Embargoed Until Friday, May 1, 8am Pacific/11am Eastern

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Strength in Motion: Intense Resistance Training Helps Power Breast Cancer Patients Along the Road to Recovery

New Study Demonstrates Strenuous Exercise Achieves Significant Functional Gains

Abstract: Functional Outcomes for Breast Cancer Survivors Following an Intense Resistance Training Program Based on Surgical Management of the Breast and Axilla

Seattle, WA, May 1, 2026—An intensive resistance exercise program significantly accelerated gains in strength, mobility and balance in post-operative breast cancer patients, however extensive their surgical treatment, supporting an earlier return to daily living activities and an improved quality of life.

These were the results of a new study presented this week at The American Society of Breast Surgeons (ASBrS) Annual Meeting in Seattle that examined the benefits of a structured, three-month total body resistance training regime for recent breast cancer survivors who had been treated with mastectomy (complete removal of breast tissue) or lumpectomy (partial breast tissue removal) and axillary lymph node dissection (ALND) as needed.

“Traditional guidelines question how soon women treated for breast cancer can exercise and how much weight they can safely lift, particularly in mastectomy and ALND patients who have had extensive surgery,” says Colin Champ, M.D., Associate Professor at Allegheny Health Network and a Certified Strength and Conditioning Specialist. “However, by the third week, most women in our program could deadlift—raise from floor to hip level—100-pound weights and by the program’s conclusion many were lifting 200-pound loads. The gains on all program parameters remained similar across lumpectomy, mastectomy and ALND status as the program demands intensified.”

He notes while a handful of studies have examined resistance exercise in these patient populations, generally the programs have been far less demanding. This regimen addressed a full range of motion with rapidly intensifying requirements similar to early training for professional athletes.

“Women treated for breast cancer may have been subjected to more than a year of physically and psychologically traumatic therapies,” comments Dr. Champ. “They lose range of motion and muscle mass. This study demonstrates that even those treated with extensive surgeries can make enormous gains in a few months and achieve the same or greater strength, motion and muscle mass than prior to surgery. They do not have to wait years to improve function and lifestyle.”

Investigators analyzed pooled data from three prior studies examining the safety of the exercise program for breast cancer survivors, including one with an added nutritional component. All studies were conducted at the Allegheny Health Network Exercise Oncology and Resiliency Center in Pittsburgh, founded and directed by Dr. Champ, which routinely delivers the same program to all cancer patients.

Researchers focused on 197 recent breast cancer survivors who completed the program. Of these, 85 were treated with mastectomy and 112 with lumpectomy, while 26 underwent ALND and 171 did not. The latter included both women who underwent no axillary staging or sentinel lymph node biopsy (SLNB).

Prior to the program, patient physical parameters were measured through ultrasound and bioimpedance analysis to determine muscle mass and overall body composition. Physical performance and functional fitness were assessed through a range of comprehensive standardized tools, including functional movement screening (FMS), balance screening and weight-lifting evaluations.

The results were compared across pre-exercise intervention groups using statistical Welch's t-test, chi-square and Mann–Whitney U tests. No significant differences were observed in body composition or functional parameters. Pre- to post-regimen changes were assessed using paired t-tests.

The study found that all women had significant improvement in body composition and function. Women treated with mastectomy and lumpectomy without ALND experienced similar significant pre- to post-intervention gains on all study measurements, including body mass index, muscle mass and FMS as well as composite weight loads lifted and loads lifted in various movement patterns. Those treated with ALND trended lower only on the functional Y-balance test.

While across all surgical groups, patients who were older or were treated with radiation therapy had lower pre-exercise FMS scores (18.5%), these factors accounted for less variation in post-program improvement (6.7%). Investigators suggest this indicates that gains resulted primarily from the exercise program.

“Based on this study and training conducted at the Exercise Oncology and Resiliency Center, we believe that the benefits of high-level exercise and resistance training and the ability of breast cancer survivors to perform well should not be underestimated,” says Dr. Champ. “In fact, we champion the belief that exercise should be not only a component of survivorship, but part of the standard of care.”

Functional Outcomes for Breast Cancer Survivors Following an Intense Resistance Training Program Based on Surgical Management of the Breast and Axilla

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Background/Objective: Traditional postoperative guidelines have long discouraged upper extremity resistance training in patients undergoing mastectomy (Mx) or axillary lymph node dissection (ALND) due to concerns for impaired recovery. However, emerging evidence supports exercise as both safe and beneficial for patient survivorship. However, the extent to which breast and axillary surgery influences objective functional recovery after a structured resistance training program remains unclear. The purpose of this study is to identify if such a structured program affects recovery.

Methods: We performed a secondary analysis of a prospective cohort of 197 breast cancer survivors completing a 3-month in person and supervised resistance training regimen utilizing dose-escalation of compound movements and exercise volume to promote hypertrophy. Participants were stratified by Mx (n=85) versus lumpectomy (Lx) (n=112) and ALND (n=26) versus no ALND (n=171), the latter encompassing patients who either underwent sentinel lymph node biopsy (SLNB) or omission of axillary staging. Baseline clinical, physical, and functional parameters were assessed via ultrasound and bioimpedance analysis (for body composition), Functional movement Screen (FMS), hand grip strength, Godin activity surveys, and Y-balance test. Weight lifted was measured via load (repetitions x sets x weight) during split squat, dumbbell bench press, dumbbell rows, and hex bar deadlifts. These variables were compared using Welch's t-test, chi-square, and Mann–Whitney U tests. Pre- to post-regimen changes were assessed using paired t-tests, and multivariable linear regression identified predictors of both baseline and pre- to post-regimen change in functional movement screen (FMS) score.

