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Effects of Blood Flow Restriction Training Combined With Conventional Physical Therapy on Pain, Muscle Architecture, Strength, Function, and Psychosocial Outcomes in Chronic Lateral Epicondylitis: A Pilot Randomized Controlled Trial

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ABCDEF 1 Jun-Ho Park
ACD 2 Ho Kim
ACDF 3 Myung-Mo Lee

1 Department of Physical Therapy, Graduate School, Daejeon University, Daejeon, South Korea
2 Department of Rehabilitation Medicine, Armed Forces Daejeon Hospital, Daejeon, South Korea
3 Department of Physical Therapy, Daejeon University, Daejeon, South Korea

Corresponding Author: Myung-Mo Lee, e-mail: mmlee@dju.kr
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Background: Chronic lateral epicondylitis (LE) causes persistent pain and functional impairment. Blood flow restriction training (BFRT) can improve strength and pain under low-load conditions, but evidence in chronic LE remains limited. This study investigated the effects of combining BFRT with conventional therapy on pain, muscle strength, function, and psychosocial outcomes.

Material/Methods: A single-blind randomized controlled trial was conducted with 22 participants diagnosed with chronic LE (>3 months). Participants were randomly assigned to an Experimental Group (EG; BFRT + conventional therapy) or a Control Group (CG; conventional therapy). After 2 dropouts, 20 participants (10 per group) completed the 6-week intervention. Both groups received 60-minute supervised sessions twice weekly, consisting of conventional modalities and progressive exercise. In the EG, BFRT was applied at 40% to 50% of individual arterial occlusion pressure. Outcome measures included pain intensity (NPRS), pressure pain threshold (PPT), pennation angle (PA), pain-free grip strength (PFGS), wrist extensor strength (WES), functional performance (PRTEE, Quick-DASH), fear-avoidance beliefs (FABQ), and health-related quality of life (SF-12).

Results: Both groups demonstrated significant improvements in pain, strength, and function ($P<0.05$). The EG exhibited greater gains in PRTEE ($P=0.001$) and Quick-DASH ($P=.025$) scores, as well as larger improvements in FABQ ($P=.039$) and the physical component of SF-12 ($P=.003$), compared to the CG. Between-group differences in pain and strength changes were not statistically significant. No adverse events were reported.

Conclusions: BFRT combined with conventional therapy effectively enhanced functional and psychosocial recovery in patients with chronic LE. This low-load, time-efficient adjunct appears safe and beneficial for improving rehabilitation outcomes.

Keywords: Ischemic Preconditioning • Tennis Elbow • Physical Therapy Modalities • Adaptation, Psychological • Recovery of Function

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Introduction

Lateral epicondylitis (LE), commonly referred to as tennis elbow, is a common overuse musculoskeletal disorder characterized by pain and tenderness at the lateral epicondyle of the humerus [1]. It is primarily caused by repetitive wrist extension and forearm supination, resulting in microtears and degenerative changes in the extensor carpi radialis brevis tendon [2]. LE is characterized by chronic lateral elbow pain, which is typically defined as symptoms persisting for more than 3 months, along with reduced grip strength and functional limitations that substantially affect daily and occupational activities [1,3]. The condition affects approximately 13% of the general population and occurs most frequently in adults aged 35 to 55 years, particularly among individuals engaged in repetitive upper-limb activities such as computer work, manual labor, or racquet sports [4,5].

Persistent pain often limits daily and occupational functioning and is frequently associated with psychological distress, including anxiety, kinesiophobia, and fear-avoidance behaviors [4,6]. These psychosocial components can further exacerbate functional disability and delay recovery [6,7]. Conservative physical therapy remains the first-line management for LE and typically includes modalities such as thermotherapy, electrotherapy, ultrasound, manual therapy, and therapeutic exercise [8]. Among these, exercise therapy focusing on eccentric loading and muscle reeducation has demonstrated moderate effectiveness in pain reduction and tendon remodeling [9,10]. However, traditional high-load resistance exercises are not always tolerated by patients due to pain aggravation or risk of further tendon injury [10], underscoring the need for low-load interventions capable of eliciting comparable physiological benefits.

Blood flow restriction training (BFRT) has recently emerged as an innovative rehabilitation method that enables muscular adaptations at substantially lower training intensities [11]. By applying external pressure to the proximal limb, BFRT partially restricts venous outflow while maintaining arterial inflow, creating a localized hypoxic environment within the working muscles [12]. This metabolic stress triggers anabolic signaling, increases growth hormone and insulin-like growth factor-1 (IGF-1) release, and stimulates muscle protein synthesis and hypertrophy, even under low-load conditions [13,14]. In addition to its well-documented effects on muscle strength, BFRT has been associated with improvements in neuromuscular coordination, pain modulation, and functional performance.

