

Table 2. Intervention studies reporting body composition in females treated for breast cancer (n=21)

	Sample (size, key characteristics)	Study design/purpose	Imaging Technique/ti ming	Outcomes			Reference
				Body weight	Adipose tissue	Lean body mass	
Campbell <i>et al.</i> , 2012	N=14 54.6 ± 8.3 yo Race not reported Stage I-III A Recruited post CT Mixed menopausal status	Pre- and post intervention; to explore the effects of a 24 week diet and exercise intervention on body weight, body composition and blood biomarkers.	DXA (baseline and post-intervention)	Weight ↓ from baseline at 24 (p=0.02) and 36 weeks (p=0.02).	%BF ↓ from baseline at 24 (p=<0.01).	LBM ↓ from baseline at 24 (p=<0.001).	43
Courneya <i>et al.</i> , 2007	N=242 Usual care=82, Aerobic Intervention=78, Resistance Intervention=82 49.2 yo (25-78 range) Race not reported Stage I-III A Recruited at CT initiation Mixed menopausal status	RCT; to study the effects of AET (n=78), RET (n=82) vs. UC (n=82) on QOL, fatigue, psychosocial functioning, physical fitness, BComp, CT completion and lymphedema rates	DXA (baseline and post-intervention)	Trend toward weight gain in all groups	AET prevented fat gain vs. UC (p=0.076)	RET ↑ LBM (p=0.004)	27

Courneya <i>et al.</i> , 2008	N=242 49.2 yo (25-78 range) Race not reported Stage I-IIIa Recruited at CT initiation Mixed menopausal status	RCT; to examine moderators and potential subgroups who responded differently to AET (n=78), RET (n=82) vs. UC (n=82)	DXA (baseline and post-intervention)	Not reported	Women with IIB/IIIA disease ↓ %BF by 1.4% in the RET and 1.0% in the AET groups vs. ↑ %BF by 1% in the UC (p=0.019). No differences in %BF noted for women with I/IIA disease.	Women with IIB/IIIA disease in the RET group ↑ LBM by 2.6 kg vs. ↓ of 0.3 kg in the UC group (p<.001). No differences in LBM noted for stage I/IIA.	26
Demark-Wahnefried <i>et al.</i> , 2002	N=45 41.9 ± 4.0 yo 90% White Stage I-III, Recruited post-surgery, pre CT Pre-menopausal only	CCT; to assess the feasibility of clinic-based nutrition and exercise program on body composition in intervention (n=9) vs. controls (n=36)	DXA (baseline and 6 mos.)	Weight ↓ in intervention patients and ↑ in controls (p=0.02)	%BF and FM ↓ in intervention patients and ↑ in controls (p=0.002, p=0.04 respectively).	No significant changes in LBM	29
Demark-Wahnefried <i>et al.</i> , 2008	N=82 41.8 ± 5.6 yo 94% White Stage I-IIIa Recruited prior to cycle II CT Pre-menopausal only	RCT; to assess the feasibility of a home based nutrition and exercise program on body composition in calcium controls (n=29), calcium + exercise (n=29), or calcium + exercise + high fruit and vegetable, low fat diet (n=24)	DXA (baseline and 6 mos.)	Weight ↑ from baseline in all groups	%BF and FM ↑ over time and among all groups.	No significant changes in LBM in all groups.	28
DeNysschen <i>et al.</i> , 2011	N=100 49.9 ± 9.6 yo	RCT; to assess the effects of aerobic	DXA (baseline, T2,	Weight ↓ in the women who	↑ in %BF for all groups over time	No significant changes in LBM in	30

