

Short-Term Effects of Low-Load Blood Flow Restriction Training on Muscle Power: A Pre–Post Study Using Quasi-Isometric Dynamometry and Sit-to-Stand Performance in Healthy Adult

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Abstract

Muscle power is a critical determinant of functional performance and rapid force generation. Low-load blood flow restriction training (LL-BFRT) has emerged as an alternative to traditional high-load resistance training; however, limited evidence exists regarding its short-term effects on muscle power using combined functional and dynamometer-based assessments. To evaluate the effect of LL-BFRT on lower limb muscle power in healthy individuals using quasi-isometric dynamometer test and the five-repetition Sit-to-Stand (5×STS) test. A pre–post experimental study was conducted in 22 healthy adults aged 22–28 years. Participants completed a four-week LL-BFRT program (three sessions/week; 30–15–15–15 repetition protocol) with occlusion pressure set at 80% limb occlusion pressure. Outcome measures included bilateral quasi-isometric dynamometer force and power, and 5×STS completion time with calculated mechanical power. Paired statistical analyses were performed to determine within-subject changes. Significant improvements were observed following LL-BFRT. Sit-to-stand completion time decreased bilaterally, while 5×STS-derived mechanical power increased significantly. Quasi-isometric dynamometer test demonstrated significant increases in maximal force and mechanical power in both limbs. Large within-subject effect sizes were observed across primary outcomes. Correlation analysis did not reveal significant associations between mechanical and functional change scores. Four weeks of LL-BFRT significantly enhanced both functional and mechanical indicators of lower limb muscle power in healthy adults, supporting its utility as a low-load strategy for short-term neuromuscular performance enhancement.

Keywords: Blood flow restriction training; Muscle power; Sit-to-stand test; Quasi-isometric dynamometry; Lower limb performance

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1. Introduction

Muscle power, which is a product of force and velocity, is the ability of skeletal muscle to produce force at a high rate. In contrast to maximal strength, the maximum force that a muscle can generate regardless of the duration, muscle power focuses on the rate at which the maximum force may be generated. This is needed in order to generate rapid forces that are bipolar with functional independence and athletic performance as most of the daily and sporting activities involve quick and explosive movements, and not the slow maximal movement. Mechanical tension, metabolic stress and the activation of molecular signalling pathways that control hypertrophy and neuromuscular efficiency are the biological processes involved in the adaptation of muscle to resistance exercise (Wackerhage et al., 2019). Muscle strength in lower limbs is of great significance in functional activities, which include getting out of the chair, climbing a stair, starting a gait and maintaining balance. Repeated sit-to-stand performance has been

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reported to be associated with walking disability and the total physical capacity of healthy people (Yanagawa et al., 2016). Moreover, the knee extensor strength and power play a very important role in the functional outcomes in patients with knee pathology, which supports the role of high-speed force production in mobility activities (Tevald et al., 2016). The latest studies have also shown that sit-to-stand test with five repetitions (5×STS) can be used to obtain adequate values related to muscle power in lower limbs and even differentiate the levels of functional performance in elderly people (Coelho-Junior et al., 2024). Also, it has been confirmed that sit-to-stand tests can be used as an effective method of measuring strength, power, and speed of movement in the clinical population (Rodriguez-Perea et al., 2025). Additional comparative studies between field-based and laboratory-based approaches also prove the reliability of estimating lower limb power with the help of the 5×STS test (Ferrari et al., 2022; Baltasar-Fernandez et al., 2021). Taken

together, these results highlight that muscle force is an essential factor of movement performance and life in the real world. Conventional methods of resistance training which are power-based normally involve the use of high mechanical loads to trigger neuromuscular adaptation. Although they are useful in improving strength and hypertrophy, they do not necessarily fit in some populations. Exercise of high-load resistance puts additional stress and mechanical strain on the joints, which could be contraindicated during early rehabilitation stages, in elderly people, or in people with musculoskeletal limitations. The meta-analysis suggests that heavy-load resistance training induces substantial increases in muscle mass and strength, but due to the mechanical demands of these protocols, these programs might not be applicable to clinical sites (Lixandrao et al., 2018). Similar improvements in strength have also been reported using comparative systematic reviews, which indicated that heavy-load and blood flow restriction protocols might provide the same benefits, implying that high mechanical loading might be not the sole successful stimulus in adaptation (Gronfeldt et al., 2020). The restrictions underline the necessity of other approaches that could help to improve muscle performance without excessive loading of the joints and reduce their risk of injury. Blood Flow Restriction Training (BFRT) is a type of exercise that involves incorporating low-resistance training and partial vascular occlusion (as with low-level training) in a location close to the limb. Restricting the venous return and sustaining arterial inflow, BFRT leads to the development of hypoxic intramuscular conditions that elevates metabolic demands and hastens fatigue. This stressful state of the body increases the recruitment of high-threshold motor units such as Type II muscle fibers despite low external loads. The systematic reviews have also provided consistent evidence that the low-load BFRT is capable of producing similar gains in muscle strength and hypertrophy rates as the traditional high-load training (Slysz et al., 2016). The same results have been announced in the elderly population, where BFRT enhanced muscular strength and size even when low training intensities were used (Centner et al., 2019). The adaptations occurring under the skin are estimated to be augmented motor unit recruitment, heightened neuromuscular activation, and stimulation of anabolic signaling pathways related to muscle growth (Wackerhage et al., 2019). In addition, high-load resistance training and low-load BFRT have shown similar strengths gain magnitudes by pooled analyses, which may support its use as a lower-mechanical-stress alternative (Lixandrao et al., 2018; Gronfeldt et al., 2020). Despite the considerable amount of evidence in favor of BFRT as a strength and hypertrophy aid, a smaller number of studies have investigated its effect in relation to muscle power specifically and short-term interventions in particular. Although the literature of BFRT has been increasing, majority of the studies have concentrated on the results associated with muscle hypertrophy and maximum strength. Muscle power, a combination of both force and velocity, is still relatively unexplored when it comes to short-duration BFRT