Although BFRT has been extensively investigated in lower-extremity conditions – particularly knee osteoarthritis and anterior cruciate ligament rehabilitation [15], and more recently patellar tendinopathy [16] – its application to upper-extremity conditions such as LE remains significantly under-researched. The limited evidence that does exist for the upper limbs often consists of low-level evidence, such as case reports on shoulder conditions [17]. Consequently, high-quality evidence from randomized controlled trials addressing the comprehensive impact of BFRT on structural, functional, and psychosocial outcomes in people with chronic LE is scarce. This study was designed to address this critical gap in the literature.

Therefore, the present study aimed to examine the effects of combining BFRT with conventional physical therapy on pain, structural adaptation, muscle strength, functional recovery, and psychosocial factors in individuals with chronic lateral epicondylitis. We hypothesized that integrating BFRT into standard physiotherapeutic management would provide superior improvements in pain reduction, upper-limb function, and health-related quality of life compared with conventional exercise alone.

Material and Methods

Study Design and Participants

This study was a single-blind, randomized controlled trial (RCT). To maintain a single-blind design, participants were blinded to their group allocation and were provided with identical instructions and expectations to minimize performance bias. The study protocol was approved by the Institutional Review Board (IRB) of Daejeon University (IRB No: 1040647-202504-HR-008-03) and was registered on the WHO International Clinical Trials Registry Platform (KCT0010845). All participants provided written informed consent in accordance with the Declaration of Helsinki.

A total of 22 participants diagnosed who had chronic LE (symptom duration > 3 months) were recruited from M Rehabilitation Clinic in Daejeon, Korea. Inclusion criteria were: 1) adults aged 18 to 65 years; 2) NPRS score ≥4 [18]; 3) positive findings on at least 2 of 4 special tests (Cozen's test, Maudsley's test, Mill's test, Handgrip dynamometer test) [2]; and 4) K-MMSE score ≥24 [19]. Exclusion criteria included: uncontrolled hypertension (systolic >180 mmHg or diastolic >110 mmHg) [20], neurological symptoms (eg, radiating pain) [18], cardiovascular disease, shoulder flexion ROM <120°, injection therapy within 6 months, or previous elbow surgery [21-23].

Participants were randomly assigned using an online randomization program (www.random.org) into either an Experimental Group (EG, n=11) or a Control Group (CG, n=11). During the 6-week intervention, 2 participants dropped out (1 from each group; EG: scheduling conflict, CG: worsening of pain). Thus, 20 participants (n=10 per group) completed the study and were included in the final data analysis (**Figure 1**).

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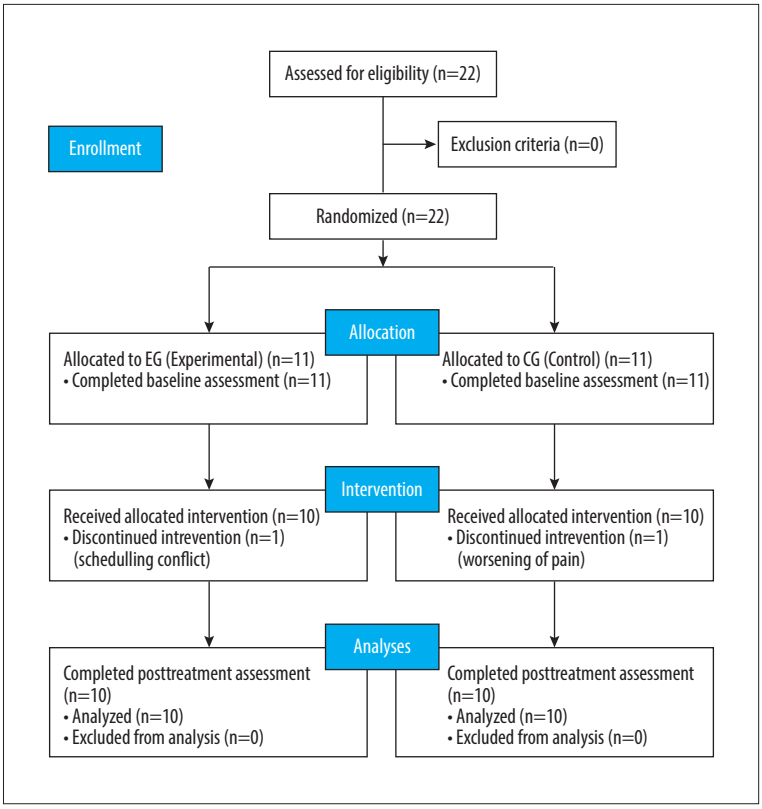


Figure 1. CONSORT flow diagram of participant enrollment, allocation, intervention, and analysis.

