1 Table 2. Study findings

Author, year	Groups	No. pts	ΔBMI kg/m²	Structure/OMI	Results	Structure/OMI	Results	Structure/OMI	Results	Reliability	Conclusion
Messier et al, 2004 (1)	Healthy lifestyle	78	-1,1 * (-3, 5.2)	ΔmJSW (mm)	-0.25 (-0.64, 0.14)	ΔlJSW (mm)	-0.15 (-0.54, 0.24)	N/A	N/A	N/A	No between-group differences in medial or later joint space widths.
	Diet	82	-4.61 * (0.38, 8.84)	X-ray	-0.20 (-0.53, 0.13)	X-ray	-0.06 (-0.39, 0.27)				
	Exercise	80	-3.46 * (-0.77, 7.69)		-0.19 (-0.60, 0.22)		-0.06 (-0.41, 0.29)				
	Diet + exercise	76	-5.2 * (0.85, 9.55)		-0.30 (-0.71, 0.11)		-0.22 (-0.59, 0.15)				
Messier et al, 2011(2)	High WL > 5%	24	-9,5* (-11.9, -7.1)	ΔmJSW (mm)	-0.120	ΔlJSW (mm)	-0.137	N/A	N/A	N/A	No between-group differences in medial or later joint space widths.
	Low WL < 5%:	23	-2,5* (-3.1, -1.9)	X-ray	-0.240	X-ray	0.009				
	No WL/ WG	29	1,3* (0.7, 2.0)		-0.256		-0.332				
Anandacoomarasamy et al, 2012(3)	WL MRI	59	MRI: -9.3 † (11.9)	Δcartilage thickness CMF (mm), 3T MRI	**0.03 (0.2)**	Δcartilage thickness MT (mm) 3T MRI	**-0.006 (0.1)**	ΔdGEM index MT (ms), 3T MRI		Intra-reliability cartilage thickness and dGEM: ICC > 0.91	WL is associated with reduced cartilage thickness losses in MT.
	WG MRI	19			−0.07 (0.2)		-0.06 (0.2)				
	WL dGEM	41	dGEM: -9.1 † (10.0)						25 (128)		
	WG dGEM	13							−4 (123)		
Gudbergsen et al, 2013(4)	WL < 10%	34	N/A	Δsum of BML 1.5 T MRI	n = 5 (15 %)	Δsum of maximum BML, 1.5 T MRI	n = 5 (15 %)	N/A	N/A	Weighted kappa: Inter-reader: 0.65 Intra-reader: 0.66	No association between WL and response in BML score.
	WL ≥ 10%	135			n = 34 (25 %)		n = 23 (17 %)				
Beavers et al, 2014(5)	Exercise	95	-1,3* (4,5)	ΔBMD total hip (mg/cm²), DXA	-2,1 (-8.2, 4)	ΔBMD femoral neck (mg/cm²), DXA	-2.6 (-8.2, 2.9)	N/A	N/A	N/A	Dietary WL results in bone loss in the hip.
	Diet	88	-9,1* (8,6)		**-24 (-30.3, -17.6)**		**-15.3 (-21.0, -9.5)**				
	Diet + Exercise	101	-10,4* (8.0)		**-19,4 (-25.3, -13.5)**		**-14.4 (-19.8, -9.1)**				
Hunter et al, 2015(6)	MRI – Exercise	36	-1.0* (-2.4, 0.3)		-0.18 (-0.43, 0.07)	Δvolume of cartilage (mm3) in MT, 3T MRI	-7.1, (23.6) ‡	ΔBLOKS BML count, 3T MRI	Referent	x-ray: Interrater reliability: 0.994 MRI: Test-retest reliability: 0.61–0.72	No association between WL and changes in mJSW, volume of cartilage or BML count.
	MRI - Diet	33	-9,8* (-12,7, -6,9)		-0.28 (-0.54, -0.03)		-23.7, (25.1)‡		-0.20 (-0.51, 0.11)		
	MRI - D+E	36	-10.5* (-14.0, -7.0)		-0.27 (-0.53, 0.02)		-37.4 (24.3)‡		-0.11 (-0.40, 0.18)		
	X-ray – Exercise	135	-1.7* (-3.1, -0.2)	ΔmJSW (mm)							
	X-ray - Diet	129	-8.9* (-10.3, -7.5)	X-ray							
	X-ray - D+E	136	-9.7* (-11.1, -8.3)								
Gersing et al, 2016(7)	BMI change < 3%	258	0.08 (0.97)	ΔT2 times (ms) MT, 3T MRI	1.1 (0.8, 1.4)	T2maps MT and WOMAC Pain	**β 0.5 ms, (0.2, 0.6)** §	T2maps MT and WOMAC Disability	**β 0.03 ms (0.003, 0.05)** §	RMSCV: Inter-reader: 2.01% Intra-reader: 1.63%	Weight change was significantly associated with change in T2 times in MT. Increase of T2 times in MT were significantly associated
	BMI decrease: 5%–10%	180	-2.03 (1.29)		0.8 (0.4, 1.0)						
	BMI decrease > 10%	78	-4.22 (1.97)		**-0.3 (-0.9, 0.4)**						