protocols. Moreover, past studies have often been based on laboratory single isolated strength tests with no functional performance tests. The 5×STS test has become an acceptable and useful tool to predict muscle power of the lower limbs in clinical and research practices (Ferrari et al., 2022; Baltasar-Fernandez et al., 2021). Nevertheless, there is relatively little research that has used functional sit-to-stand evaluation together with quasi-isometric measurements of neuromuscular changes to assess post low-load BFRT changes more comprehensively than previous studies. Thus, the necessity to investigate the short-term power alteration by means of objective mechanical and functional outcome measures is evident, and the proposed research aims to test the changes in the muscle power after the application of LL-BFRT based on quasi-isometric dynamometer testing and the five-repetition Sit-to-Stand test.

Research objectives:

1. To evaluate the effect of low load blood flow restriction training (LL-BFRT) on muscle power in healthy individuals using quasi-isometric dynamometer test and the five-repetition Sit-to-Stand (5×STS) test.
2. To examine within-subject changes following LL-BFRT as the primary focus of this investigation.
3. To provide preliminary evidence that may support future randomized controlled trials comparing BFRT with conventional resistance training for further validation of these findings.

2. Materials and Methods

2.1 Study Design

The experimental design of the study was a pre-post type with within-subject comparison which was used to assess the short-term intervention of low-load blood flow restriction training (LL-BFRT) on muscle power. All of the participants were baseline tested before the intervention and reassessed after a four-week training protocol. Due to the four weeks duration of the study, the early neuromuscular adaptations in the post-LL-BFRT could be investigated.

2.2 Participants

The study involved 22 healthy adults of the ages 22-28 years, who were voluntarily recruited into the study. Convenience sampling was used to recruit the participants. They were recruited into the study as they were healthy adults aged 20-30 years old, had no history of musculoskeletal or neurological impairment, and were independently functionally mobile without any assistive device usage. Exclusion criteria were cardiovascular contra indications to exercise, recent injuries of the lower limbs and pain during the tests. Participants received information on the purpose and procedures of the study beforehand and informed consent was signed in writing. The research processes were ethical when it comes to human research.

2.3 Intervention Protocol (Low-Load BFRT)

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The participants were put through an organized low-load blood flow restriction, training regimen in a course of four weeks, whereby three trainings were conducted during a week making a total of 12 trainings. Proximal thigh occlusion cuff was placed at the highest part of the thigh and this cuff was used to partially restrict the blood flow of the thigh at the expense of the arterial flow. The individualized occlusion pressure was 80 % of Limb

Occlusion Pressure (LOP). LOP was calculated in each participant through a manual inflation system and the respective pressure was applied on the training the whole way through the intervention. The arrangement of the cuff and occlusion were standardized among the participants. Figure 1 depicts the LL-BFRT setup, cuff placement, determination of limb occlusion pressure and exercise execution.



Figure 1. Low-load blood flow restriction training (LL-BFRT) setup and exercise execution

The exercises involved were seated knee flexion and knee extension exercises, at controlled occlusion pressure, with a 30-15-15-15 repetition protocol at the end of which there was short inter-set rest of about 30 seconds. The exercises were sitting knee extension and knee flexion exercises that were done in a controlled way in order to generate the same muscle activity. The design of the protocol was to cause metabolic stress and to reduce mechanical load to the joints. The load used is 30 % of 1 repetition maximum (1RM).

2.4 Outcome Measures

The measures of outcome were measured at the baseline (PRE) and the end (POST) of the four-week intervention. The measurement of muscle force and power was done using the ActivForce 2 Handheld Dynamometer under standardized quasi-isometric testing. The participants were positioned with a 90° flexion of the hips and knee in the starting position, as shown in Figure 2 and allowed them to apply maximum force to reach up to pre-set 30° angle of dividing disc of the quadriceps table for both flexion and extension.

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During flexion, HHD is placed on the calf pad of the quadriceps table posteriorly and anteriorly on knee

extension. Straps were used to stabilize the pelvis and thigh so that compensatory movements are minimized.



Figure 2. Quasi-isometric dynamometer testing configuration

The right and left limbs were tested bilaterally. HHD is placed 5 cm above the lateral malleolus. The lever arm distance (LAD) is measured from mid-point of patella to position where HHD is placed, which is shown in Figure 3.