The sample size was estimated using G*Power 3.1 based on a previous study [19] that examined pain-free grip strength (PFGS). Assuming an effect size (d)=1.11, α=.05, and power=.80, the required sample size was 9 participants per group. Considering a 20% dropout rate, the final target was 11 participants per group (total N=22).

Intervention Procedures

Following participant allocation, both groups underwent a standardized 6-week intervention protocol consisting of 60-minute sessions, performed twice weekly. All interventions were delivered by a licensed physical therapist with more than 2 years of clinical experience. Each session included 40 minutes of conventional physical therapy followed by a 20-minute exercise program.

The 40-minute conventional therapy protocol was applied to both groups and consisted of thermotherapy (hot pack) for 15 minutes, followed by a simultaneous application of interferential current therapy (IN-2300, Young-in Bio) and laser therapy (OPT-30PII, DSE) for 15 minutes. The session concluded with 10 minutes of manual therapy, which included techniques such as soft-tissue mobilization, functional stretching, and functional muscle relaxation techniques for the wrist extensors and flexors [24].

Both groups performed the same 20-minute exercise program, which included concentric, eccentric, and isometric exercises for the elbow and wrist, as well as strengthening exercises for the shoulder girdle (eg, middle and lower trapezius) [10,25]. The 20-minute exercise program was structured into 3 progressive stages (Weeks 1-2, 3-4, and 5-6), as illustrated in **Figure 2**. Each stage consisted of concentric, eccentric, and isometric strengthening exercises targeting the elbow flexors, wrist extensors, forearm pronators and supinators, and shoulder stabilizers. Exercises were performed for 3 sets of 8 to 15 repetitions or 10- to 15-second holds, with a 60-second rest period between sets [26,27]. To establish the initial exercise intensity for all participants, the intervention during the first week was applied only within the low-load intensity range of 9 to 12 ('very light' to 'fairly light') on the rating of perceived exertion (RPE) scale. From the fourth week onward, the intensity was progressively increased up to a maximum RPE of 16 ('hard') if the participant reported no pain.

The Experimental Group performed the 20-minute exercise program while wearing a pneumatic cuff (EDGE Restriction System BFR Cuffs, USA) placed on the proximal portion of the affected arm [27]. Each participant's arterial occlusion pressure (AOP) was determined using the ArtUS EXT-1H (TELEMED, Lithuania) in DPDI-PW Doppler mode (**Figure 3**) [12]. Doppler measurements were obtained at the brachial artery to verify complete cessation of arterial flow during cuff inflation and restoration

