Proprioception in patients with fibromyalgia and chronic fatigue syndrome: A systematic review

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Background

Previous research found impairments in postural balance and interoception in individuals with fibromyalgia (FM) and chronic fatigue syndrome (CFS).

Postural balance & interoception

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associated with proprioception

Clinical relevance

An understanding of the extent and nature of proprioceptive impairments in FM and CFS is needed to identify target points for rehabilitation.

Objective

To investigate the evidence for impairments in proprioception in individuals with FM and CFS and analyse differences with healthy controls.

Methods

Databases
PubMed, Web of Science, MEDLINE

Search terms
Fibromyalgia OR *Chronic Fatigue Syndrome* AND *proprioception (proprioceptive* or *postural awareness* or *proprioceptive accuracy* or *movement sense* or *motion sense* or *joint position matching)*

Time frame
From inception until April 26th 2021

Eligibility criteria
1) Case-control observational studies
2) Studies that objectively measured a construct of proprioception
3) Studies that applied objective diagnostic criteria to select participants with FM or CFS
4) Studies that included a comparison group of healthy controls
5) Studies which assessed proprioception before any treatment.

Sample
Six studies (n = 422 participants) met the criteria

Results

Table 1. Study characteristics

Study (design)	Participant characteristics		Diagnostic criteria	Proprioceptive measurement	Proprioceptive accuracy	
	Healthy Controls	Cases			Mean position error (º)	*p* – value
Akyol et al. (2013), CC	N = 45 (100% female), 36.62 ± 9.39 y, BMI = 24.85 ± 5.07	N = 60 FM (100% female), 40.18 ± 8.84 y, BMI = 25.64 ± 3.89, IDT = 43.28 ± 42.72	ACR criteria (1990)	Dominant knee joint repositioning task (Sp) following passive positioning, no visual feedback	4.45 ± 4.134 - 5.76 ± 3.25 (HC); 4.17 ± 2.90 - 6.53 ± 4.226 (C)	.71; .43
Nijs et al. (2006), CC	N = 69 (83% female), 37.9 ± 10.2 y	N = 68 CFS (82% female), 38.4 ± 10.0 y, IDT = 84.9 ± 64.8	CDC criteria (1994)	Active (L) knee joint repositioning task (Sp), no visual feedback	0.88 ± 0.76 (HC); 1.37 ± 1.36 (C)	.44
Ulus et al. (2013), CC	N = 30 (100% female), 40.67 ± 9.03 y, BMI = 27.34 ± 5.14	N = 30 FM (100% female), 41 ± 9.20 y, BMI = 26.03 ± 3.45	ACR criteria (1990)	Active knee joint repositioning task (Sp) following passive positioning, no visual feedback	4.74 ± 4.52 - 5.95 ± 2.88 (HC); 4.57 ± 3.22 - 6.94 ± 4.53 (C)	.75; .53
Bardal et al. (2016), CC	N = 25 (100% female), 51.8 ± 8.3 y, BMI = 25.2 ± 3.5	N = 25 FM (100% female), Age (years): 55.8 ± 6.8 BMI = 28.8 ± 4.1, IDT = 116.4 ± 73.2	ACR criteria (1990)	Bilateral shoulder joint repositioning task (Fp) following passive positioning, no visual feedback	5.2 ± 4.3 (HC); 5.9 ± 5.1 (C)	.59
Brun et al. (2020), CC	N = 20 (100% female), 42.9 + 12.3 y	N = 20 FM (100% female), 43.1 ± 15.1 y, IDT = 145.5 ± 126	/	Bilateral UL active position matching task (FP & Sp) following passive positioning, no visual feedback [46]	2.0 ± 0.0 – 4.2 ± 0.0 (HC); 2.0 ± 0.0 – 4.0 ± 0.0 (C)	.81
Celenay et al. (2019), CC	N = 15 (100% female), 39 ± 6.9 y, BMI = 23.8 ± 2.1	N = 15 FM (100% female), 39.7 ± 10.5 y, BMI = 24.6 ± 3.4	ACR criteria (2010)	Active trunk repositioning task (Sp) following active positioning, no visual feedback	1.51 ± 0.60 (HC); 3.64 ± 2.36 (C)	.002**

Abbreviations: CC, Case-control; FM, Fibromyalgia; CFS, Chronic Fatigue Syndrome; BMI, Body mass index (kg/m²); IDT, Illness duration time (months); y, years; ACR, American College of Rheumatology; CDC, Centers of Disease Control and Prevention; HC, Healthy Controls; C, Cases; Fp, frontal plane; Sp, Sagittal plane; L, left; R, right; UL, upper limb.
** $P < 0.005$.

Table 2. Summary of findings and Quality of evidence assessment

Summary of findings		Quality of evidence assessment (GRADE)	
Outcome	Number of studies	Certainty of the evidence (GRADE)	Importance
Knee proprioception	3	Very low	Important but not critical
Upper body-related proprioception	2	Very low	Important but not critical
Trunk-related proprioception	1	Very low	Critical

Discussion

Evidence suggests trunk-related impairments may be present and relevant to the frequently reported postural imbalances in this population. However, the overall body of evidence after applying the GRADE approach was very low and further research using higher quality designs and procedures would be needed to establish strong data-based conclusions.

Until then, professionals should consider the assessment of trunk-related posture and proprioception when working with this population.