby, Sweden) at four anatomical points: deltoid, acromion, trapezius, and anterior tibialis. The order of evaluation was randomized. Each point was measured three times, and the average was calculated. Temporal summation testing was also conducted on the deltoid and anterior tibialis, where the previously determined PPT pressure was applied 10 consecutive times. Pain intensity was recorded using the 11-point Numeric Pain Rating Scale before and after the last stimuli. CPM was evaluated using the cold pressor test, with PPT serving as the test stimulus. The participant's hand immersed in cold water (8°C) for two minutes and the PPT was measured on the deltoid during and after immersion. The reliability was assessed with Intraclass Correlation Coefficient (ICC 3.3) and measurement error with SEM and MDC95. ICC(3,3) with values interpreted as follows: greater than 0.90 as excellent, 0.75 to 0.90 as good, 0.50 to 0.75 as moderate, less than 0.50 as poor reliability.

**Results:** Ten asymptomatic individuals (7 women, mean age of  $25 \pm 4.12$  years) participated in the study. The PPT of trapezius (ICC = 0.88; SEM = 0.13; MDC95 = 0.86), and anterior tibialis (0.78; SEM = 0.44; MDC95 = 1.23) were good and of acromion (ICC = 0.92; SEM = 0.15; MDC95 = 0.41) and deltoid (ICC = 0.93; SEM = 0.13; MDC95 = 0.37) were excellent. The temporal summation showed good reliability, with ICC values of 0.78 for deltoid (SEM = 0.74, MDC = 2.05) and 0.73 for tibialis anterior (SEM = 1.33, MDC = 3.69). The CPM showed good to excellent reliability, with ICC ranging from 0.84 to 0.95 (SEM: 0.41, 0.56; MDC95: 1.15, 1.57).

**Conclusion:** The procedures for the assessment of central pain processing showed good to excellent reliability. These results indicate those procedures are suitable tools for clinical pain assessment.

**Implications:** Clinicians should use the PPTs, temporal summation, and CPM for assessment of central pain processing in the shoulder region. In addition, clinicians should interpret the results of those procedures considering the SEM and MDC.

**Keywords:** measurement properties, clinimetric properties, Rotator cuff, subacromial

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## PAIN AND ANXIETY CORRELATION IN PATIENTS WITH TEMPOROMANDIBULAR DISORDER AFTER PHOTOBIO-MODULATION LASER AURICULOTHERAPY

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**Background:** TMD is often associated with both physical pain and psychological symptoms, particularly anxiety. Pain and anxiety can influence each other, creating a cycle that exacerbates symptoms. Bio-photobiomodulation (PBM) laser auriculotherapy has been proposed as a treatment to address both pain and anxiety in TMD

patients. However, the correlation between pain and anxiety after PBM treatment remains poorly understood. This study aimed to investigate whether PBM laser auriculotherapy can alter the relationship between pain and anxiety in TMD patients.

**Objectives:** The study aimed to evaluate the correlation between pain and anxiety symptoms in TMD patients after PBM laser auriculotherapy.

**Methods:** This randomized, controlled crossover trial involved 22 TMD patients assigned to either the Experimental Group (EG) or Placebo Group (PG). PBM treatment was administered twice a week for 4 weeks. The EG received active PBM treatment, while the PG received sham treatment. Pain was assessed using the Chronic Pain Disability Scale (CPDS), and anxiety was evaluated using the Generalized Anxiety Disorder Scale (GAD-7). Data were analyzed using Spearman's correlation test.

**Results:** In the PG, there was a significant positive correlation between pain and anxiety symptoms ( $r = 0.67$ ,  $p = 0.01$ ). In contrast, no significant correlation was observed in the EG ( $r = 0.34$ ,  $p = 0.12$ ).

**Conclusion:** The results suggest that PBM laser auriculotherapy may reduce the correlation between pain and anxiety in TMD patients. The significant correlation in the placebo group supports this possibility, but further research is needed to confirm these findings.