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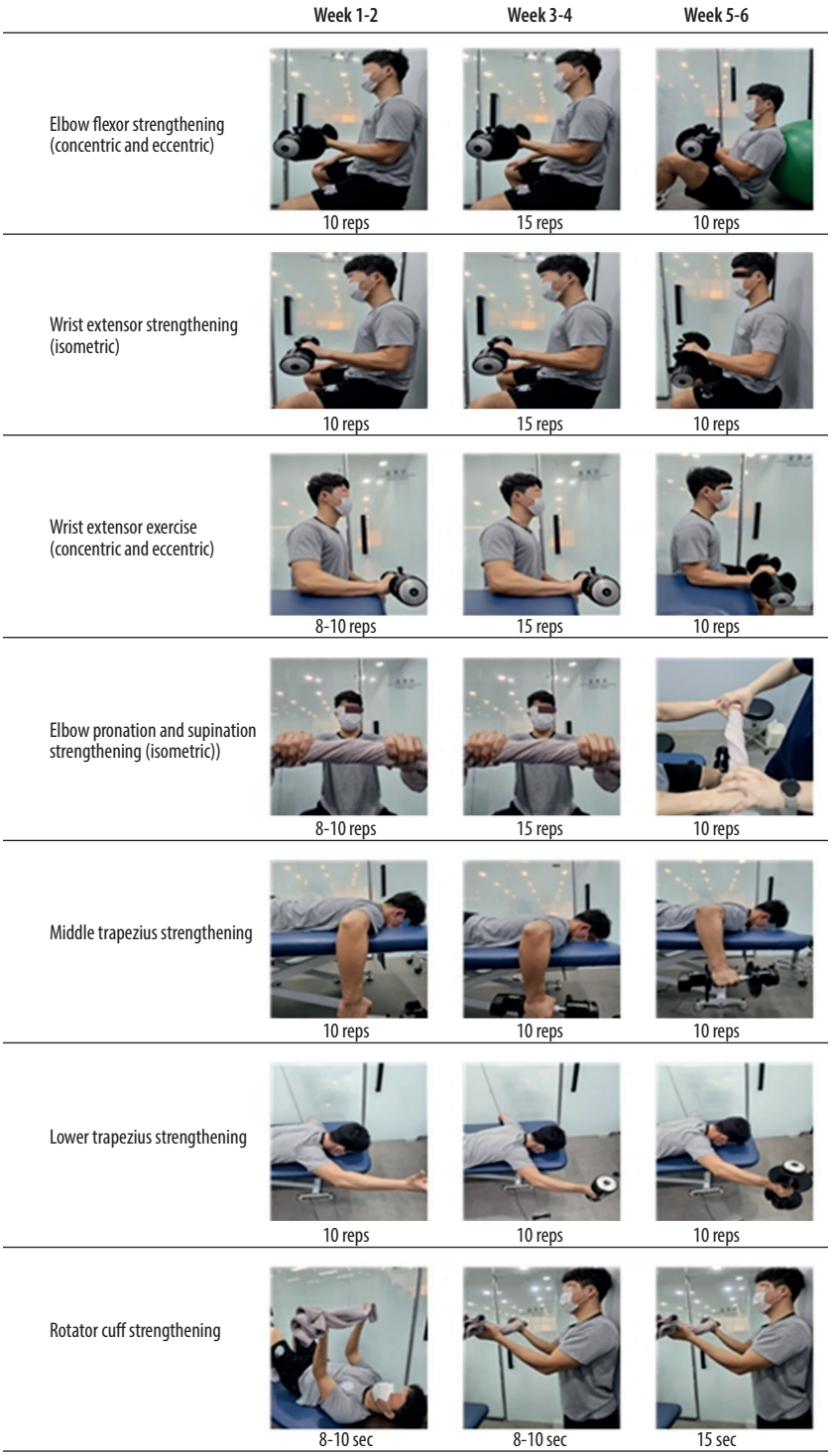


Figure 2. Weekly progressive resistance exercise protocol for both groups. Each session consisted of concentric, eccentric, and isometric strengthening exercises targeting the elbow flexors, wrist extensors, pronators/supinators, and shoulder stabilizers. The numbers indicate repetitions (reps) or contraction duration (seconds) per set. Photographs were taken during actual intervention sessions with participant consent.

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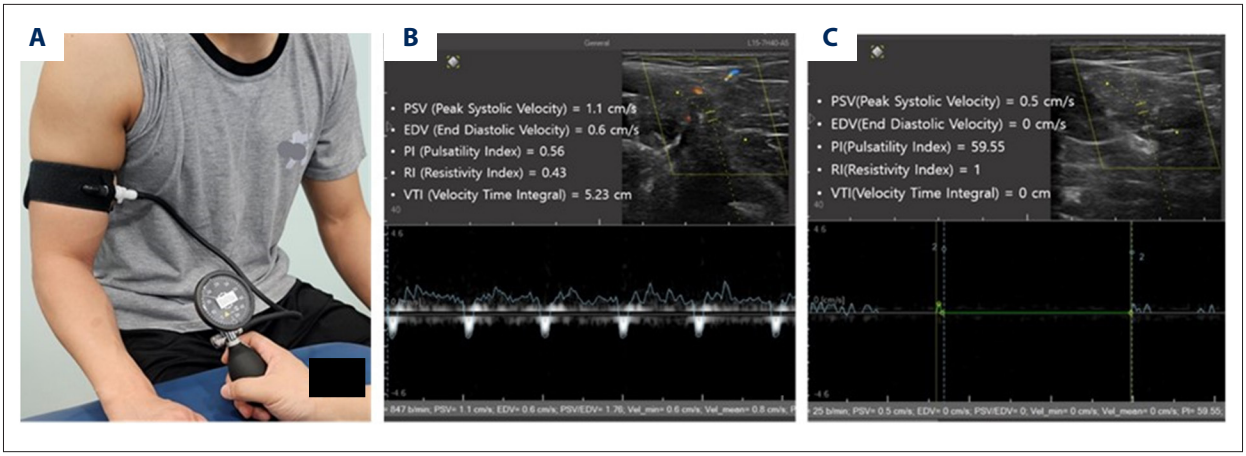


Figure 3. Ultrasound assessment of arterial blood flow during blood flow restriction (BFR) measurement. (**A**) Application of the pneumatic cuff for blood flow restriction on the proximal upper arm; (**B**) Doppler ultrasound image obtained before cuff inflation showing normal systolic and diastolic flow velocities; and (**C**) Doppler ultrasound image obtained after cuff inflation showing complete occlusion with absence of flow velocity.