Figure 3. HHD placement with Lever arm distance measurement

The output force was measured in Newton (N) and automatically recorded using the ActivForce 2 handheld dynamometer (ActivForce 2) software. Mechanical power was calculated using the quasi-isometric testing approach with a preset contraction duration of 5 seconds and an angular displacement of 30° (0.52 radians). Torque was calculated as the product of peak force and lever arm distance. Mechanical work and power were then derived using standardized equations previously described in studies validating the quasi-isometric muscle power test. This method has demonstrated good reliability and validity and has been correlated with functional sit-to-stand performance in clinical populations (Sasidharan (2025), Sasidharan et al., 2025) [Torque= Peak force (N) \times lever arm distance (m) Work done (j) = torque \times .52 radian (angular velocity) Power (W) = work done / preset time] The five-repetition sit-to-stand (5 \times STS) test was used to assess functional lower

limb muscle power. Participants were seated on a standard-height chair (45.7 cm) with their arms crossed over the chest and were instructed to stand up and sit down five times as quickly as possible. The total time required to complete the five repetitions was recorded using a stopwatch. The standardized chair height used for the assessment and the sit-to-stand movement sequence are illustrated in Figure 4. Mechanical power during the five-repetition sit-to-stand (5 \times STS) test was estimated using the validated field-based equation proposed by Alcázar et al. 2018, which incorporates body mass, chair height, and time required to complete the repetitions. Power (W) = (Body mass \times 0.9 \times g \times chair height \times repetitions) / time Where: g = 9.81 m/s², chair height = 0.457 m The 5 \times STS test was selected because it is a well-validated, functionally relevant, and practical method for determining lower-limb muscle power in both clinical and healthy populations.



Figure 4. Standardized chair height (45.7 cm) and five-repetition sit-to-stand (5×STS) test procedure used to assess lower-limb muscle power



Figure 5. Equipment used in the study

The equipment used in the study is represented in Figure 5. ActivForce 2 handheld dynamometer and proximal

thigh occlusion cuff system used in the evaluation of LL-BFRT and quasi-isometric assessment.

2.5 Statistical Analysis

Proper statistical software was used in all the statistical analyses. Mean \pm standard deviation was computed and presented as descriptive statistics. The Shapiro-Wilk test was used to test data normality. Paired t-tests were applied to compare pre- and post-interventions in subjects in the case of normally distributed variables. Wilcoxon signed-rank test was used on the variables that failed to satisfy the normality conditions. Categorical variables were analysed using chi-square tests where appropriate like sex distribution. The Pearson correlation analysis was used to assess the association between quasi-isometric dynamometer power and 5 \times STS-mechanical power and Spearman correlation was utilized to provide the correlation analysis in non-parametric data. The simple linear regression analysis was done in order to see whether the dynamometer

measured force changes were predictors of changes in the functional power outcomes. The statistical significance was fixed to $p < 0.05$.

3. Results

3.1 Participant Characteristics

No adverse events or dropouts were reported with all twenty-two participants (12 sessions) undergoing the 4-week LL-BFRT intervention protocol. The research sample was mainly composed of women, and the number of men in the sample was lower. The baseline anthropometric measures were normally distributed and were constant during the period of intervention since no changes in body mass or height were anticipated during the short period of the study. The demographic data proved that the study sample was a homogeneous group of young adults suitable to investigate short-term neuromuscular changes after LL-BFRT.

Table 1. Participant Characteristics (n = 22)

Variable	Mean \pm SD
Age (years)	23.73 \pm 1.45
Body Mass (kg)	58.52 \pm 12.45
Height (m)	1.63 \pm 0.05
Sex (M/F)	5 / 17

Demographic and anthropometric measurements of study cohort were measured in their baseline before the intervention. Figure 5 shows the distribution of the age, body mass and height.

