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Tobi Baldwin

University of St. Augustine for Health Sciences, tbaldwin@usa.edu

Fred Baldwin

Brooks Rehabilitation, fbaldwinpt@hotmail.com

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Blood Flow Restriction Training for Chronic Quadriceps Weakness and Atrophy: A Case Report

Tobi Baldwin¹, Fred Baldwin²

¹University of St. Augustine for Health Sciences, St. Augustine, FL

²Brooks Rehabilitation Motion Analysis Center, Jacksonville, FL



BACKGROUND

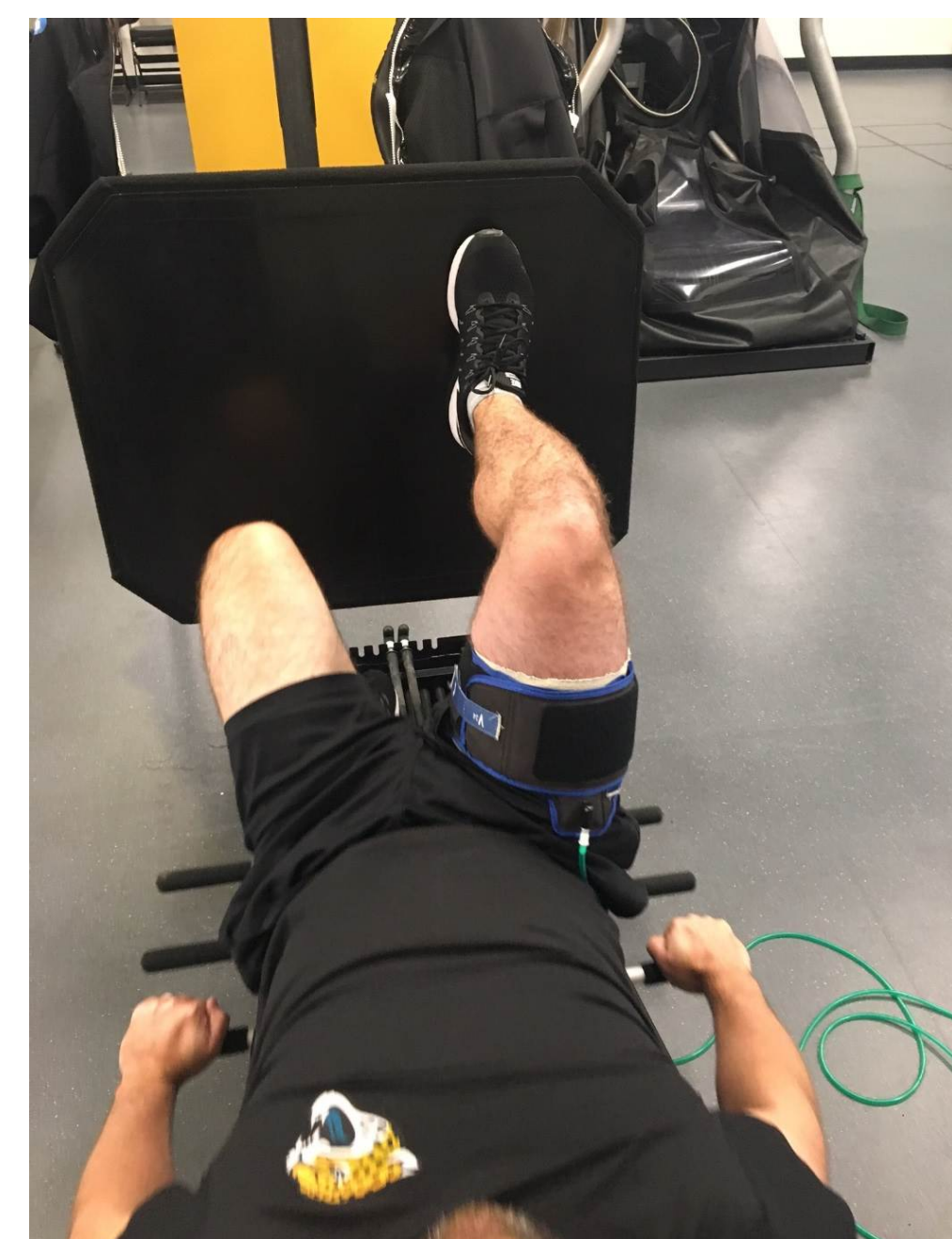
- Traditional strength training involves high load and high intensity to increase strength and hypertrophy
- Blood flow restriction (BFR) training has been used when these parameters are not appropriate for certain patient populations such as geriatric, post operative, and acute orthopedic injury.
- What if traditional strength training is tolerated and appropriate for a healthy individual with chronic weakness and atrophy but has not been effective, could BFR be used to increase strength and hypertrophy for this patient population?