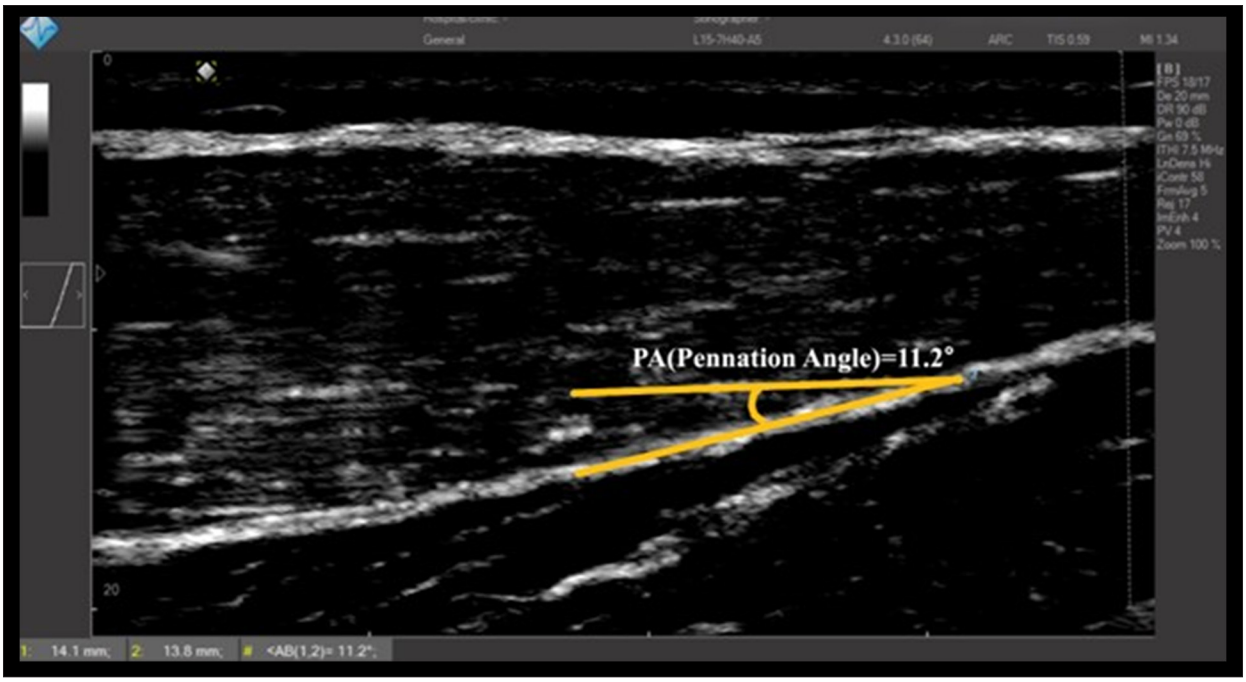


Figure 4. Measurement of the pennation angle (PA) of the extensor carpi radialis brevis (ECRB) using B-mode ultrasonography.

of flow after deflation. During exercise, the cuff pressure was maintained at 40% to 50% of the individual AOP [28]. The cuff was deflated during the 60-second rest intervals and reinflated before the next set [27]. The Control Group performed the same exercise program without cuff application.

Outcome Measures

All variables were assessed at baseline (pre-intervention) and after 6 weeks by a trained physical therapist. Pain intensity was assessed with the Numeric Pain Rating Scale (NPRS), demonstrating a previously reported test–retest reliability of.61 [29]. Pressure pain threshold (PPT) was measured over the extensor carpi radialis brevis (ECRB) using a mechanical push–pull dynamometer (Baseline, USA), with the measure showing a reported intra-rater reliability of.96 [24,30]. Structural changes were evaluated by measuring the pennation angle (PA) of the extensor carpi radialis brevis (ECRB) using a B-mode ultrasound system (ArtUS EXT-1H; TELEMED, Lithuania), a method that has demonstrated high intra-rater reliability in previous research [31]. The PA was defined as the angle between the muscle fascicle and the deep aponeurosis, as illustrated in **Figure 4**.

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Table 1. Baseline characteristics (N=20).

