Blood Flow Restriction Therapy Before and After Arthroscopic Rotator Cuff Repair

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Poster #19

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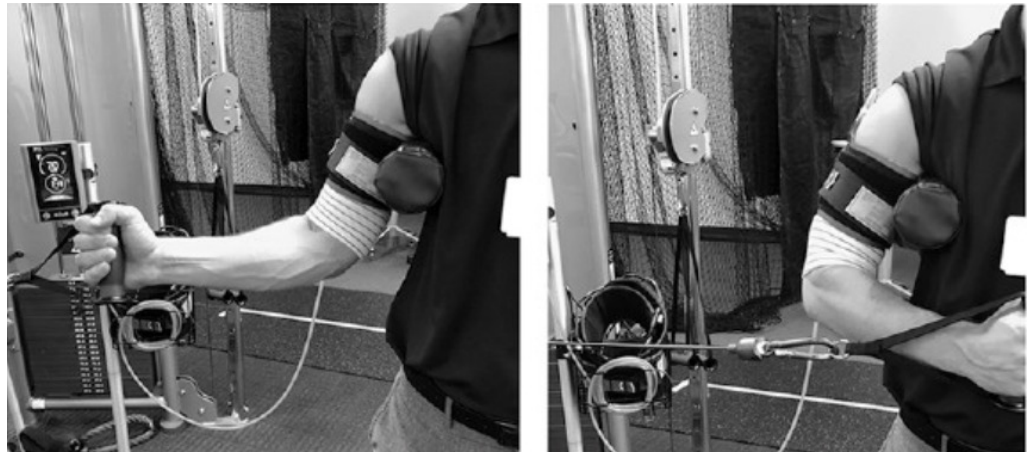
Disclosures

- I, and the co-authors, have no relevant financial disclosures related to this presentation.

Background

- From 2007-2016 rates of rotator cuff repair (RCR) **increased 1.6%** per year with over 300,000 performed.[1]
- Rotator cuff **rehabilitation** typically progresses through phases of immobilization, passive then active range of motion and muscle strengthening[2]
- **Blood flow restriction (BFR) therapy** can lead to increases in muscle strength activation and volume[3], with some indication that there may be **benefit to musculature proximal to the cuff[4]**
- BFR offers a potential modality to following RCR **accelerate strength gains**



Lambert et al,
AJSM 2021

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Purpose

- To evaluate the impact of **BFR** therapy conducted **both before and after** RCR on rotator cuff muscle strength and patient reported outcomes.

McGinniss et al,
IJSPT 2022

Study Design

- **Prospective Randomized Control Trial**
  - 1 institution, 2 Surgeons
- **Study Period**
  - June 2020 to December 2021
  - Patients evaluated at initial clinic visit (ICV), the day of surgery, 6 weeks and **3 months post-operatively**
- **Primary outcome**
  - **Strength testing** performed using a handheld dynamometer to determine peak and average force of abduction, forward flexion, external rotation and internal rotation
- **Secondary outcomes**
  - **Range of motion (ROM) and Patient reported outcomes** included American Shoulder and Elbow Score (ASES), Patient reported outcomes measurement information system (PROMIS) upper extremity (UE), pain interference (PI) and depression (D).

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Protocol

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Patient Selection

- **Inclusion**
  - **Patients undergoing rotator cuff repair** for chronic (>3 months of symptoms) rotator cuff tears
- **Exclusion**
  - History or family of venous thromboembolic event, smokers, peripheral arterial disease, BMI>40, intolerance of BFR cuff

Rehabilitation included 2 weeks of **preoperative** isometric strengthening following by a standard of care **postoperative** rotator cuff repair rehabilitation program with exercises performed +/- a **BFR** cuff inflated at 60% limb occlusion pressure around the proximal arm, under supervision of BFR certified **physical therapist**