	76% White Stages I-III Recruited prior to cycle II CT Mixed menopausal status	exercise on body composition via secondary analyses -Group 1: exercised from T1-T3(n=36); group 2: exercise T2 (post-CT) - T3 (n=30); group 3: usual care/no exercise(n=34)	and T3)	exercised during and after CT. Weight ↑ in women who exercised after CT and in controls		all groups	
Djuric <i>et al.</i> , 2011	N=40 52.2 ± 8.2 yo 88% white Stage I-III Recruited prior to CT Mixed menopausal status	RCT; to evaluate the effects of a weight control program initiated during CT	DXA (baseline and 12 mos.)	Weight unchanged from baseline to 6 and 12 mos.	No significant changes in %BF between baseline and 12 mos for intervention or control groups.	No significant changes in LBM between baseline and 12 mos for intervention or control groups.	31
Francini <i>et al.</i> , 2006	N=56 61.5 ± 3.6 yo Race not specified Stage I-III Recruited during CT Post-menopausal only	RCT; to evaluate the changes in body composition and lipid profiles for women receiving tamoxifen (n=27) vs. exemestane (n=28)	DXA (baseline, 6 and 12 mos.)	Weight unchanged from baseline to 12 mos in the tamoxifen, and ↓ in the exemestane group (p=0.06)	↓ FM in the exemestane from baseline (p<0.01) and compared to tamoxifen p<0.05)	Fat free mass (FFM)/FM ratio ↑ in the exemestane group from baseline (p<0.01); no changes in the tamoxifen group; the between-group difference was significant (p<0.05).	44
Irwin <i>et al.</i> , 2009	N=75 55.8 ± 8.6 yo 85% White Stage 0-III	RCT; to investigate the effects of an AET (n=37) vs. UC (n=36) on body	DXA (baseline, 6 and 12 mos.)	Weight changes were not significantly different	%BF ↓ in AE group and ↑ in UC group. Changes in %BF were significantly	LBM ↑ in AE and ↓ in UC groups. Changes in LBM were significantly	33

	Recruited post CT Post-menopausal	composition		between groups at 6 or 12 mos.	different between groups at baseline to 6 mos. and baseline to 12 mos. (p=0.0022)	different between groups at baseline to 6 mos. and baseline to 12 mos. (p=0.047)	
Knobf <i>et al.</i> , 2008	N=26 51.3 ± 6.2 yo 100% white Stage I-II Recruited post CT/RT Post-menopausal only	Pre- and post intervention; to explore the effects of a 16-24 week aerobic weight loaded exercise intervention on body composition	DXA (baseline, 16 and 24 weeks)	No significant changes in weight over time	No significant changes in %BF over time (p=0.14)	No significant changes in LBM over time (p=0.08)	34
Matthews <i>et al.</i> , 2007	N=36 54.1 ± 10.7 84% White Stage I-III Recruited post CT and/or RT Post-menopausal only	RCT; to evaluate the effectiveness of a 12 week home based walking intervention on PA behaviors, weight and body composition in intervention (n=22) vs. UC (n=14)	DXA (baseline and 12 weeks)	No significant changes in weight over time	No significant changes in %BF over time; however trend (p=0.15) toward ↓ in intervention group	No significant changes in FFM over time between groups, trend toward ↑ in FFM for intervention group	32
Mefferd <i>et al.</i> , 2007	N=76 56.3 ± 8.2 yo 93% White Stage I-III Recruited post CT Mixed menopausal status	RCT; to test the effectiveness of a 16 week weight loss intervention on body composition and blood lipids in intervention (n=47) vs. control (n=29)	DXA (baseline and 16 weeks)	Weight ↓ by 7% in the intervention group vs. control (p<0.05). No significant changes in weight for controls	Significant ↓ in %BF in the intervention vs. control groups (p<0.01)	No significant changes in LBM for either group	35
Montagnani <i>et al.</i> , 2008	N=59 61.8 ± 7.0 yo	RCT; to evaluate any changes in body	DXA (baseline and	No significant changes in	%BF significant ↓ over time in	Significant ↑ FFM and FFM/FM in	45

	Race not specified Stage not specified Recruited post CT Post-menopausal	composition and lipids women in women treated with tamoxifen (n=33) or exemestane(n=35)	between 12 and 24 mos.)	weight over time	exemestane group (p<0.05); no changes in tamoxifen group	exemestane group (p<0.01). No significant changes were noted for FFM or FFM/FM in the tamoxifen group	
Pakiz <i>et al.</i> , 2011	N=68 56.0 ± 8.5 yo 94% white Stage I-IIIa Recruited post CT Menopausal status not reported	RCT; to examine the relationships between weight loss, PA and inflammatory marker in treatment (n=44) vs. control (n=25)	DXA (baseline and 16 wks)	Significant ↓ in BW in the intervention vs. controls (p<0.001)	Significant ↓ in %BF in the intervention vs. controls (p<0.001)	LBM not reported	36
Rogers <i>et al.</i> , 2009	N=41 53 ± 9 yo 93% white Stage I-IIIa Recruited post-CT Mixed menopausal status	RCT; to determine the feasibility and preliminary effectiveness of a PA intervention (n=21) vs. UC (n=20)	DXA (baseline and 3 mos., and 6 mos.)	Not reported	No significant differences in %BF between groups.	LBM not reported	37
Rogers <i>et al.</i> , 2009	N=41 53 ± 9 yo 93% White Stage I-IIIa Recruited post CT Mixed menopausal status	RCT; to assess the benefits and sustained activity 3 mos. after participating in a 12 week PA intervention (n=21) vs. UC (n=20)	DXA (baseline, 3 mos., and 6 mos.)	Not reported	No significant effects for group, time or group X time interaction for %BF	LBM not reported	38
Schmitz <i>et al.</i> , 2005	N=85 53 ± 8 yo 98% white	RCT; to assess the effects of twice weekly weight	DXA (baseline, 6 and 12 mos.)	No significant changes in weight between	Significant ↓ in % BF for exercisers vs. non-exercisers	Significant ↑ in LBM for exercisers vs. non-exercisers	39

