

Preliminary analysis of adaptations of exercise ± creatine in breast cancer survivors

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Introduction

Breast cancer and its cytotoxic treatment increases patients' risk for skeletal muscle atrophy, reducing strength, physical function, increasing fatigue, and impairing quality of life. Exercise can improve recurrence rates and survivability in nearly all cancers.¹ Creatine is a widely studied supplement with research showing augmented training adaptations in healthy and clinical populations, but it's never been studied in cancer survivors.²

Aim: Study the effects of resistance training with or without creatine supplementation in breast cancer survivors post chemotherapy on outcomes of strength, function and fatigue.

Hypothesis: Breast cancer survivors (BCS) will see increased muscle strength, physical function, and reduced fatigue following a 12-week resistance exercise program and these effects will be greater in those taking creatine.

Methods

Design: Pilot randomized control trial.

Patients: BCS (n=10) who completed chemotherapy within the previous 6 months were recruited to complete 12 weeks of a progressive, home-based resistance exercise program (3 supervised sessions/week). BCS participants were randomized to either receive creatine supplement + exercise (n=5) or exercise alone (n=5).

Age-Matched Controls (AMC): Women who have never had cancer were recruited to complete baseline testing only.

Assessments: Strength was assessed using 1-Repetition Maximum (RM), 10-RM testing, and isometric dynamometry. Physical function was assessed with 6-minute walk test. Fatigue was self-reported using EORTC QLQ BR23 and C30 surveys.

Analysis: Within and between group comparisons were performed using either a paired t-test or two-way ANOVA.

Results

Table 1. Participant Demographics		
	BCa Survivors	Age Matched Controls
Age	46.4 ± 12.5	50.3 ± 13.3
Weight (kg)	73.4 ± 16.2	77.6 ± 14.3
BMI	28.1 ± 5.3	30.8 ± 5.8
Participant Ethnicity/Race		
Hispanic/Latina	3	10
Non-Hispanic	7	0
White	6	10
Black	3	0
Asian	1	0