Demographics

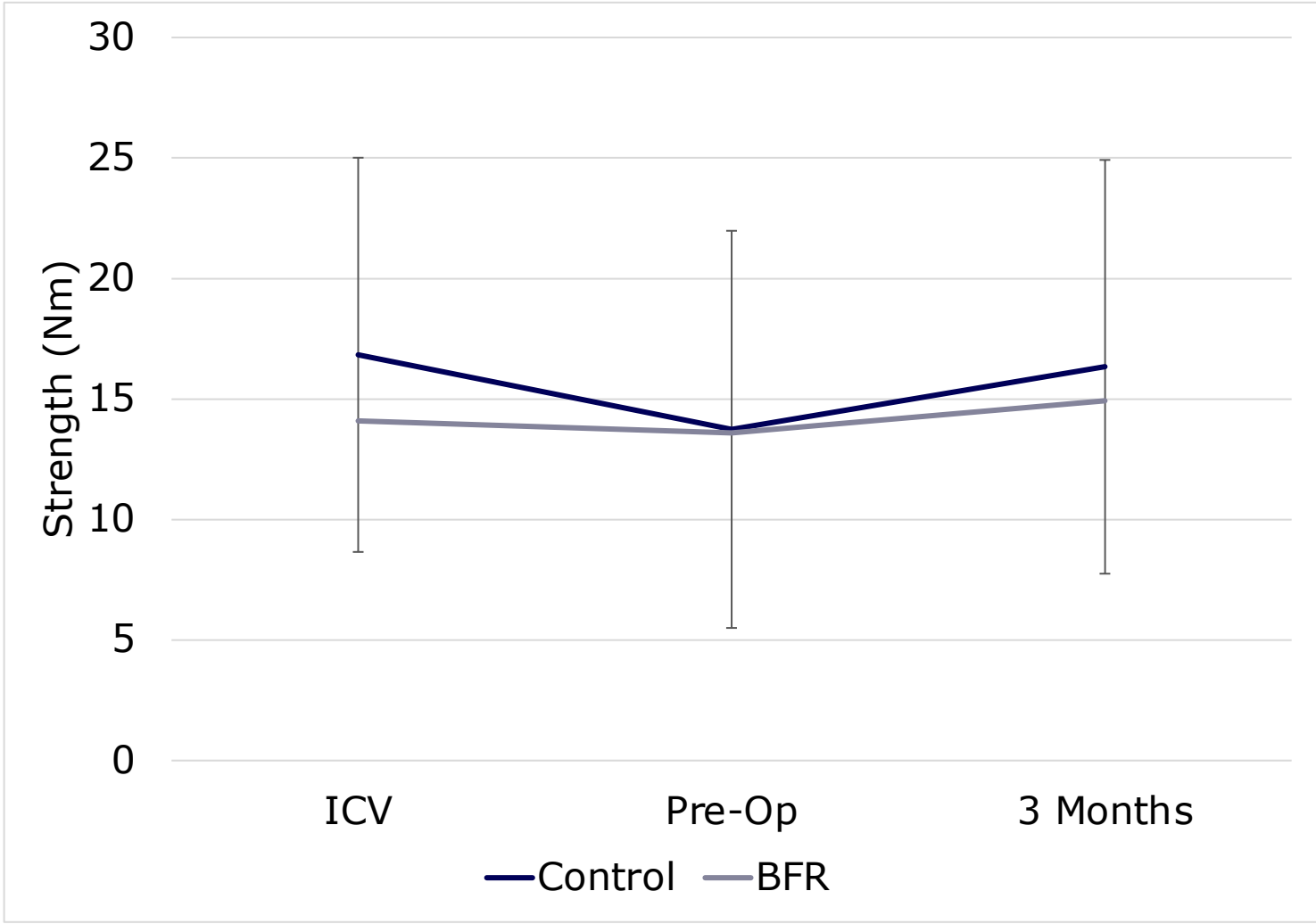
- Equal distributions of tear sizes from small to large
- No significant difference in concomitant procedures

Patient Demographics

		Control	BFR	P-Value
N		15	13	
Age		58.2 ± 10.7	59.6 ± 6.6	0.452
BMI		28.9 ± 4.8	27.4 ± 5.0	0.195
Sex	Male	11 (73.0%)	10 (77.0%)	0.834
	Female	4 (27.0%)	3 (23.0%)	
Laterality	Right	8 (53.3%)	7 (53.8%)	0.979
	Left	7 (46.7%)	6 (46.2%)	
Tear Size	Small	3 (20.0%)	2 (15.4%)	0.543
	Medium	8 (53.3%)	9 (69.2%)	
	Large	4 (26.7%)	2 (15.4%)	
	Massive	0 (0.0%)	0 (0.0%)	
Concomitant Procedure	Biceps tenodesis	2 (13.3%)	2 (15.4%)	0.463
	DCE	2 (13.3%)	0 (0.0%)	
	Subacromial Decompression	13 (86.7%)	9 (69.2%)	
	MUA	6 (40.0%)	1 (7.7%)	
	Acromioplasty	2 (13.3%)	4 (30.8%)	

Forward flexion strength over time

- Strength measurements of peak and average torque generation in abduction, forward flexion external rotation and internal rotation showed **no significant differences** at any timepoint ($p>0.05$)