Results: At baseline, Mx patients were younger, more likely to have received ALND or chemotherapy, and less likely to have received radiation (all $p < 0.05$). Specifically, the Mx group had a median age of 51 years old versus 59 years old in the Lx group; 21 patients (24.7%) in the Mx group underwent ALND compared with 5 (4.5%) in the Lx group; 38 (44.7%) in the Mx group received chemotherapy versus 30 (26.8%) in the Lx group; and 55 (64.7%) in the Mx group received radiation therapy compared with 94 (83.9%) in the Lx group. No significant baseline differences were observed in body composition or functional parameters. Both Mx and Lx groups demonstrated significant pre- to post-regiment improvements in BMI, muscle mass percentage, body fat percentage, phase angle, FMS score, composite load lifted, and load lifted for each movement pattern (all $p < 0.001$). The magnitude of improvement across all parameters did not differ by Mx or ALND status, except for greater Y-balance gains in patients without ALND (Table 1). In multivariable models, older age ($\beta = -0.09$, 95% CI: –0.124 to –0.055) and receipt of radiation ($\beta = -0.86$, 95% CI: –1.709 to –0.011) were associated with lower baseline FMS ($p < 0.05$), while age alone predicted smaller FMS improvement ($\beta = -0.05$, 95% CI: –0.087 to 95% CI: –0.015, $p = 0.006$). While Mx trended with less improvement in bench press load lifted, it was

not significant ($p = 0.19$). Baseline clinical and treatment factors explained 18.5% of the variability in FMS scores ($R2 = 0.185$), indicating a modest influence on initial functional status. In contrast, these factors accounted for only 6.7% of the variability in pre- to post-program FMS improvement ($R2 = 0.067$), suggesting that functional gains were largely independent of surgical or treatment history and primarily driven by the exercise intervention.

Conclusion: Participation in a 3-month supervised resistance training regimen yielded meaningful functional gains in breast cancer patients, regardless of surgical management of the breast and axilla. Mx and ALND were not independent predictors of either baseline or pre- to post-regimen improvement in FMS or load lifted, even with bench press movements. The findings of this secondary analysis support the broad applicability of dose-escalated resistance training across surgical modalities for breast cancer.

Table 1. Comparison of the Magnitude of Changes Across Pre- and Post-Regimen Parameters for Participants Across (A) Receipt of Mastectomy and (B) Receipt of Adjuvant Lymph Node Dissection (ALND).

A.

Parameter	Lumpectomy (n=112)	Mastectomy (n=85)	P-value
Change in Composite Load	2144.70 [1610.75 - 2960.40]	2031.00 [1422.90 - 2987.10]	0.922
Change in BMI (kg/m2)	-0.11 [-0.64 - 0.36]	-0.26 [-0.97 - 0.13]	0.269
Change in Inbody Bodyfat (%)	-1.50 [-2.50 - -0.10]	-1.50 [-2.80 - -0.10]	0.992
Change in Inbody Muscle Mass (%)	0.98 [0.17 - 1.72]	1.03 [0.20 - 1.86]	0.446
Change in Bone Mineral Content	0.02 [-0.09 - 0.19]	0.00 [-0.11 - 0.11]	0.169
Change in Whole Body Phase Angle	0.20 [0.00 - 0.35]	0.20 [0.00 - 0.40]	0.755
Change in Inbody RMR	16.00 [-1.25 - 36.00]	14.00 [-1.00 - 28.00]	0.387
Change in Grip Strength	3.50 [0.00 - 6.00]	2.50 [0.00 - 6.00]	0.900
Change in Godin Score	21.00 [8.75 - 28.25]	20.00 [10.00 - 34.00]	0.601
Change in FMS Score	2.00 [0.00 - 3.00]	2.00 [1.00 - 4.00]	0.217
Change in Y Balance	10.06 [4.58 - 16.11]	8.99 [4.89 - 16.28]	0.318

B.

Parameter	No ALND (n=171)	ALND (n=26)	P-value
Change in Composite Load	2110.60 [1551.40 - 2977.90]	2384.00 [1324.00 - 2942.00]	0.504
Change in BMI (kg/m2)	-0.13 [-0.72 - 0.32]	-0.30 [-0.65 - 0.18]	0.985
Change in Inbody Bodyfat (%)	-1.50 [-2.75 - -0.10]	-1.30 [-2.28 - 0.07]	0.099
Change in Inbody Muscle Mass (%)	1.03 [0.19 - 1.79]	0.85 [0.11 - 1.46]	0.172
Change in Bone Mineral Content	0.02 [-0.09 - 0.14]	-0.04 [-0.16 - 0.07]	0.915
Change in Whole Body Phase Angle	0.20 [0.00 - 0.30]	0.26 [0.10 - 0.40]	0.840
Change in Inbody RMR	16.00 [-1.00 - 32.50]	9.00 [-11.50 - 28.00]	0.243
Change in Grip Strength	3.00 [0.00 - 6.00]	1.75 [-0.38 - 3.75]	0.325
Change in Godin Score	21.00 [9.00 - 30.50]	17.50 [12.50 - 33.00]	0.908
Change in FMS Score	2.00 [1.00 - 4.00]	1.00 [0.00 - 2.75]	0.123
Change in Y Balance	9.93 [4.77 - 16.39]	7.11 [3.41 - 14.12]	0.036