**Implications:** These findings indicate that PBM laser auriculotherapy might help break the cycle of pain and anxiety in TMD patients. Additional studies are necessary to confirm the efficacy of PBM in managing both pain and anxiety.

**Keywords:** Anxiety, Rehabilitation, Laser Therapy

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## EFFECTS OF BLOOD FLOW RESTRICTION ON PAIN IN PATIENTS WITH KNEE OSTEOARTHRITIS DURING ONE-MONTH INTERVENTION: A RANDOMIZED CLINICAL TRIAL

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**Background:** Physical exercises are strongly recommended for the treatment of knee osteoarthritis (KOA). However, when subjected to loads that overload the joint, these individuals may experience worsened symptoms and low adherence to treatment. Evidence shows that exercises combined with Blood Flow Restriction (BFR) allow for strength and muscle endurance gains using lighter loads. Therefore, it is necessary to investigate whether this method can

help patients reduce pain and joint discomfort as effectively as exercises with heavier loads.

**Objectives:** To assess the efficacy of 40% occlusion with blood flow restriction in improving pain in patients with knee osteoarthritis.

**Methods:** Clinical study with 16 patients (12 women, 4 men; average age  $51.31 \pm (9.1)$  years), divided into three groups: 40% BFR + Rest ( $n = 4$ ), 40% BFR + Low Load ( $n = 6$ ), and HIRE (High Intensity Resistance Exercise) + Placebo ( $n = 6$ ). Pain was assessed before and after one month using the Visual Analog Scale (VAS).

**Results:** Regarding the initial pain scale, the averages were:  $3.5 \pm 3.3$  for the 40% BFR + Rest group,  $6 \pm 3.16$  for the 40% BFR + Low Load group, and  $3.83 \pm 3.25$  for the HIRE + Placebo group. Regarding the final pain scale, the averages were:  $3 \pm 3.4$  for the 40% BFR + Rest group,  $4 \pm 3.87$  for the 40% BFR + Low Load group, and  $0.6 \pm 1.21$  for the HIRE + Placebo group. Thus, when evaluating pain levels before and after one month of treatment, the 40% BFR + Rest group showed a pain reduction of approximately 14% on average, while the 40% BFR + Low Load group demonstrated a reduction of around 33%, and the HIRE + Placebo group reduced the average by about 84%, indicating a greater improvement in pain compared to the 40% BFR + Rest and 40% BFR + Low Load groups.

**Conclusion:** Thus, it is concluded that all groups showed improvement in the investigated outcome, but the group using high loads (HIRE + Placebo) still appears to be more effective in reducing knee pain in patients with osteoarthritis.

**Implications:** It is expected that the results of this clinical study will clarify the applicability and implementation of 40% BFR in the rehabilitation of OA.

**Keywords:** Pain, Knee Osteoarthritis, Blood Flow Restriction Therapy

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## ASSESSMENT OF EMOTIONAL ASPECTS, PAIN SELF-EFFICACY AND FUNCTIONAL PERFORMANCE IN VERTICAL JUMP IN WOMEN WITH PATELLOFEMORAL PAIN SYNDROME

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**Background:** Patellofemoral pain syndrome (PFPS) primarily affects females, characterized by intermittent episodes exacerbated during functional activities, particularly eccentric actions like jumping. Its etiology remains incompletely understood, but biomechanical alterations in the lower limbs, neuromuscular control deficits, and psychosocial influences such as kinesiophobia and hyperalgesia may contribute to symptom onset or intensification. Understanding factors beyond biomechanical aspects, including psychosocial characteristics of individuals with PFPS, could optimize physiotherapy assessment and intervention strategies.

**Objectives:** To compare aspects related to pain perception, self-efficacy, emotional states, and functional performance in subjects with and without patellofemoral pain syndrome.

**Methods:** This study is a cross-sectional study in which one hundred women aged 18 to 30 years, with and without anterior knee pain, were evaluated. Participants were divided into two groups: the