

normalized by the activation peak. After verifying the normality of the data, the One-way Anova test was applied and a significance level of  $\alpha < 0.05$  was adopted.

**Results:** There was no statistically significant difference for GM muscle activation during the proposed exercises ( $\alpha = 0.715$ ).

**Conclusion:** It is possible to conclude that the proposed exercises with an emphasis on the muscle activation of the GM both in the Pilates method and in the conventional exercise protocol, present the same magnitude of muscle recruitment.

**Implications:** The Pilates method has occupied a prominent place in the prevention and rehabilitation of musculoskeletal disorders of the lumbar spine and other lower limb joints. The squat exercise is also present in clinical practice in conventional rehabilitation protocols, and it was possible to conclude that it has the same muscle activation as the gluteus maximus muscle. Therefore, both methods can be applied as a way of activating and strengthening this musculature with the objective of lumbopelvic stabilization, mainly during functional activities.

**Keywords:** Electromyography, Exercise Therapy, Muscle Contraction

**Conflict of interest:** The authors declare no conflict of interest.

**Acknowledgment:** Not applicable.

**Ethics committee approval:** Study approved by the Research Ethics Committee of the Faculty of Philosophy and Sciences – Sao Paulo State University, under protocol n° 5.859.083.

<https://doi.org/10.1016/j.bjpt.2024.100908>

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## EFFECTS OF STRENGTH TRAINING WITH BLOOD FLOW RESTRICTION AND ELECTROSTIMULATION ON MUSCLE STRENGTH AND ACTIVITY – STUDY PROTOCOL

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**Background:** Increasing muscle strength may allow an athlete to improve their performance while reducing the risk of injury. Blood Flow Restriction (BFR) has emerged as an alternative for increasing muscle strength because it can promote physiological changes and hypertrophy with a lower degree of mechanical overload. When combined with Neuromuscular Electrostimulation (NME) it offers the possibility of hypertrophy with greater activation of motor units, potentially increasing the effects of BFR.

**Objectives:** To evaluate the effects of strength training with BFR combined with NME of the quadriceps muscle in physically active individuals on parameters of strength and muscle activation.

**Methods:** This protocol is a randomized clinical trial with a blinded evaluator for groups and statistical analysis. Eligibility criteria will be age between 18 and 35 years old; both sexes and physically active according to the International Physical Activity Questionnaire. The following criteria are not considered appropriate: Body Mass Index over 30; use of stimulants in the 24 hours before the examinations; risk factors for thromboembolism and hypertension. Anthropometric data will be collected, followed by blood pressure measurement and kirtometers. Subjects will be randomly divided into three groups: Blood Flow Restriction Group (BFRG), Blood Flow Restriction and Electrostimulation Group (BFREG) and Conventional Exercise Group (CEG). A Vascular Doppler will be used to measure Total Occlusion Pressure (TOP). Maximum Repetition Test (1RM) unilateral will be used to determine the load during exercise, with adjustment in four weeks. An isokinetic dynamometer in

concentric/eccentric mode at two angular speeds will be used to assess muscle strength: 60°/s and 180°/s, and isometric strength by the 30s test at 30° and 60°. Surface Electromyography (EMG) will be used to record the electrical activity of the quadriceps muscles. The intervention protocol consists of four sets of 30, 15, 15, 15 repetitions in the chair for extension, with one minute rest between sets, a load of 30% 1RM and 50% of POT, with adjustment of 5% each week up 80% of POT. The BFREG follows the same methodology, with an asymmetric biphasic current, frequency of 50Hz and a pulse duration of 400us. In the CEG the exercise will be performed without intervention in three sets of ten repetitions at 70% of 1RM. The training lasts eight weeks and takes place twice a week, with re-evaluation at the end of the training. The distribution of normality will be analysed by the Shapiro-Wilk test. To analyse the effect of group and the interventions, ANOVA for repeated measures and Bonferroni post test will be performed. The significant level adopted will be 5%.

**Conclusion:** It is reasonable to assume that BFR and the intervention associated with electrostimulation are superior to conventional training in terms of strength and muscle recruitment parameters.

**Implications:** Because BFR requires a reduced load and it has been hypothesised that its effects are similar to those of conventional training, BFR offers mechanical and physiological benefits. Reduced loading may produce the same results in terms of hypertrophy and increased muscle strength in individuals without joint overload and prolonged loading.

**Keywords:** Muscle Strength, Electromyography, Blood Flow Restriction Exercise

**Conflict of interest:** The authors declare no conflict of interest.

**Acknowledgment:** Not applicable.

**Ethics committee approval:** Study approved by the Research Ethics Committee of the Faculty of Philosophy and Sciences – Sao Paulo State University, under protocol n° 5.809.107.

<https://doi.org/10.1016/j.bjpt.2024.100909>

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## EFFECTS OF TWO TELEREHABILITATION PROGRAMS FOR PEOPLE WITH KNEE OSTEOARTHRITIS: PRELIMINARY RESULTS OF A RANDOMIZED CLINICAL TRIAL

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**Background:** Physical exercise is among the main indications for non-surgical treatment for knee osteoarthritis (OA), however, people with the problem tend to reduce the practice of physical exercise over time, which is a great challenge for professionals who accompany them. An alternative for the maintenance and continuity of supervised physical exercise is to offer it remotely, using telecommunication technological resources for rehabilitation.

**Objectives:** To evaluate the effects of two telerehabilitation programs on pain, quality of life, functionality and adherence to exercises in people with knee OA.

**Methods:** This is a randomized, single-blind clinical trial, with pre- and post-intervention assessments and two groups: synchronous (GS), who performed an exercise program via video call through the WhatsApp messaging application; and asynchronous (GA), who