Figure 1

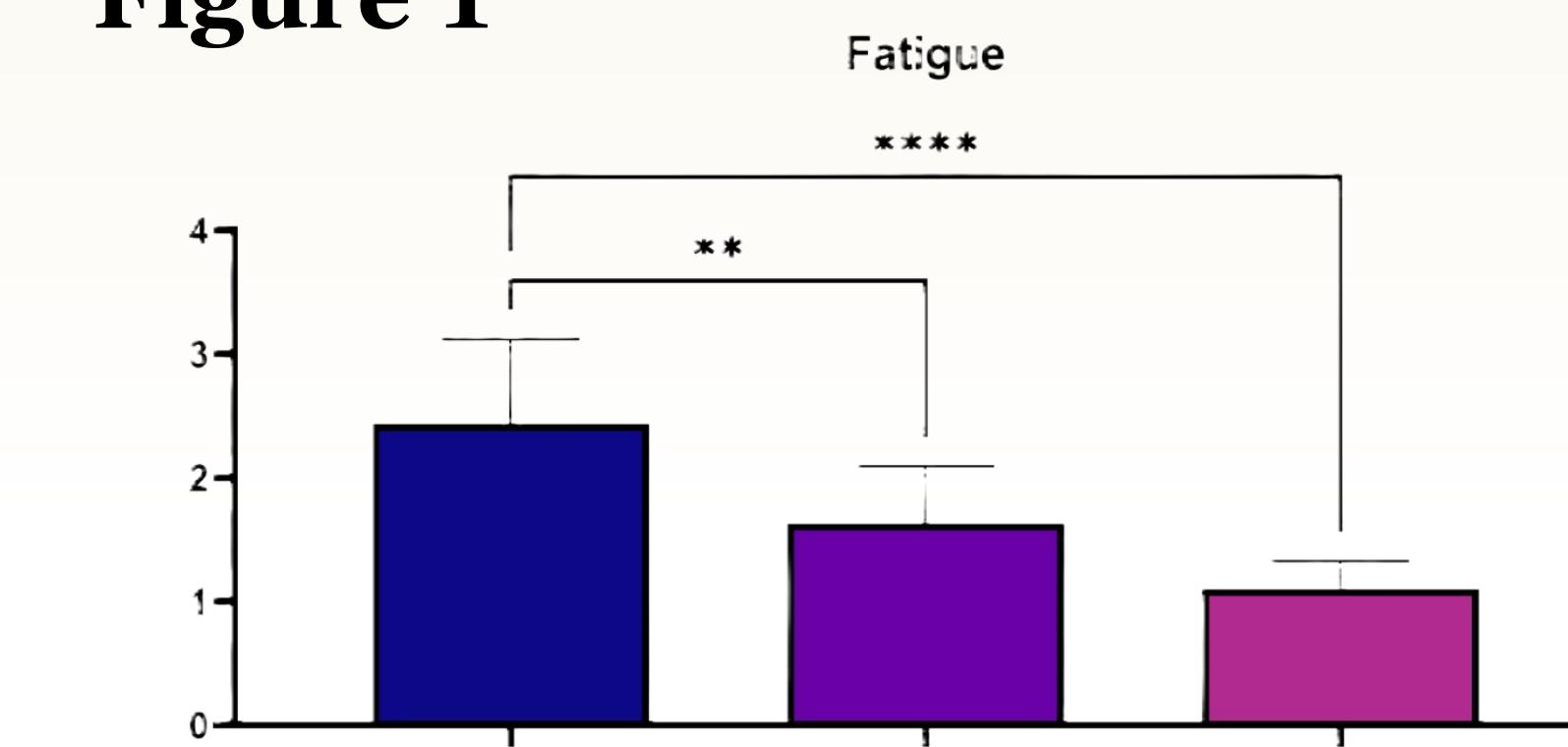


Figure 1. Self-reported fatigue was significantly lower in BCa survivors after the 12-week resistance training intervention ($p < 0.01$). Of greater significance, resistant training was able to bring fatigue in BCa survivors to similar levels as age-matched controls (AMC).

	Overhead press	Row	Triceps Extension	Biceps Curl	Leg Extension	Leg Curl
Baseline	38.4 ± 25.2	60.5 ± 17.5	65.7 ± 31.1	24.0 ± 15.0	160.4 ± 59.1	129.6 ± 44.4
End of Study	47.8 ± 21.0	82.7 ± 34.3	72.5 ± 48.5	29.1 ± 12.3*	158.4 ± 26.0	167.7 ± 48.0*

