

EEG infraslow neurofeedback training for pain management in people with knee osteoarthritis: a randomized sham-controlled feasibility clinical trial

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INTRODUCTION

Electroencephalography (EEG) Infraslow Neurofeedback (ISF-NF) training is a novel tool designed to modulate cortical slow-wave activity to alter neural mechanisms linked to the pain experience. ISF-NF is a recent development in EEG NF training, focusing on modulating slow-wave activity (0.0–0.1 Hz). To date, no ISF-NF clinical trial has been performed for any musculoskeletal (MSK) pain conditions. Since the proposed ISF-NF training protocol is a novel intervention; a feasibility testing of the protocol in individuals with KOA is warranted

OBJECTIVES

To determine the feasibility, safety, and acceptability of administering EEG ISF-NF training in people with knee osteoarthritis (KOA) and determine the training-induced variability in pain, function, and EEG measures.

METHODS

Design: A parallel, two-armed double-blinded (participant and assessor) randomized sham-controlled feasibility clinical trial.

Inclusion criteria: Adults aged 44-75 years, with a clinical diagnosis of KOA; with pain (≥ 4 on an 11-point numerical rating scale) for a minimum duration of three months.

Baseline, post-intervention & follow-up measures: Pain (intensity, interference, unpleasantness), physical function and resting state EEG (rs-EEG)

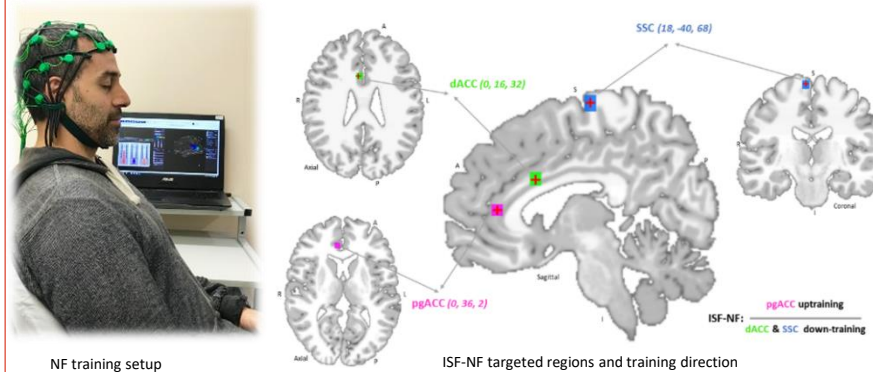
Intervention: Active: 9 sessions (30 min.) of ISF-NF training, 3 sessions/week ; Sham: listened to pre-recorded auditory files.

Data analysis: Pain & function: Descriptive statistics; rs-EEG: Exact low-resolution brain electromagnetic tomography (eLORETA)

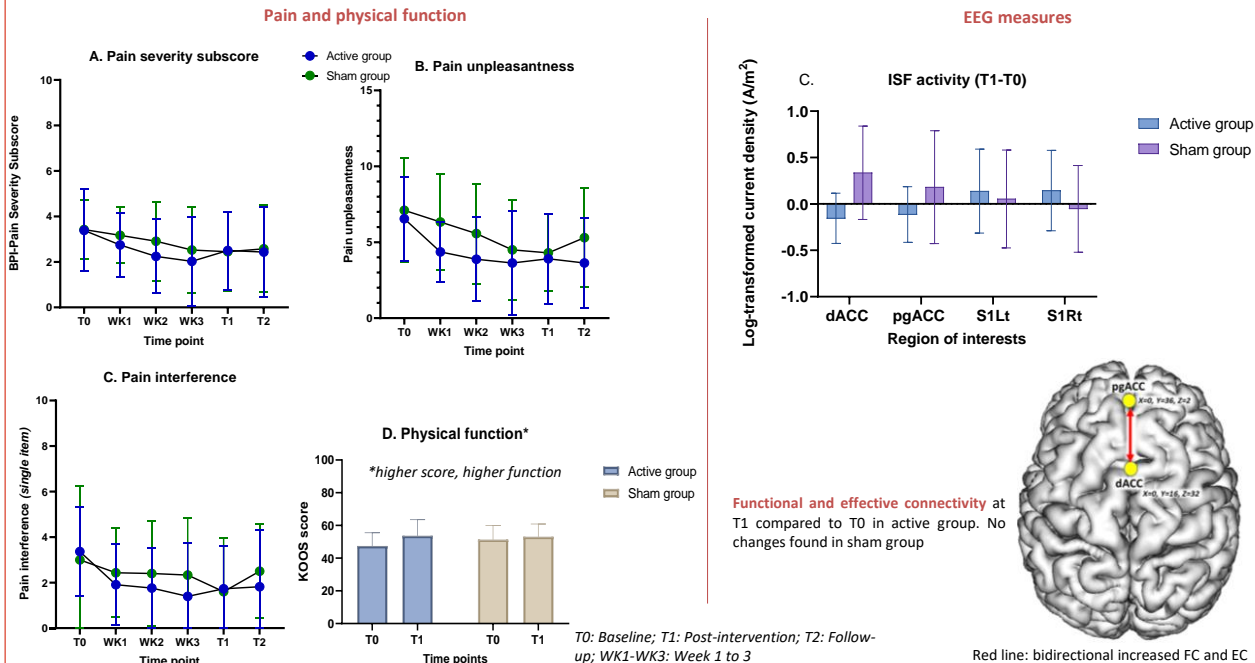
Ethical approval: Health & Disability Ethics Committee (HDEC), New Zealand (19CEN182)

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INTERVENTION



RESULTS



RESULTS

Demographics and feasibility measures

Variables	Active group (n = 11)	Sham group (n = 10)
Age, years, M \pm SD	61.4 \pm 8.8	60.6 \pm 5.3
Sex, n (%)		
Females	7 (63.6%)	6 (60%)
BMI, kg/m ² , M \pm SD	28.4 \pm 5	32.1 \pm 7
Disease duration (yrs.), M \pm SD	5.3 \pm 4	2.6 \pm 2.3
Drop-out rate	0	1
Adverse effects (safety)	None	None
Treatment acceptability (7-point scale)	6.3 \pm 0.9	6.5 \pm 0.5
Perceived level of effectiveness (7-point scale)	4.8 \pm 2.1	5.7 \pm 1.3

Feasibility of recruitment: 22 participants in 6-months duration

CONCLUSIONS

The ISF-NF training is a feasible, safe, and acceptable intervention for pain management in people with KOA. ISF-NF can produce measurable activity and connectivity changes within the targeted cortical regions. The findings of this study warrants a fully powered clinical trial.

REFERENCES

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