	Stage 0-III Recruited post CT Mixed menopausal status	training on body size and biomarkers of breast cancer risk in exercisers (n=41) vs. no exercise control (n=41)		groups over time	(P<0.01)	(P=0.03)	
Stendell- Hollis <i>et al.</i> , 2010	N=39 57.1 ± 8.2 yo 93% white Stage 0-III Recruited post CT Menopausal status not reported	RCT; to test the effects of daily green tea consumption on body weight and body composition in daily decaf tea consumers (n=23) vs. nonconsumers (n=16)	DXA (baseline and 6 mos.)	No significant changes in weight over time or between groups	No significant changes in %BF over time or between groups	No significant changes in LBM over time or between groups	40
Thompson <i>et al.</i> , 2010	N=40 56.2 ± 9.4 yo 83% white Stage I-II Recruited post CT Post-menopausal only	RCT; to evaluate changes in weight, body composition and metabolic parameters among obese/overweight women enrolled in a 6 month diet intervention comparing low fat (n=21) vs. Atkins diet (n=19)	DXA (baseline and 6 mos.)	Significant ↓ in BW from baseline through 6, 12, 18 and 24 weeks for both dietary intervention groups (P <0.001)	Significant ↓ in %BF from baseline to 24 weeks for low CHO (P<0.001) and low FAT groups (p=0.003)	Significant ↓ in LBM from baseline to 24 weeks for low CHO (P<0.001) and low FAT groups (p=0.008)	41
Van Londen <i>et al.</i> , 2011	N=82 50.5 ± 1.4 yo	RCT; to examine the impact of AIs on	DXA (baseline,	Significant ↑ in BW in non-AI	Significant ↑ in %BF from baseline at 6,	Significant ↑ in LBM from baseline to 12,	46

	Race not specified Stage I-III Recruited post CT Post-menopausal only	body composition and gonadal hormone levels in AI recipients (n=11) vs. control (n=71)	6,12,18 and 24 mos.)	group at 6, 12, 18 and 24 mos. vs. baseline; significant ↑ in BW in the AI group at 12, 18 and 24 mos. vs. baseline (p<0.05)	12, 18 and 24 mos. for non-AI users (p<0.01). Significantly ↓ levels of %BF were detected at 6, 12, 18 and 24 mos. for AI users (p<0.05)	18 and 24 mos. in AI users. No differences in LBM from baseline for non-AI users. Significantly higher levels of LBM in non-AI vs. AI users at 12, 18 and 24 mos. (p≤ 0.01).	
Winters- Stone <i>et al.</i> , 2011	N=106 62.2 ± 6.7 yo Race not specified Stage 0-III Recruited post CT Post-menopausal only	RCT; to evaluate the impact of 12 months of resistance plus impact exercise on bone health and body composition in exercisers (n=52) vs. controls (n=54)	DXA (baseline, 6 and 12 mos.)	No significant differences in body weight within or between groups	No significant differences in %BF within or between groups	No significant differences in LBM within or between group	42

Abbreviations used: AET=aerobic exercise training, AI= aromatase inhibitor, BW= body weight, BF= body fat; CA=cancer, CAT=computed axial tomography, CCT=controlled clinical trial, CHO=carbohydrate, CT= chemotherapy, DXA=dual energy x-ray absorptiometry, FM=fat mass, LBM= lean body mass, PA=physical activity, RCT=randomized controlled trial, RET=resistance exercise training, UC=Usual care, QOL= quality of life