* $p < 0.05$

Figure 2

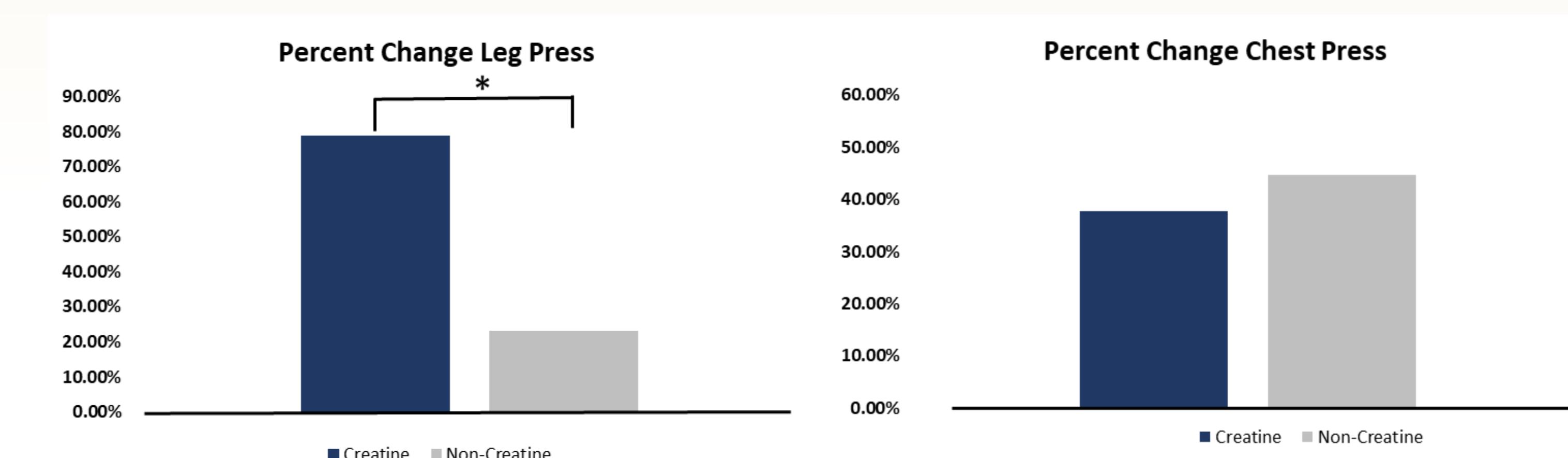


Figure 2. A. The change in 1-RM leg press was significantly more in those who took creatine compared to those who did not. Creatine group had an 80% change, Non-Creatine group had a 25% change. B. No statistically significant change was found in chest press between the two groups.

Figure 3

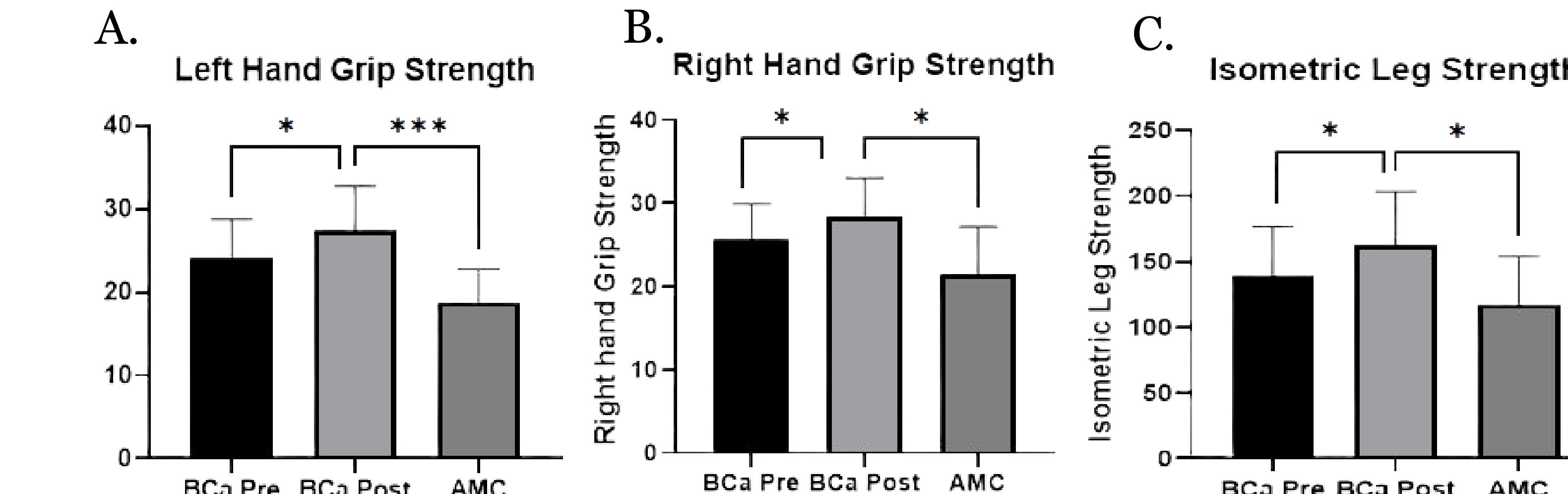


Figure 3. After 12 weeks of intervention, left hand grip strength, right hand grip strength, and isometric leg strength were significantly increased in all BCS. After 12 weeks of intervention, Left hand grip strength, right hand grip strength, and isometric leg strength were significantly higher in all BCS than age-matched controls.