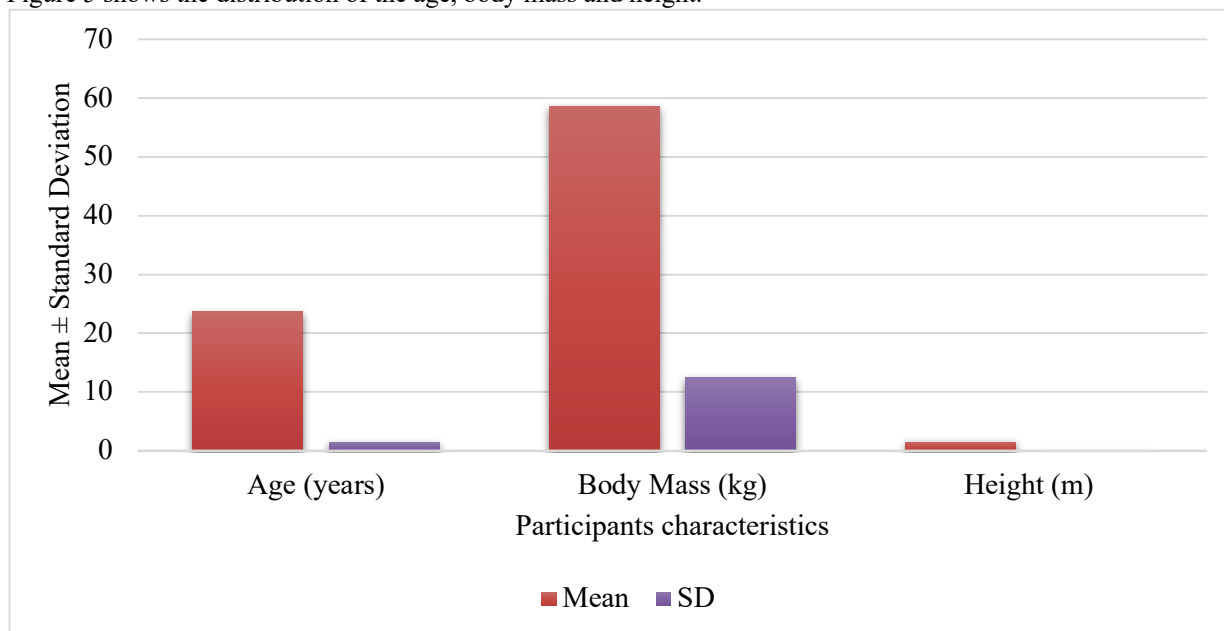


Figure 5. Baseline participant characteristics (mean \pm SD)

The sample proved (Figure 5) to be rather homogeneous with respect to age and height, and body mass was moderately variable. These control attributes ascertain that the cohort was appropriate by assessing short-term neuromuscular adaptations.

3.2 Effects of LL-BFRT on Functional Muscle Power (5 \times STS Performance)

3.2.1 5 \times STS Completion Time

After completion of the 4-week intervention, it was noted that the participants had a significant decrease in bilateral five-repetition sit-to-stand completion time. There was an improvement in almost all individuals, which depicted increase in rate of development of force and efficiency of movement. The shortening of the time of completion implies enhancement of the neuromuscular coordination and functional performance capacity. The right and left limb reported similar improvements.

Table 2. Descriptive Statistics for 5×STS Completion Time

Limb	Pre (Mean ± SD)	Post (Mean ± SD)
Right	11.74 ± 1.59	8.74 ± 1.11
Left	12.52 ± 2.03	9.46 ± 1.29

The five-repetition sit-to-stand test (5×STS) was assessed as a functional lower limb performance test. Figure 6 shows the pre- and post-changes in the completion time.

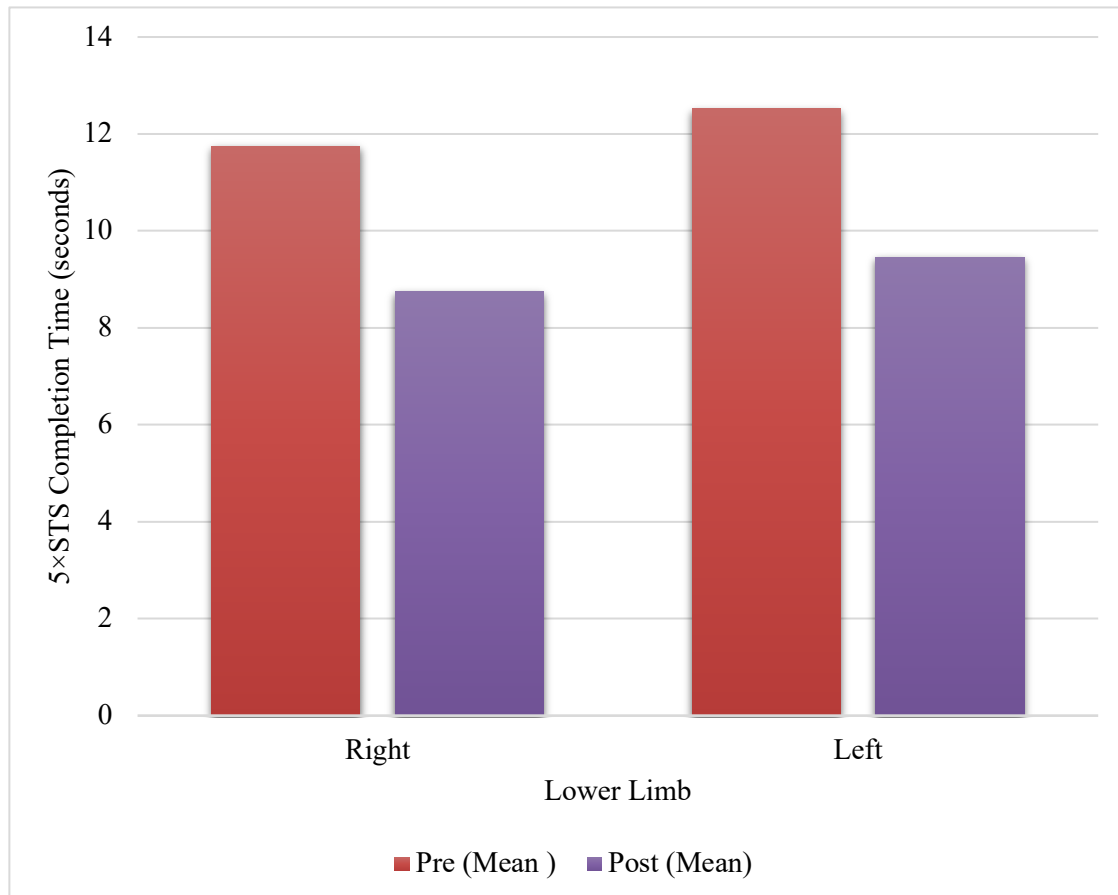


Figure 6. Pre-post changes in five-repetition sit-to-stand (5×STS) completion time

The intervention resulted in a bilateral reduction of the completion time. This is an improvement in terms of increased functional movement efficiency following LL-BFRT.