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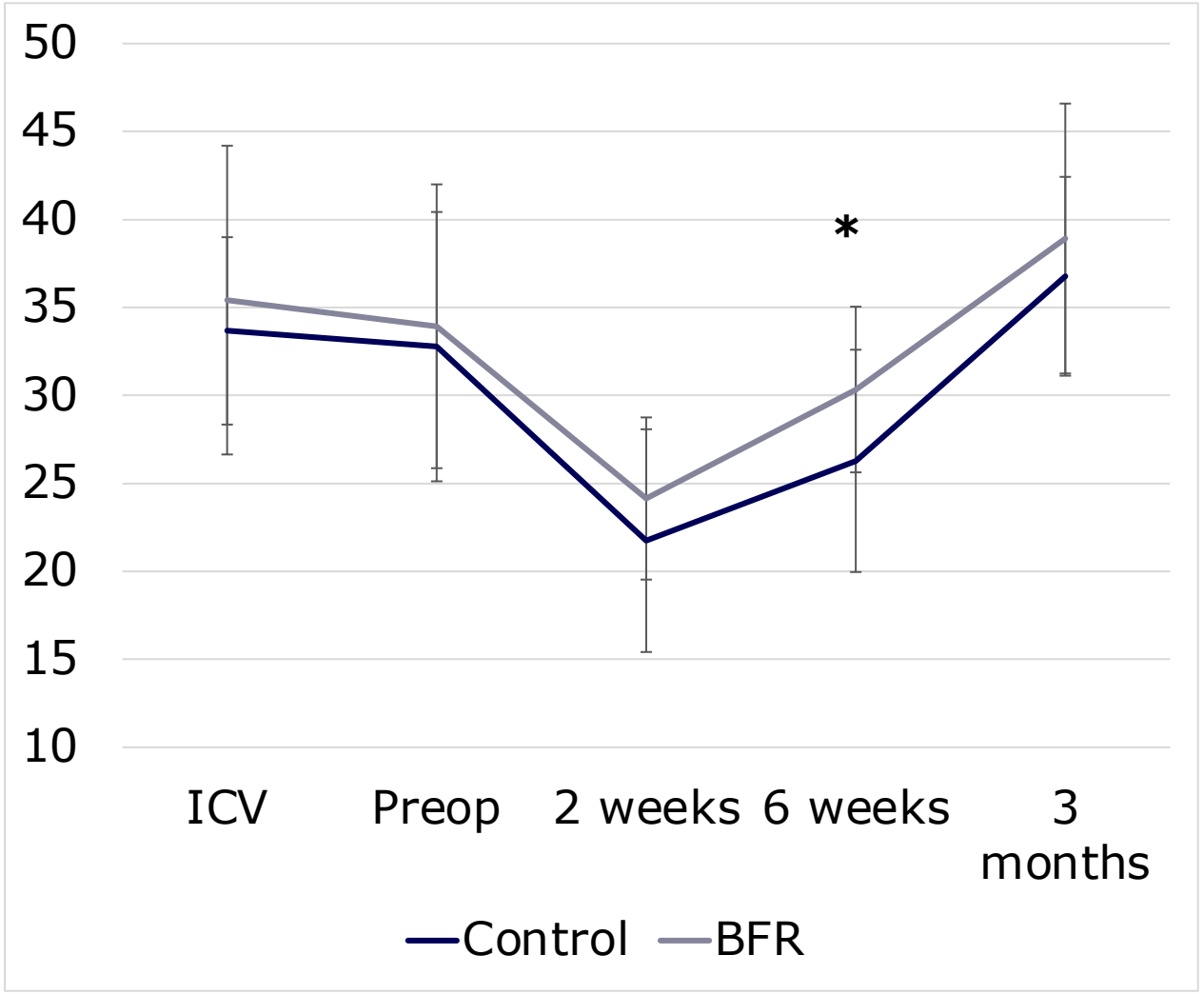
PROMIS-Upper Extremity scores

- BFR group demonstrated **better PROMIS-UE** scores (30.3 ± 4.7 versus 26.3 ± 6.3, p=0.03) and passive **ROM in abduction** (82.4º ± 24.7 versus 65.1º ± 18.8, p=0.03) at 6 weeks post surgery compared to controls.
- No apparent differences at 3 month follow up



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Conclusions

- 2 weeks of “prehabilitation” followed by integration of **BFR** into standard post-operative RCR physical therapy **did not** significantly alter rotator cuff muscle strength at 3 months following surgery

- Performing therapy **with BFR** resulted in improved range of motion in abduction and PROMIS-UE scores at 6 weeks after surgery

- Future research may determine if alternative BFR protocols or duration of treatment lead to long term differences

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Thank you.

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