Variable	EG (*n*=10)	CG (*n*=10)	*t*/Fisher	*P* value
Sex (M/F)	5/5	6/4	n/a	1.000
Age	34.00±6.48	34.00±7.62	.000	1.000
Height (cm)	169.40±7.93	170.50±8.85	-.293	.773
Weight (kg)	75.00±17.88	75.80±15.39	-.107	.916
Lesion side (L/R)	6/4	2/8	n/a	.170
Pain duration (months)	7.00±3.37	6.20±3.01	.560	.582

EG – Experimental Group (BFRT); CG – Control Group (Conventional PT). Values are presented as mean±standard deviation (SD) or n (frequency). Statistical analysis for baseline homogeneity was performed using the independent *t* test for continuous variables (Age, Height, Weight, Pain Duration) and Fisher's exact test for categorical variables (Sex, Lesion side). Statistical significance was set at *P*<.05.

Pain-free grip strength (PFGS) was measured using a digital hand dynamometer (EH101; Camry, China) [32], and wrist extensor strength (WES) was measured using a Bluetooth-based dynamometer (ActiveForce2; ActiveForce, USA) [33]. Functional disability was evaluated using the Korean versions of the Patient-Rated Tennis Elbow Evaluation (PRTEE) (Cronbach's alpha=.94) [34] and the Quick Disabilities of the Arm, Shoulder and Hand (Quick-DASH) [35].

Psychosocial factors were assessed using the Korean version of the Fear-Avoidance Beliefs Questionnaire (FABQ), which has demonstrated excellent test–retest reliability (.92-.97) [36] and the 12-Item Short Form Health Survey (SF-12) [37], from which the physical (PCS; Cronbach's α=.77) and mental (MCS; Cronbach's α=.80) component summary scores were derived.

Statistical Analysis

Statistical analysis was performed using SPSS (version 21.0, IBM Corp, Armonk, NY, USA). All analyses were conducted on a per-protocol (PP) basis, including only the 20 participants who completed the 6-week intervention. The Shapiro-Wilk test was applied to verify data normality. Independent *t* tests were used for continuous baseline variables and Fisher's exact test was used for categorical variables due to small expected cell counts. Paired *t* tests were conducted for within-group comparisons, and independent *t* tests were used for between-group comparisons of change scores. Statistical significance was set at *P*<.05.

Results

Twenty participants (10 EG, 10 CG) successfully completed the 6-week intervention and all assessments. Baseline demographic, clinical, and outcome variables were comparable between groups, with no significant differences observed (**Table 1**).

After 6 weeks of intervention, both groups showed statistically significant improvements from baseline across all outcome measures, including pain reduction (NPRS), increased pain threshold (PPT), improved muscle architecture (PA), enhanced strength (PFGS, WES), reduced functional disability (PRTEE, Quick-DASH), lower fear-avoidance beliefs (FABQ), and improved health-related quality of life (SF-12 PCS, MCS).

Between-group comparisons of change scores revealed significantly greater improvements in the EG for functional and psychosocial outcomes (**Table 2**). The EG showed larger reductions in elbow-specific disability on the PRTEE (p=.001, SMD=2.22) and overall upper-limb disability on the Quick-DASH (*P*=.025, SMD=1.10). Greater improvements were also observed in the FABQ total score (*P*=.039, SMD=.99) and in the physical component of the SF-12 (PCS; *P*=.003, SMD=1.54). No significant between-group differences were found for NPRS, PPT, PA, PFGS, WES, or SF-12 MCS. The interventions were well tolerated, and no adverse events related to the BFRT or exercise program were reported in either group.

Discussion

This randomized controlled trial investigated the effects of combining blood flow restriction training (BFRT) with conventional physical therapy on pain, muscle structure, strength, function, and psychosocial factors in patients with chronic lateral epicondylitis (LE). The principal findings indicated that both treatment approaches produced significant improvements across all measured outcomes [38]; however, participants receiving BFRT had larger gains in functional performance, reductions in fear-avoidance beliefs, and enhancements in health-related quality of life. These results suggest that BFRT can serve as an effective adjunct to conventional rehabilitation for individuals with chronic lateral tendinopathy of the elbow.

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Table 2. Comparison of pre- and post-intervention outcomes between groups (N=20).