3.2.2 5×STS Mechanical Power

Mechanical power generated by sit-to-stand test improved significantly after LL-BFRT. The scale of

change denotes better output of functional lower limb power execution during repetitive transitional motions. The bilateral improvements were also observed, but the slight gains were also seen on the right side. Nevertheless, the two limbs showed significant improvement in the mechanical output.

Table 3. Descriptive Statistics for 5×STS Mechanical Power

Limb	Pre (Mean ± SD)	Post (Mean ± SD)
Right	172.26 ± 45.04	219.12 ± 53.64
Left	163.02 ± 45.93	203.18 ± 51.27

Mechanical power derived from the 5×STS test was calculated to quantify functional lower limb output. The changes observed after the intervention are shown in Figure 7.

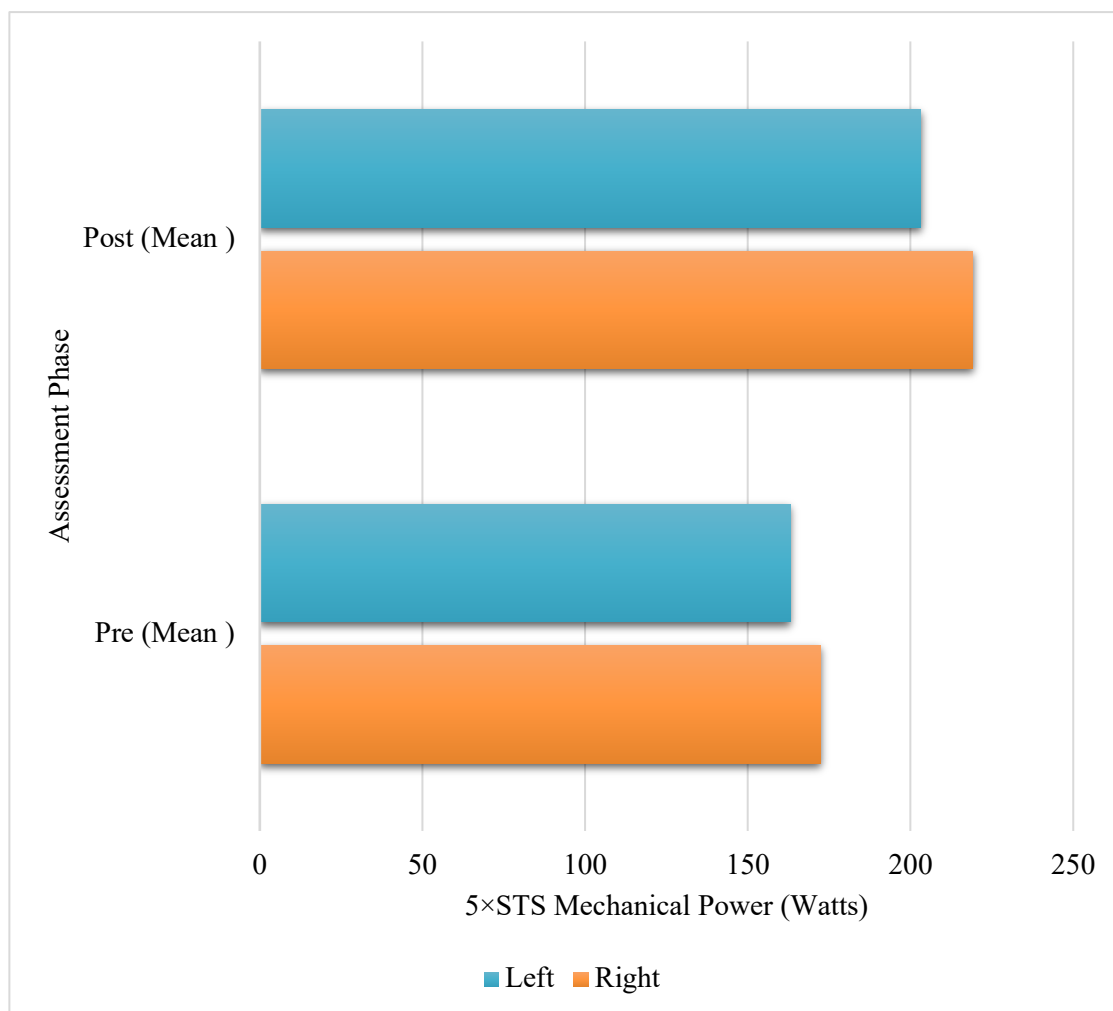


Figure 7. Pre–post changes in five-repetition sit-to-stand (5xSTS) mechanical power.

