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MANIPULATION VS. MOBILIZATION IN THE LUMBAR SPINE: WHICH IS MORE PLEASURABLE? A PROTOCOL FOR A RANDOMIZED CROSSOVER TRIAL

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Background: Joint mobilizations and manipulations are manual techniques widely used in the management of spinal dysfunctions. Mobilizations are low-velocity, low-force oscillatory techniques that typically do not produce audible joint sounds, while manipulations are characterized by a high-velocity, low-amplitude thrust at or near the end of the physiological movement, often resulting in audible joint sounds. Despite being distinct techniques, current evidence suggests that there is no difference between them in terms of pain reduction and range of motion improvement. Therefore, in most cases, the choice of technique is left to the discretion of the physical therapist. However, recent studies suggest that modern manual therapy should adopt a person-centered care model. Consequently, investigating patient-related outcomes after the application of joint techniques is of paramount importance, and to the best of our knowledge, this has not yet been explored.
Objectives: To investigate whether there is a difference in pleasure perception immediately after manipulation compared to joint mobilization in the lumbar spine of healthy individuals and to evaluate whether there is a relationship between pain, fear, comfort, and the participant's pleasure perception immediately after the application of the techniques.
Methods: This is a protocol for a randomized, crossover clinical trial with two arms and a single-blind design, involving participants of both sexes and ages ranging from 18 to 60 years who have not experienced significant lumbar pain in the past 3 months and consider themselves healthy. The volunteers recruited for the study will be randomly assigned to one of two groups: the manipulation group (Gm) or the mobilization group (Gmob). As a crossover design, all participants will undergo both techniques with a 7-day washout period between them, aimed at eliminating any residual effects from the previous technique. After the washout period, participants will undergo the second technique. The Gm group will consist of 15 volunteers who will receive a "thrust" manipulation in the lumbar spine during the first phase and mobilization in the second phase, after the washout period. The Gmob group will follow the same protocol. Randomization will be performed by P1, who will not be involved in data collection, and the allocation will be placed in opaque envelopes. After opening and identifying the participant's group, P3 will apply the designated technique, and finally, P2 will administer the assessment instruments. This evaluator will be blinded. All participants will be assessed for eligibility and sign the Informed Consent Form (ICF). Participants will be evaluated for pleasure sensation, pain intensity, relaxation perception, fear, comfort, and self-perception immediately after the application of the technique. Adverse effects, if any, will also be collected.
Results: We believe that the comparison of the two techniques in terms of the participants' pleasure perception will be more evident in the Gm group, as the presence of audible clicks may generate psychological effects and influence the pleasure sensation.
Conclusion: We hope to clarify which technique is more pleasurable after completing the study.
Implications: The results found will assist physical therapists in decision-making regarding which technique to use.
Keywords: Manipulação articular, mobilização articular, percepção de prazer

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RATE OF TORQUE DEVELOPMENT IN HIP MUSCLES OF WOMEN WITH AND WITHOUT PATELLOFEMORAL PAIN

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Background: Patellofemoral pain (PFP) is a common musculoskeletal disorder, primarily affecting women. It is characterized by pain in the anterior region of the knee, which can lead to functional limitations in the knee and hip. The rate of torque development (RTD) is considered a more representative indicator of daily task performance compared to maximal strength. Even though previous studies have examined strength deficits in individuals with PFP, limited research has explored RTD alterations in the hip musculature of this population. Understanding its influence on the hip musculature in this population can contribute to a better understanding of the factors involving PFP.
Objectives: To compare the rate of torque development (RTD) of the hip extensor and abductor muscles in women with and without PFP.
Methods: This is a cross-sectional study involving 60 women, divided into two groups: PFP (n = 30) and control (n = 30). Hip extensor and abductor torque were measured using a System 4 PRO isokinetic dynamometer (Biodex®). The protocol consisted on three maximal concentric contractions and the movement range was 0° to 30° of abduction and 90° to 60° of hip flexion at an angular velocity of 30°/second. RTD was calculated by dividing the difference in normalized torque by the difference in time from contraction onset to 30% (RTD 30%) and 60% (RTD 60%) of maximum torque ([Nm. Kg?[1]] × 100/ms). Data was statistically analyzed using PASW Statistics 18.0® (SPSS), applying the t-test.
Results: Women with PFP showed a reduction in the RTD of hip extensors and abductors at 30% ($p < 0.001$, $p = 0.015$, respectively) and 60% of peak torque ($p < 0.001$, $p = 0.015$, respectively) compared to asymptomatic women.
Conclusion: Women with PFP exhibit deficits in rate of torque development of the hip extensor and abductor muscles when compared to women without PFP, underscoring the importance of targeting various aspects of muscle function in exercise therapy.
Implications: RDT may better represent the ability to perform daily living activities compared to maximal strength. Everyday tasks

require rapid force production, yet this deficit in muscle power is rarely addressed in exercise therapy. Therefore, it is essential to emphasize both hip strength and power in the rehabilitation of women with patellofemoral pain to achieve more favorable medium- and long-term outcomes.
Keywords: Rate of torque development, anterior knee pain, women

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ANALYSIS OF SPATIOTEMPORAL GAIT VARIABLES IN PATIENTS UNDERGOING ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION: A LONGITUDINAL STUDY