		EG (n=10)	CG (n=10)	*t* (*P*)	SMD
Numeric Pain Rating Scale (score)	Pre	5.50±1.08	5.10±0.87	.910 (.375)	.406
	Post	1.90±1.37	1.60±1.07	.545 (.593)	.244
	Diff	-3.60±0.96	-3.50±0.70	.264 (.795)	.118
	t(p)	11.784 (.001)	15.652 (.001)		
Pressure pain threshold (kgf)	Pre	3.32±1.52	4.24±1.76	-1.241 (.231)	.554
	Post	6.44±2.50	6.49±2.24	-.473 (.963)	.021
	Diff	3.12±1.49	2.25±1.06	-1.491 (.153)	.666
	t(p)	-6.618 (.000)	-6.676 (.000)		
Pennation angle (degree)	Pre	4.79±2.45	5.17±2.80	-.323 (.750)	.144
	Post	7.13±2.79	6.93±2.78	.160 (.874)	.071
	Diff	2.34±0.79	1.76±0.70	-1.720 (.102)	.769
	t(p)	-9.263 (.000)	-7.885 (.000)		
Pain-free grip strength (kg)	Pre	28.87±10.58	29.93±11.05	-.219 (.829)	.098
	Post	35.34±12.25	34.53±11.36	.153 (.880)	.068
	Diff	6.47±3.08	4.60±1.76	-1.664 (.113)	.744
	t(p)	-6.632 (.000)	-8.238 (.000)		
Wrist extensor strength (kg)	Pre	14.81±4.63	17.27±6.23	-1.001 (.330)	.447
	Post	19.51±4.65	21.99±5.57	-1.080 (.294)	.482
	Diff	4.70±0.75	4.72±0.85	.064 (.950)	.028
	t(p)	-19.811 (.000)	-17.427 (.000)		
Patient-Rated Tennis Elbow Evaluation (score)	Pre	44.50±6.64	41.30±6.55	1.085 (.292)	.485
	Post	20.30±5.03	25.70±5.35	-2.323 (.032)	1.039
	Diff	-24.20±4.02	-15.60±3.71	4.965 (.000)	2.220
	t(p)	19.026 (.000)	13.269 (.000)		
Quick Disabilities of the Arm, Shoulder and Hand (score)	Pre	44.32±8.52	44.54±6.37	-.065 (.949)	.029
	Post	31.48±5.99	37.02±5.63	-2.129 (.047)	.951
	Diff	-12.83±4.97	-7.51±4.72	2.451 (.025)	1.096
	t(p)	8.155 (.000)	5.022 (.001)		
Fear-Avoidance Beliefs Questionnaire (score)	Pre	23.60±6.27	25.80±6.37	-.778 (.447)	.347
	Post	18.30±3.49	23.30±5.18	-2.528 (.021)	1.130
	Diff	-5.30±3.52	-2.50±1.84	2.224 (.039)	.994
	t(p)	4.749 (.001)	4.294 (.002)		

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Table 2 continued. Comparison of pre- and post-intervention outcomes between groups (N=20).

		EG (n=10)	CG (n=10)	*t* (*P*)	SMD
The 12-Item Short Form Health Survey total (score)	Pre	76.90±3.33	75.40±3.14	1.038 (.313)	.464
	Post	95.49±9.87	87.88±6.73	2.012 (.059)	.899
	Diff	18.58±8.22	12.48±5.06	-1.997 (.061)	.892
	t(p)	-7.141 (.000)	-7.793 (.000)		
SF-12 Physical Component Summary (score)	Pre	33.42±4.14	36.35±5.44	-1.357 (.192)	.606
	Post	44.34±4.48	39.87±4.59	2.201 (.041)	.984
	Diff	10.92±5.60	3.52±3.86	-3.435 (.003)	1.536
	t(p)	-6.160 (.000)	-2.879 (.018)		
SF-12 Mental Component Summary (score)	Pre	43.48±4.65	39.04±3.90	2.310 (.033)	1.033
	Post	51.15±6.34	48.01±4.22	1.301 (.210)	.582
	Diff	7.66±4.59	8.96±3.47	.712 (.486)	.318
	t(p)	-5.273 (.001)	-8.146 (.000)		

EG – Experimental Group (BFRT); CG – Control Group (Conventional PT). Values are presented as mean±standard deviation (SD). Change values represent Post–Pre differences. Independent *t* tests were used for between-group comparisons. Statistical significance was set at *P*<.05.

In contrast to functional and psychosocial outcomes, no significant between-group differences were observed in pain (NPRS, PPT), muscle architecture (PA), or strength (PFGS, WES). This may be attributed to the limited sample size (N=20), which likely reduced statistical power to detect intergroup differences – a limitation also reported in prior tendinopathy research. Nonetheless, the observed effect sizes indicated moderate-to-large clinical effects favoring the BFRT group, particularly for PPT (SMD=.67), PA (SMD=.77), and PFGS (SMD=.74). These findings suggest that BFRT elicited clinically meaningful adaptations that may reach statistical significance in larger cohorts.