PURPOSE

The purpose of this case report is to describe the use of blood flow restriction training in a recreationally active male who was fully functional but continued to demonstrate chronic unilateral quadriceps weakness and atrophy despite participation in traditional strength training programs.

CASE DESCRIPTION

- 37 year old male
- 25 years post well healed right femur fracture
- Recreationally active in weight lifting, high intensity interval training and played college football
- Girth and strength deficits at initial evaluation
- Performed light isotonic, single leg quadriceps strengthening with BFR
- BFR unit set according to manufacturer instructions
- 80% occlusion maintained throughout the exercise
- Exercises performed 2x/week for 6 weeks

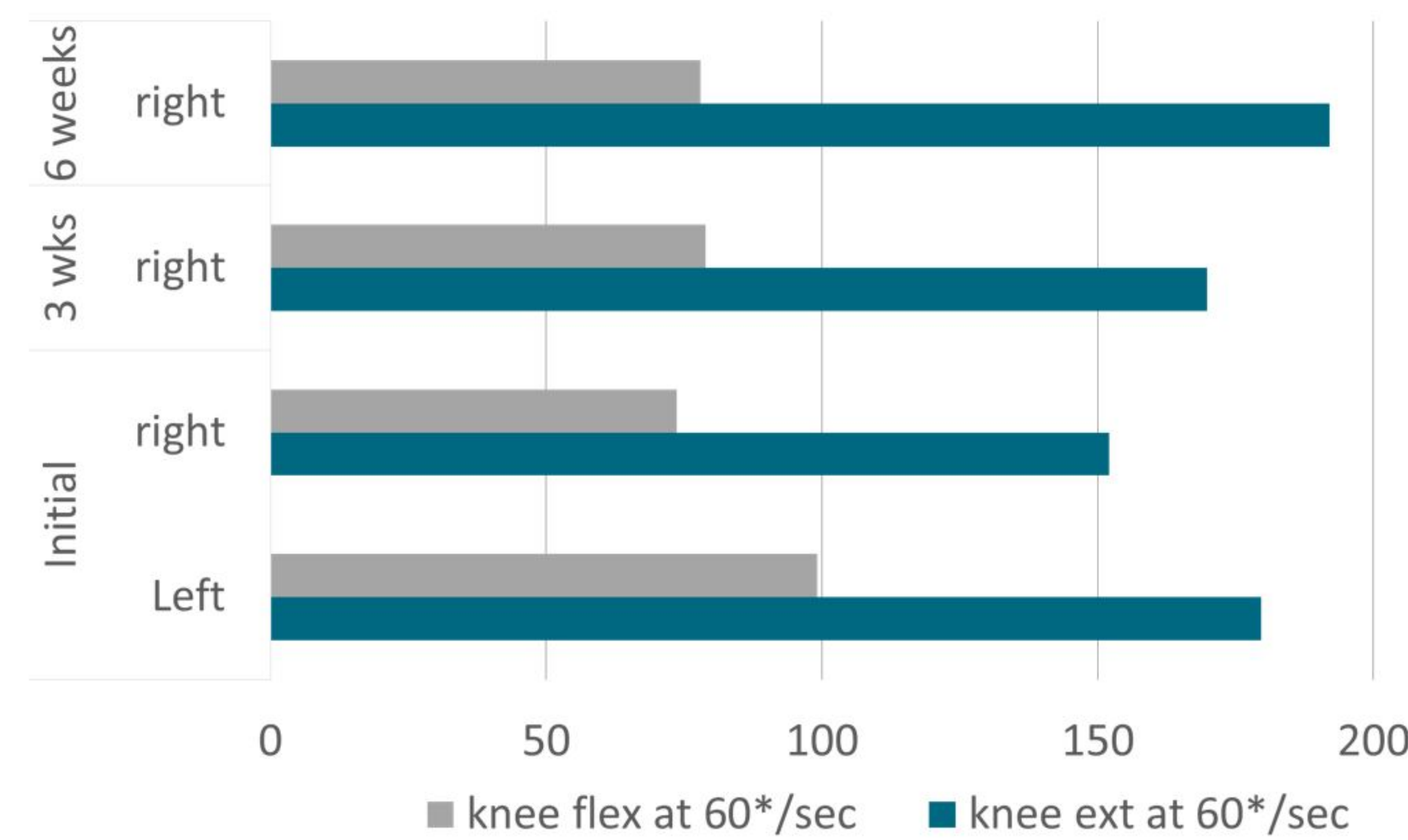


Single leg press on shuttle with BFR unit

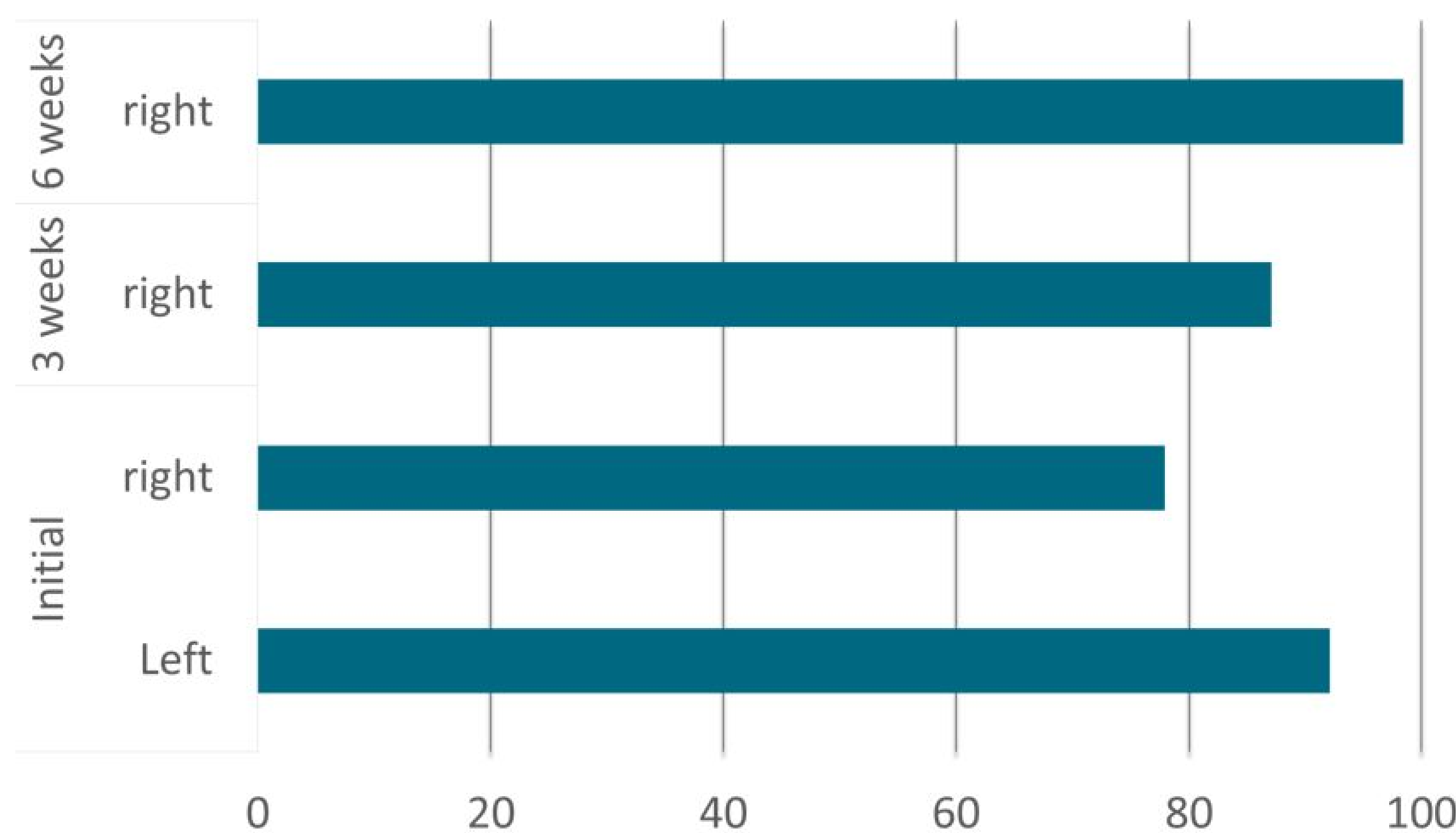


Straight leg raise with light weight with BFR unit

Peak Torque in Foot Pounds



Knee Extension to % Body Weight



Girth Measurements in centimeters

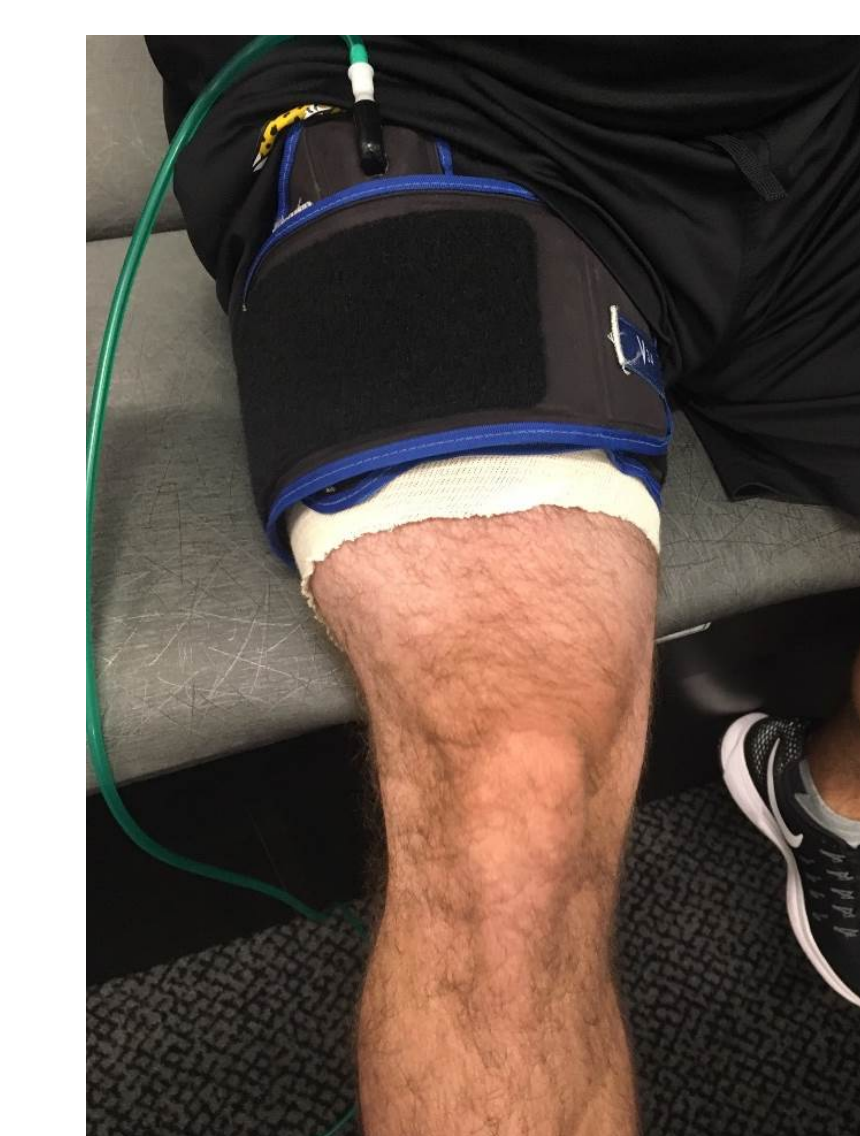
	Initial		3 weeks	6 weeks	Change
	Left	Right	Right	Right	Right
15 cm proximal	57	55	56	56.5	+1.5
10 cm proximal	50	47	48	49	+2
Mid patella	37	37	37	37	0
15 cm distal	43.5	41	42	42	+1

RESULTS

- Isokinetic testing at initial evaluation, 3 weeks into the training program and upon completion at 6 weeks.
- 15% deficit in peak torque improved to an 8% advantage over the uninvolved leg
- Total percentage change of 27% for peak torque
- Knee extension to % body weight increased
- Girth measurement increased by 1.5 to 2.0 centimeters.

DISCUSSION

- Blood flow restriction training has been used to improve quadriceps strength and muscle size.
- It has been used to augment traditional strength training in athletes.
- Upon completion of 6 weeks of blood flow restricted training, hypertrophy and improved strength were noted
- These changes were not able to be achieved in the past with traditional strength training at higher intensities and resistances.
- BFR may be beneficial for chronic atrophy and strength deficits when traditional strength training is ineffective



BFR unit placed on proximal right thigh



BFR unit

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