The mechanical power in both limbs showed positive improvement after training. Such results demonstrate a better functional force-velocity performance upon the post-LL-BFRT. Bilateral mechanical power after intervention was also improved as it was an indicator of functional lower limb power output.

3.3 Effects of LL-BFRT on Quasi-Isometric Muscle Force and Power

3.3.1 Quasi-Isometric Force

There were significant gains in maximal voluntary force output after the intervention. The bilateral improvements were consistent, and both neuromuscular adaptations were symmetrical. The extent of force increase reflects an enhancement of motor unit recruitment and mechanical output size after the low load occlusion training.

Table 4. Descriptive Statistics for Quasi-Isometric Force

Limb	Pre (Mean ± SD)	Post (Mean ± SD)
Right	291.99 ± 52.13	374.75 ± 73.24
Left	264.06 ± 44.51	350.44 ± 69.59

Maximal voluntary force production was assessed using quasi-isometric dynamometry. The pre–post changes in force output are illustrated in Figure 8.

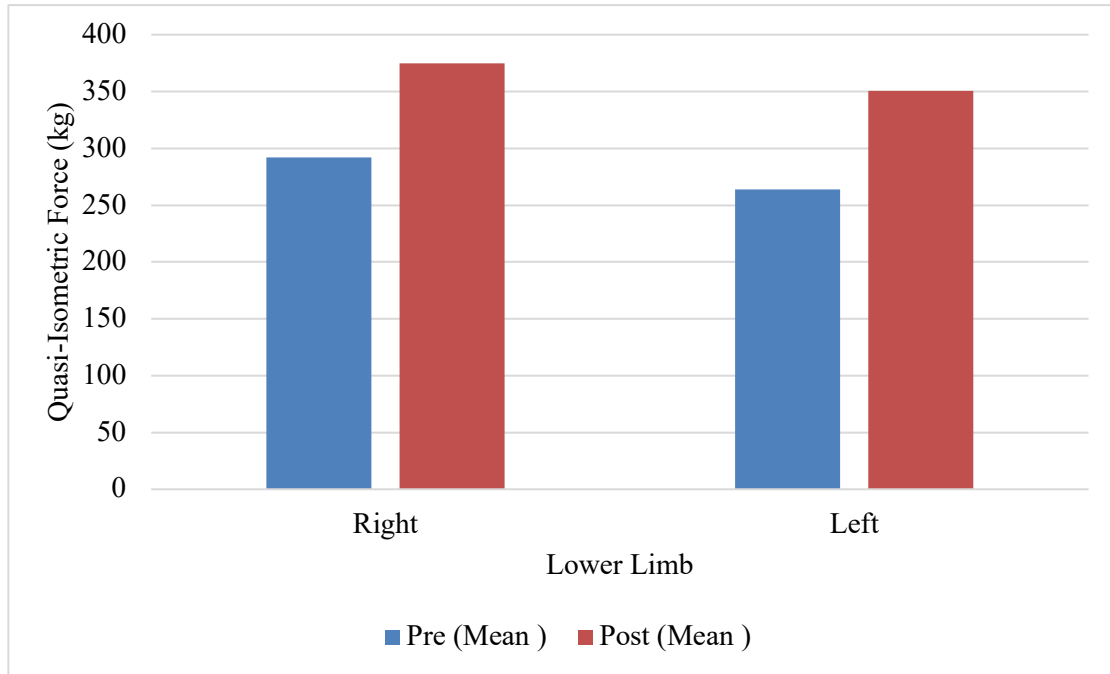


Figure 8. Pre-post changes in quasi-isometric dynamometer force

There was bilateral increase in the force output after the training session. This implies an increased neuromuscular activity and strength capacity.

3.3.2 Quasi-Isometric Mechanical Power

The mechanical power measured with dynamometer significantly increased following the 4-week LL-BFRT protocol. There were improvements in both limbs and

were similar to those witnessed in force production. These results show that short-term LL-BFRT does not only increase the maximal isometric output, but also the calculated mechanical power in quasi-isometric testing. To further assess the neuromuscular performance, mechanical power based on measurements of dynamometer was obtained. Table 5 shows the pre-post comparison.

Table 5. Descriptive Statistics for Quasi-Isometric Mechanical Power

Limb	Pre (Mean ± SD)	Post (Mean ± SD)
Right	99.35 ± 21.90	125.10 ± 25.49
Left	89.77 ± 19.13	117.08 ± 24.39