The favorable effect sizes in both muscle architecture (PA) and strength (PFGS) suggest that BFRT initiated these clinically meaningful physiological adaptations. The trend in PA reflects structural changes consistent with muscle hypertrophy, which supports prior evidence that low-load BFRT can produce results similar to those of high-load exercise [27]. This structural adaptation likely underpins the observed improvement in muscle strength (PFGS). This efficacy in improving strength aligns with previous BFRT research for lateral elbow pain [19], suggesting that the therapeutic benefits of BFRT extend across different tendon pathologies, similar to findings in lower-limb studies [16]. However, comparisons between the upper and lower extremities should be interpreted with caution due to biomechanical differences. Furthermore, our findings are consistent with reports on other upper-limb tendinopathies, where BFRT demonstrated improvements in both strength and function [17]. Notably, high-quality BFRT research in upper-limb tendinopathies remains limited, and few studies have simultaneously examined pain, muscle architecture, function, and psychosocial factors. The present RCT therefore provides a unique and comprehensive contribution to the upper-limb BFRT literature.

Therefore, BFRT appears to be a viable low-stress, pain-tolerant alternative for rehabilitation.

The most notable finding of this study was the superior functional recovery observed in the BFRT group, evidenced by significant improvements in elbow-specific function (PRTEE) and overall upper-limb performance (Quick-DASH), with large effect sizes (PRTEE SMD=2.22; Quick-DASH SMD=1.10). These results highlight BFRT's capacity to facilitate meaningful functional restoration in daily life. In chronic LE, patients often experience pain-related difficulty performing high-intensity strengthening required for tendon recovery. BFRT circumvents this limitation by inducing muscular adaptations at only 20% to 40% of 1 RM [14], reducing mechanical stress while maintaining anabolic stimulus. This low-pain yet effective exercise modality can enhance adherence and confidence in movement [3], thereby improving functional and psychosocial outcomes.

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Moreover, the significant reductions in beliefs (FABQ) emphasize BFRT's potential role in addressing the psychosocial dimension of chronic pain. Chronic pain adversely affects psychological and social well-being [4,6].

It is possible that BFRT, by serving as an effective low-pain exercise modality, enhanced the participants' confidence in limb use. This, in turn, may have reduced kinesiophobia and encouraged active engagement in rehabilitation [17], thereby contributing to the significant improvements in FABQ scores. The improvement in the physical component summary (PCS) of the SF-12 further supports BFRT's holistic benefits. Enhanced physical health perception, combined with functional gains, indicates that BFRT contributes not only to physiological recovery but also to overall physical well-being. The absence of significant differences in the mental component summary (MCS) may reflect the relatively short intervention duration of 6 weeks, which might be insufficient to produce measurable psychological change. However, this proposed psychological pathway remains tentative and requires further dedicated research to confirm these mechanisms.

Several limitations should be acknowledged. First, the small sample size limits the generalizability of the findings; future studies with larger and more diverse populations are needed [38]. Second, the study was conducted at a single clinical site without follow-up assessments; thus, the long-term sustainability of the observed effects remains unknown. Third, although the present trial was designed as a single-blind RCT in which participants were not informed of their group allocation, full participant blinding was not feasible due to the perceptible nature of BFRT, which may have introduced response bias in self-reported outcomes. Furthermore, because the outcome assessor was not blinded to group allocation, the possibility of detection bias cannot be ruled out, particularly for subjective measures such as PPT and WES. Despite these limitations, the present trial provides valuable evidence that integrating BFRT into conventional physiotherapy enhances clinical outcomes in chronic LE. By facilitating pain modulation, promoting structural remodeling, and addressing psychosocial barriers to recovery, BFRT is a promising, low-load, and well-tolerated strategy within musculoskeletal rehabilitation practice.

Conclusions

This randomized controlled trial demonstrated that integrating blood flow restriction training (BFRT) with conventional physical therapy produced superior improvements in functional performance, fear-avoidance beliefs, and physical quality of life compared with conventional exercise alone in individuals with chronic lateral epicondylitis. Both interventions effectively reduced pain and enhanced muscle function; however, the addition of BFRT yielded clinically meaningful advantages in restoring upper-limb function and promoting confidence in limb use.

These findings indicate that BFRT can be a safe, efficient, and clinically valuable adjunct to standard physiotherapy for chronic lateral tendinopathy of the elbow. By eliciting favorable neuromuscular and metabolic adaptations under low-load conditions, BFRT enables effective rehabilitation while minimizing mechanical stress on the tendon. Future research should validate these outcomes in larger cohorts with extended follow-up and further investigate optimal occlusion parameters to establish evidence-based guidelines for integrating BFRT into musculoskeletal rehabilitation practice.

Clinical Implications and Future Directions

Incorporating BFRT into conventional physiotherapy programs may offer a low-load, well-tolerated, and effective approach for patients with chronic lateral epicondylitis. Future studies should explore optimal pressure parameters, long-term effects, and the psychosocial mechanisms underlying BFRT-induced recovery.

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Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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