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Background: Anterior cruciate ligament reconstruction (ACLR) aims to restore knee stability. However, there is limited knowledge regarding the evolution of spatiotemporal gait variables in the first postoperative months, which is crucial for optimizing exercises protocols.
Objectives: To identify spatiotemporal gait differences between the preoperative period and 15, 30, and 60 days after ACLR.
Method: A longitudinal study was conducted with participants undergoing ACLR, followed by up to 60 days of physical therapy. Gait was assessed using GAITRite® in the preoperative period and at 15, 30, and 60 days postoperative (PO). Single support, double support, swing phase, and stance phase were analyzed using the generalized estimating equation model with specific syntax and the Bonferroni post hoc test in SPSS®, with a 5 % significance.
Results: Sixteen participants were evaluated (13 men and 3 women), with a mean age of 26 year (SD = 7.57), weight of 82 kg (SD = 17), and height of 1.72 m (SD = 0.89). Comparison between the ACLR and control limbs revealed significant differences at PO15: single support ($P < 0.005$), swing phase ($P < 0.009$), and stance phase ($P < 0.009$). In the ACLR limb, differences were found in single support between preoperative and PO15 ($P < 0.0001$) and PO30 ($P = 0.021$), as well as between PO15 and PO30 ($P = 0.001$). For double support, significant differences were observed between preoperative and PO15 ($P < 0.0001$), PO30 ($P < 0.0001$), between PO15 and PO30 ($P < 0.0001$), PO15 and PO60 ($P < 0.0001$), and PO30 and PO60 ($P < 0.0001$). The swing phase showed differences between preoperative and PO30 ($P = 0.010$) and between PO30 and PO60 ($P < 0.0001$). In the stance phase, differences were observed between preoperative and PO30 ($P = 0.012$) and between PO30 and PO60 ($P < 0.0001$). In the uninjured limb, differences were found in single support between preoperative and PO30 ($P = 0.007$) and PO30 and PO60 ($P < 0.0001$). For double support, differences were observed between preoperative and PO15 ($P < 0.0001$), PO30 ($P < 0.0001$), between PO15 and PO30 ($P < 0.0001$), and PO15 and PO60 ($P < 0.0001$). PO30 was different from PO60 ($P < 0.0001$). The swing phase indicated differences between preoperative and PO15 ($P = 0.001$) and PO30 ($P = 0.016$). PO15 was different from PO30 ($P = 0.003$) and PO60 ($P = 0.001$), and PO30 was different from PO60 ($P = 0.006$). In the stance phase, significant differences were found between preoperative and PO15 ($P = 0.001$), PO30 ($P = 0.015$), between PO15 and PO30 ($P = 0.003$), PO15 and PO60 ($P = 0.001$), and between PO30 and PO60 ($P = 0.008$).
Conclusion: On PO15, the ACLR limb exhibited lower single support, a longer swing phase, and a shorter stance phase. Additionally, at PO15, single support was lower, and double support was greater. In the uninjured limb, at PO15, double support and stance phase were greater, while the swing phase was shorter. At PO30, the ACLR limb showed a decrease in single support.
Implications: There are significant differences in gait between the two lower limbs up to 60 days after ACLR, emphasizing the importance of targeting exercises strategies for each phase of the gait cycle and physical function.
Keywords: Anterior Cruciate Ligament Reconstruction, Gait Analysis, Postoperative Period

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SIMULATION MODELING ANALYSIS FOR PREDICTION OF QUALITY OF LIFE AFTER NEUROMUSCULAR TRAINING FOR HIP OSTEOARTHRITIS

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Background: Neuromuscular training in hip osteoarthritis is a promising approach to improve quality of life, pain, and functional performance, but few studies use statistical methods to predict clinical evolution of these patients. Simulation Modeling Analysis (SMA) allows the application of time series analysis in small samples, identifying individual patterns of response to treatment. This approach can optimize physical therapy interventions and become a relevant tool in hip osteoarthritis treatment.
Objectives: To predict values and verify differences in quality of life for a patient with hip osteoarthritis undergoing neuromuscular training, using SMA. Additionally, to evaluate pain intensity, functional performance, and muscle strength before and after neuromuscular training. Method: Case study with a male patient (59 years, BMI: 32.2 kg/m^2) diagnosed with advanced hip osteoarthritis. Quality of life was assessed by WOMAC, pain by Numerical Pain Scale (NPS), functional performance by Timed Up & Go (TUG), and 30-Second Chair Stand (30STS) tests, and muscle strength by maximum isometric dynamometry. Treatment followed an adapted neuromuscular training protocol (NEMEX-TJR), with 26 sessions of 50 minutes over three months. Statistical analysis included descriptive analysis of variables (pain, functional performance, and muscle strength) and time series analysis for WOMAC data. Bootstrapping was used to estimate autocorrelation coefficients based on lags. Correlation values and slopes were also calculated. Statistical significance was set at 5 %. Results: SMA analysis demonstrated a significant prediction of continuous improvement in quality of life with neuromuscular training, with an estimated reduction of 1.28 points on WOMAC per week. After neuromuscular training, there was a global improvement of 61.9 % in quality of life and 100 % reduction