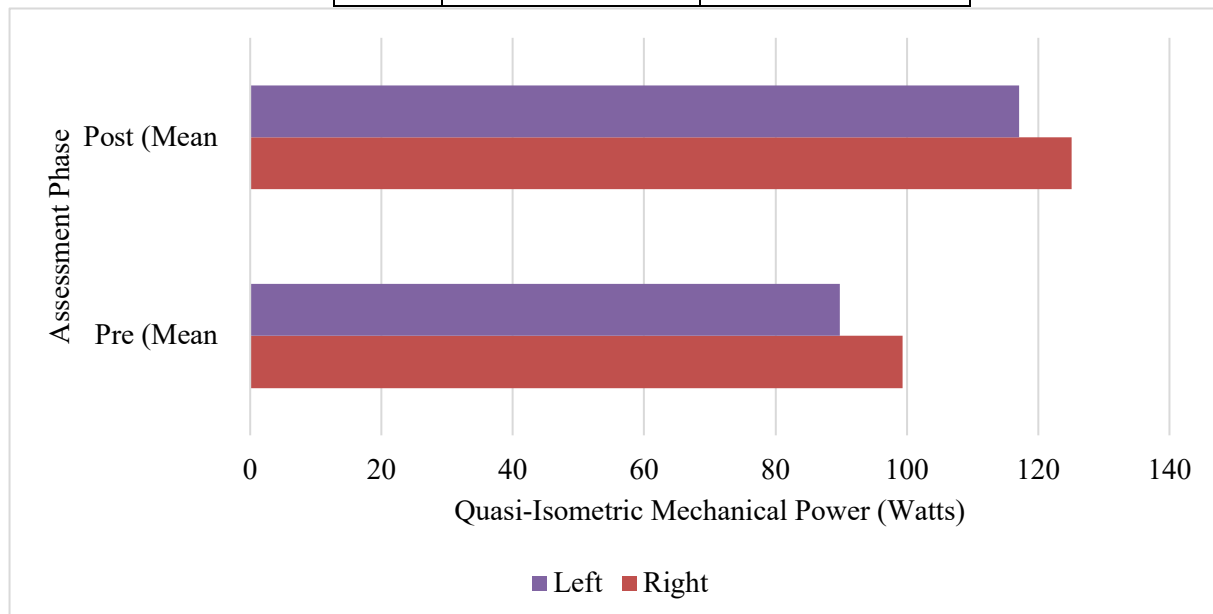


Figure 9. Pre-post changes in quasi-isometric dynamometer mechanical power

Both limbs had an improvement in the dynamometer-derived mechanical power. These findings suggest greater mechanical performance by quasi-isometric testing (Figure 9).

3.4 Magnitude and Significance of Within-Subject Adaptations

The paired-sample t -tests were used to compare values of pre-intervention and post-intervention within

subjects. Meanwhile, 5×STS completion time bilaterally significantly reduced. Equally, 5×STS mechanical power showed statistically significant improvement in both limbs. The effect size calculations showed that the within-subject effects were large. Quasi-isometric force and mechanical power also showed statistically significant gain of both limbs after LL-BFRT. Any main mechanical and functional results were statistically significant at the set alpha level.

Table 6. Summary of Paired t-Test Results

Outcome	t-value	p-value	Effect Size (Cohen’s dz)
5×STS Time – Right	-14.15	<0.001	Large
5×STS Time – Left	-10.82	<0.001	Large
5×STS Power – Right	13.75	<0.001	Large
5×STS Power – Left	10.08	<0.001	Large
Force – Right	10.94	<0.001	Large
Force – Left	10.33	<0.001	Large
Power – Right	9.18	<0.001	Large
Power – Left	8.71	<0.001	Large

3.5 Association Between Dynamometer-Derived and Sit-to-Stand Adaptations

Exploratory Pearson correlation analysis was underdone to appreciate whether a given change in functional sit-to-stand performance was related with an improvement in quasi-isometric mechanical power. Significant associations were not identified during the analysis. The linear regression analysis also showed that a change in the mechanical force or the power did not significantly predict a change in the functional performance outcomes.

Table 7. Correlation and Regression Analysis

Analysis	Statistic	Significance
Δ Dyn Power vs Δ STS Power	r = 0.218	Not significant
Δ Dyn Power vs Δ STS Time	r = -0.263	Not significant
Regression (Dyn Power → STS Power)	R ² = 0.047	Not significant

3.6 Integrated Functional and Mechanical Adaptations Following LL-BFRT

The 4-week LL-BFRT program demonstrated a considerable positive change in both functional and mechanical lower limb muscle power. There was a significant decrease in five-repetition sit-to-stand (5×STS) completion time and a significant increase in mechanical power generated by 5×STS, which was a sign of improved functional performance capacity. Simultaneously, the quasi-isometric dynamometer measurement revealed a considerable improvement of both the highest output of the force and the calculated mechanical power. These changes were bilateral and had large within-subject effect sizes of the key outcome variables, which showed that there was a significant short-term neuromuscular improvement after the LL-BFRT protocol.

4. Discussion

The current paper focused on short-term outcomes of the low-load blood flow restriction training (LL-BFRT) on the lower limb muscle power through the functional