Figure 4

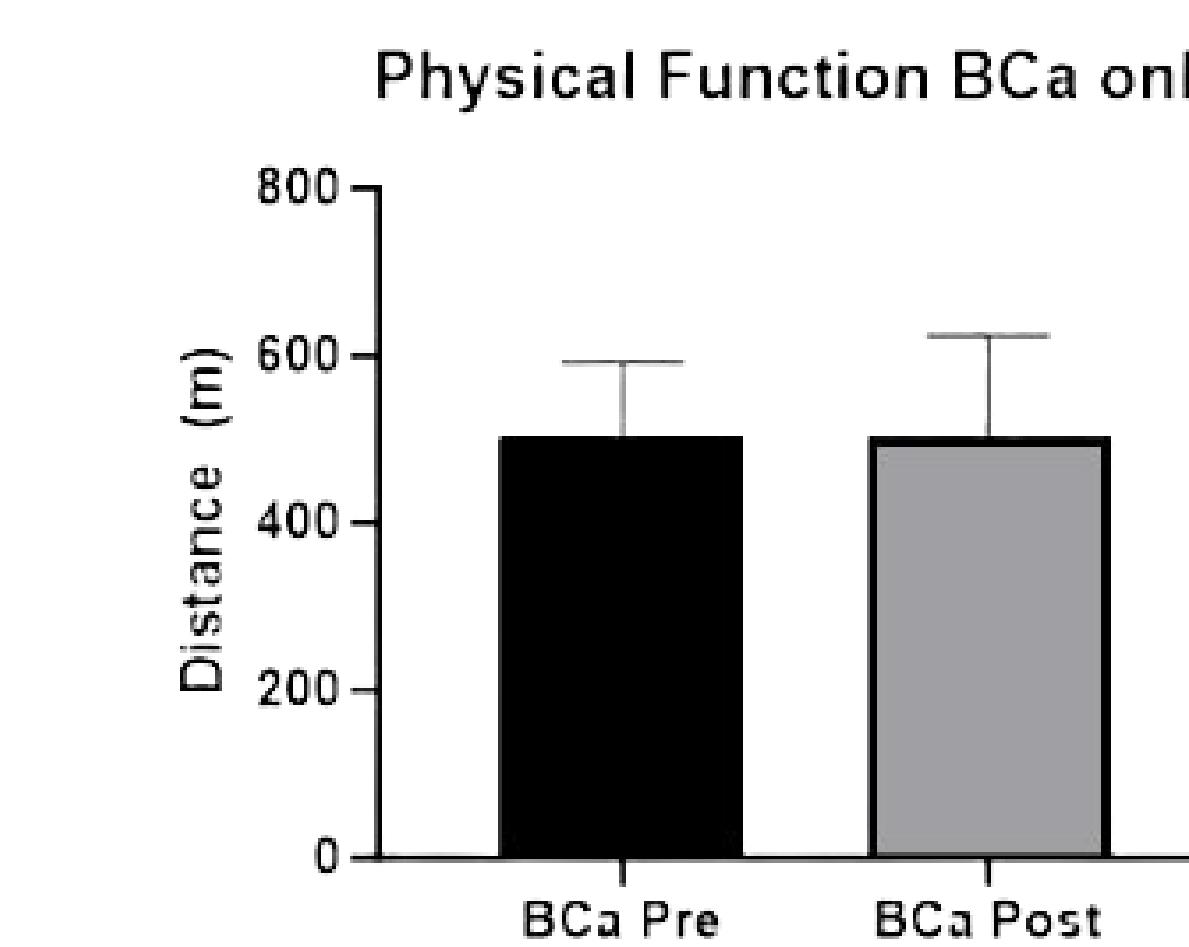


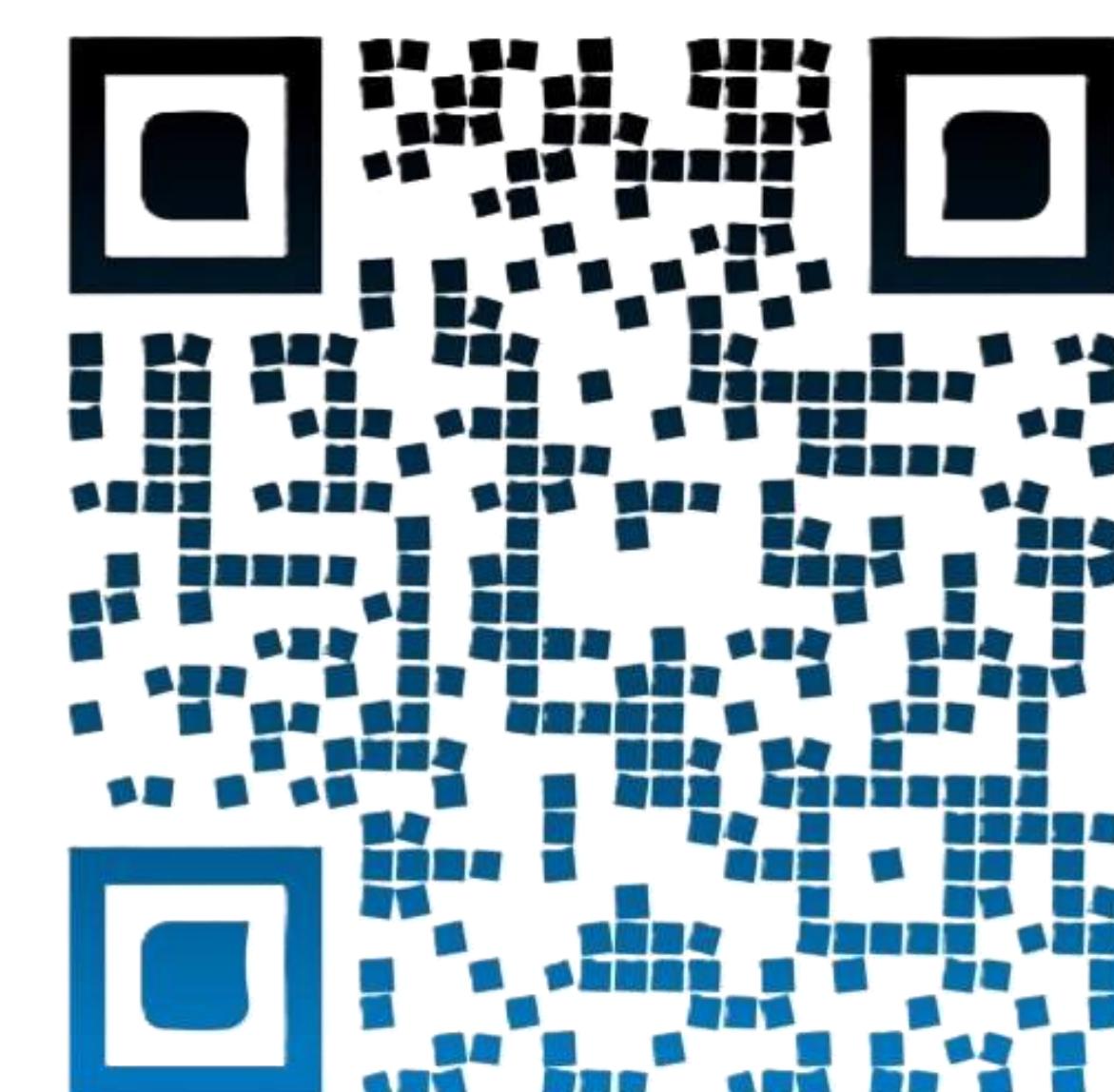
Figure 4. Physical function, as evaluated by the 6-minute walk test showed no significant differences.

Discussion

- 1-RM Leg Press was the only assessment thus far to show a significant difference between BCS who took creatine and those who did not.
- 12 weeks of a supervised, home-based resistance exercise program significantly improved strength in all assessments for all BCS.
- The study is ongoing. More research needs to be done to validate results.

Breast cancer survivors taking creatine during 12 weeks of resistance exercise training increased 1-RM leg press by 80%.

Scan the QR code to read the study's published protocol



References

1. Barreto R, Mandili G, Witzmann FA, Novelli F, Zimmers TA, Bonetto A. Cancer and chemotherapy contribute to muscle loss by activating common signaling pathways. *Frontiers in physiology* 2016;7:472.
2. Kreider RB, Kalman DS, Antonio J, Ziegenfuss TN, Wildman R, Collins R, Candow DG, Kleiner SM, Almada AL, Lopez HL. International Society of Sports Nutrition position stand: safety and efficacy of creatine supplementation in exercise, sport, and medicine. *Journal of the International Society of Sports Nutrition* 2017;14(1):18.