											with increase in WOMAC pain and disability.
Gersing et al, 2017(8)	BMI change < 3% BMI decrease: 5%–10% BMI decrease > 10%	320 238 82	0.08 (0.97) -2.13 (1.21) -4.62 (1.92)	Δcartilage WORMS sum 3T MRI	2,3 (2, 2.7) **1,6 (1.3, 1.9)** **1 (0.6, 1.4)**	ΔBMLWORMS sum	0.6 (0.4, 0.8) 0.7 (0.4, 0.9) 0.5 (0.01, 0.9)	Δmeniscus WORMS sum	0.9 (0.6, 1.1) 0.6 (0.3, 0.9) 0.7 (0.1, 1.5)	ICC Intra-observer: 0.81– 0.85 ICC Inter-observer: 0.78– 0.86	WL was only significantly associated with increase in cartilage WORMS.
Murillo et al, 2017(9)	Exercise Diet Diet + Exercise	36 35 35	–0.26 (–0.74, 0.22) –3.45 (–4.46, –2.43) –4.31 (–5.43, –3.20)	ΔIPFP Volume, (mm^3), 1.5T MRI	**–704 (–1,217, –190)** **–1,074 (–1,607, –540)** **–1,462 (–1,994, –930)**	ΔIPFP posterior surface area, (mm^2), 1.5T MRI	**–90.3 (–156.7, –24.0)** **–141.9 (–210.2, –73.6)** **–182.0 (–250.5, –113.5)**	N/A	N/A	Ref. to reliability (10) RMSCV Intra-observer: 5.0% Inter-observer: 1.1%	There was a significant reduction in IPFP volume in each of the 3 intervention groups.
Hangaard et al, 2018 (11)	KLG 1 KLG 2	9 10	-12.8 ¶ (-22.0 – -8)# -11.4 ¶ (-23.6 – -8.8)#	ΔdGEM (ms) 1.5 T MRI	**-15 (-85 – 213)**# -41 (-178–32)#	N/A	N/A	N/A	N/A	ICC: Intra-reader: 0.96 Inter-reader: 0.92.	The median dGEMRIC T1 value decreased significantly less in the KLG-1 group compared with the KLG-2 group.
Steidle-Kloc et al. 2018 (12)	WL: WL:	38 34	>10–20% >10–20%	ΔIPFP Volume, (cm^3)	**-0.6 (-4.1, -0.4)** -0.1 (-2.2, 2.7)	ΔIPFP posterior surface area, (cm^2)	-0.2 (-2.5, 2.0) 0.3 (-1.3, 3.9)	ΔIPFP depth, (mm)	**- 0.3 (-4.5, -0.1)** 0.2 (- 0.3, 4.2)	Ref. to reliability (10) RMSCV Intra-observer: 5.0% Inter-observer: 1.1%	IPFP morphology is somewhat responsive to WL but not to WG.
Guimaraes et al, 2018 (13)	WL >3% WG: 3-10% WG >10% WS	141 77 15 254	-7.3 (2.9) 6.8 (3.0)** 0.19 ± 1.54	ΔWORMS Medial meniscus: 3T MRI	0.5 †† (0.30, 1.10) **6.8 †† (3.5, 11.3)** **21.0 †† (5.1, 80.7)**	ΔWORMS Lateral meniscus: 3T MRI	0.9 †† (0.41–2.06) **2.6 †† (1.1–6.6)** **9.7 †† (0.95–100.2)**	ΔWORMS both menisci 3T MRI	0.6 †† (0.33–1.26) **4.9 †† (2.4–8.9)** **9.5 †† (3.2–28.5)**	ICC Intra-observer: 0.85 and 0.87 Inter-observer: 0.83	WL did not have a significantly decreased likelihood of progression to tear/maceration compared to SW.
Jafarzadeh et al. 2018 (14)	≥ 20% WL < 20% WL	40 35	-34.9 ‡‡ (-22.2- -56.5) # -6.2 ‡‡ (-25.5- 22.2) #	Δcartilage MOAKS Sum	-0.84 (-2.51, 0.82)	ΔGlobal cartilage thickness	0.02 (-0.14, 0.16)	ΔBML MOAKS Sum	-0.19 (-0.64, 0.25)	N/A	WL was not associated with effects on structural changes.
Gersing et al. 2019 (15)	SW >5% WL	380 380	0.03 (0.86) -3.52 (1.83)	ΔGlobal cartilage T2 times (ms), 3T MRI	**0.24 (0.20, 0.41)** §§	ΔGlobal cartilage deep layer T2 times (ms), 3T MRI	**0.35 (0.20, 0.42)** §§	ΔGlobal cartilage superficial layer T2 times (ms) 3T MRI	0.04 (-0.13, 0.09) §§	RMSCV Inter-reader: 1.93% Intra-reader: 1.12% and 2.06%	WL was associated with a significantly slower increase in global cartilage T2.

The results are reported as mean (SD), 95% CI or number unless otherwise indicated. Significant results ($P < 0.05$) are bolded. BMD: bone marrow density, BMI: body mass index, BML: bone marrow lesion, CMF: central medial femur, dGEM: dGEMRIC, IPFP: infrapatellar fat pad, KLG: Kellgren-Lawrence grade, lJSW: lateral joint space width, mJSW: medial joint space width, MT: medial tibia, OMI: outcome measurement instrument, RMSCV: Root Mean Square Coefficient of Variation, SW: stable weight, WG: weight gain, WL: weight loss.

* Kilograms
† Percentage
‡ Standard Error
§ Increase in cartilage T2 in the medial tibia per point increased on the WOMAC pain/disability scale
¶ BMI Percentage (Body Mass Index).
# Range
** Average for both weight gain groups
†† Odds ratio for progression to tear/maceration in menisci with intrasubstance degeneration
‡‡ Median kilograms
§§ Adjusted mean difference of change in T2 ms/year [95% CI]

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