(5×STS) and quasi-isometric dynamometer methods. The main results prove the high positive changes in sit-to-stand, mechanical power output and isometric force production after four weeks of LL-BFRT. These findings suggest that despite a rather short course of intervention, the use of LL-BFRT can produce quantifiable neuromuscular improvements in young healthy adults. The bilateral changes that were observed above are an indication that the stimulus was strong enough to cause symmetrical limb adaptations. A drastic decrease in 5×STS yielding time and subsequent rise in the calculated mechanical power points towards improved functional lower limb performance. It is demonstrated that the 5×STS test is a valid and clinically useful measure of the lower extremity power and transitional movement capacity (Germans et al., 2025). Increases in this test indicate increased coordination of concentric force production with velocity of movement. It has been demonstrated in the past that low-load resistance training and vascular restriction can benefit the functional outcome of the rehabilitation populations (Ladlow et al., 2018). Our results apply this evidence to

healthy people, and prove that comparable functional advantages can take place even in non-clinical contexts. Besides, comparative studies and systematic reviews of blood flow restriction (BFR) training regimens versus conventional resistance exercises indicate that LL-BFR has the potential to improve strength and explosive exercise indicators (jumping and sprinting) (Deng et al., 2025). These broader performance adaptations were in agreement to the improvements in functional sit-to-stand power that were observed in this study. Besides, the comparative studies on BFR and heavy-load resistance training have shown the similarity in strength and power improvement in specific circumstances (Wang et al., 2025). This indicates that the lower external loads can be compensated by metabolic stress induced by occlusion to allow functional performance gains in the absence of high mechanical stress. There were important gains in quasi-isometric force and derived mechanical power after the intervention. These results are not isolated cases as meta-analytic articles prove that with proper execution, LL-BFR can provoke the same strength gain as high-load training (Lixandrao et al., 2018). The extent of increase in isometric output would indicate an increase in motor unit recruitment and neuromuscular efficiency. It has also been compared to demonstrate that low-load BFR training is capable of resulting in significant hypertrophic and strength adaptations in older adults in the event that traditional heavy resistance is not possible (Fabero-Garrido et al., 2022). Although our group was comprised of young adults, the physiological processes seem to be comparable, which contributes to the versatility of the given training modality in the population. In sports, it was revealed that LL-BFR strengthens performance of professional soccer players in aspects of strength in relation to conventional training methods (Castilla-Lopez & Romero-Franco, 2023). Though sport-specific tasks were not considered in the present research, the gain in mechanical and power is in accordance with that in populations under training. The neuromuscular effects noted could be explained by the special physiological condition that is developed through partial vascular occlusion. Masooma and Thykar (2012) assert that blood flow restriction enhances metabolic accumulation, which encourages the early recruitment of higher-threshold motor units despite minimal external loads. The integrative reviews of physiology propose that the activation of muscle fibers and fatigue-related signaling responses by LL-BFR are found to be comparable to those of high-load training (Wernbom and Aagaard, 2020). Electromyographic measurements have shown an augmented myoelectric activity of low-load occlusion exercise, specifically at higher pressures of occlusions (de Queiros et al., 2021). This could be the reason of improvement of isometric force in the current study. Motor unit firing rate changes were also observed to occur after BFR training interventions and this, once more, points to neural involvement in strength gain (Bass et al., 2026). It is believed that at the molecular level, the adaptations caused by BFR entail heightened anabolic signaling pathways, metabolic stress caused by

hypoxia, and heightened growth factor expression (Pearson & Hussain, 2015). Reliable comparative studies that involve low-load training to failure of the task undertaken and compared to the presence and absence of BFR have revealed very different structural and functional changes in support of the protocol that involves occlusion (Quadriatero & Burr, 2018). Moreover, it has been shown that traditional resistance training and BFR have different metabolic responses, and the use of occlusion yields greater accumulation of metabolites compared to load intensity (Ferth, 2020). Taken altogether, these mechanisms are probably the cause of the short-term neuromuscular improvements that were found in this study. The results support the prospects of LL-BFRT as a low-mechanical-load intervention towards muscle power. Musculoskeletal rehabilitation The effectiveness of systematic reviews in the musculoskeletal rehabilitation context helps in strengthening the muscles whilst reducing joint stress (Hughes et al., 2017). Since the observed benefits were in the area of functions as well as mechanical ones, LL-BFRT can be a transitional tool in the early rehabilitative process, or in the population that cannot tolerate high loads. This study had a pre-post, no-comparison-group study design in spite of the encouraging results. This will require future randomized controlled trials that will compare the efficacy of LL-BFRT directly with the traditional resistance types of training programs within extended periods of time. Along with this, the use of electromyographic and imaging tests would also enlighten neural and structural inputs into adaptation.

5. Conclusion

The current research shows that after four weeks of low-load blood flow restriction exercise (LL-BFRT), a considerable change in both functional and mechanical outcomes of lower limb muscles power was observed in normal young individuals. There was significant improvement in the completion time of five-repetition sit-to-stand (5×STS) task as well as improvement in calculated mechanical power among the study participants, which demonstrates improvement in functional performance. Simultaneously, quasi-isometric dynamometer test results showed that there were significant changes in maximal force production and derived mechanical power which indicated the increase of neuromuscular capacity. These results indicate that with 80% limb occlusion pressure, and a frame worked 30-15-15-15 regimen, the activation of large short-term adaptations can be achieved with low external loading employing LL-BFRT. The bilateral changes in the results show symmetric neuromuscular development and prove the success of the intervention in the development of muscle power. Noteworthy, the findings confirm the usefulness of implementing functional performance testing with objective dynamometer-based measurement to fully assess muscle power remodelling. LL-BFRT can thus provide a viable and effective alternative to high-load resistance training especially where it is desirable to minimize the amount of stress on the joints. Randomized controlled trials in

the future are justified to directly compare LL-BFRT to conventional resistance training in the various populations and over extended periods of time.

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