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AN EVALUATION OF A NEW STRENGTHENING AND EXERCISE PROGRAMME THAT AIMS TO IMPROVE THE SYMPTOMS OF KNEE OSTEOARTHRITIS BY GOAL SETTING, USING STRENGTH TO BODYWEIGHT RATIOS

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Abstract:

Purpose: To present the clinical outcome measures from the evaluation at 12 weeks.

Methods: 37 patients were enrolled into a KneeFit group, a 6 week program of exercises for up to 12 participants. Group exercises consisted of 5 minute stints on unilateral leg press and leg extension machines, static cycling, cross training, balance boards, heel raises, bridging, hip abductions (resisted) and hamstring curls. At the first session patients had their Oxford knee score, EQ5D-5L, Patient Specific Functional Scale (PSFS), one rep max (1RM) unilateral leg press, 1RM leg extension, and bodyweight measured. From these measurements patients were advised to train at approximately 75% of their 1RM at 3 sets of 10 repetitions. Exercise progressions were facilitated by therapists within the group. Measurements were all repeated at week 6 when they completed their final group session and at week 12. Patients were given a home exercise program (week 1) and advised to complete it twice per week. On completion of the group at week 6 they were referred to community gyms, given the option of utilising the hospital gym without direct supervision, or encouraged to maintain home exercises.

Results: 37 participants with unilateral knee osteoarthritis were assessed at 6 weeks, and 31 participants completed the majority of assessments at 12 weeks. 17 had osteoarthritis in the left knee, and 20 in the right knee. The mean age was 60.0 (SD 7.5). Table 1 shows outcome scores at 1 and 12 weeks. The related-samples Wilcoxon Signed Rank test was used in the analysis as data were not normal. Statistically significant improvements were found at 12 weeks for the Oxford Knee Score, EQ5D-5L and the PSFS. 1RM unilateral leg press and 1RM leg extension assessments were divided by bodyweight and multiplied by 100 to standardise. Statistically significant improvements were found for one rep max leg press (standardised) and one rep max leg extension (standardised) for both the affected and unaffected limbs at 12 weeks. Figure 1 shows the percentage of participants assessed at week 12 who had an improved outcome.

Conclusions: The KneeFit group programme was successful at improving a range of functional and strength related outcome measures. Compliance was excellent.

Crucially these changes were observed at 12 weeks from the beginning of the intervention, and 6 weeks after the completion of the supervised circuits. This suggests that the patient specific tailoring of exercise based on 1RM strength training principles, is well tolerated, successful, and can provides a sustained improvement in patients with symptomatic knee osteoarthritis. A greater change was observed in the affected limb compared to the non-affected limb for both 1RM leg press and extension. This suggests that clinicians designing exercise programmes for knee osteoarthritis with a strengthening aim, should tailor resistance on an individual basis depending on baseline 1RM.

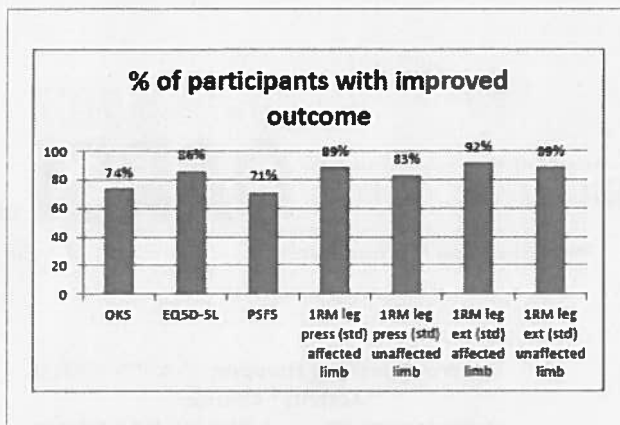


Table 1: KneeFit outcome scores at 1 and 12 weeks

Outcome	Week 1 median (IQR)	Week 12 median (IQR)	Median of change (IQR)	p
Oxford Knee Score	29.0 (24.0 to 35.5) (n=37)	37.0 (26.0 to 42.0) (n=31)	4.0 (0 to 8.0) (n=31)	<0.001
EQ5D-5L	0.6 (0.5 to 0.7) (n=32)	0.7 (0.7 to 0.8) (n=29)	0.1 (0 to 0.3) (n=29)	0.001
PSFS	4.3 (2.8 to 5.5) (n=37)	6.3 (5.0 to 7.6) (n=31)	2.3 (-0.3 to 3.3) (n=31)	0.016
1RM leg press (std) - affected (kg)	59.6 (40.2 to 71.3) (n=35)	73.3 (65.1 to 97.6) (n=29)	24.2 (9.6 to 35.9) (n=28)	<0.001
1RM leg press (std) unaffected (kg)	73.0 (55.1 to 85.5) (n=36)	81.8 (75.4 to 107.0) (n=30)	13.5 (1.0 to 24.4) (n=29)	<0.001
1RM leg extension (std) affected (kg)	10.7 (3.2 to 22.4) (n=31)	18.1 (10.3 to 28.7) (n=28)	7.8 (3.9 to 14.0) (n=24)	<0.001
1RM leg extension (std) unaffected (kg)	19.8 (11.6 to 31.7) (n=36)	25.8 (17.7 to 35.2) (n=29)	5.4 (1.7 to 7.4) (n=28)	<0.001

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