AN EVALUATION OF A NEW STRENGTHENING AND EXERCISE PROGRAMME THAT AIDS 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, EQSD-5L, Patient Specific Functional Scale (PSFS), one rep max
(IRM) 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, EQSD-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 patients 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.
% of participants with improved outcome

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Week 1 median (IQR)</th>
<th>Week 12 median (IQR)</th>
<th>Median of change (IQR)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxford Knee Score</td>
<td>29.0 (24.0 to 35.5) (n=37)</td>
<td>37.0 (26.0 to 42.0) (n=31)</td>
<td>4.0 (0 to 8.0) (n=31)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>EQSD-SL</td>
<td>0.6 (0.5 to 0.7) (n=32)</td>
<td>0.7 (0.7 to 0.8) (n=29)</td>
<td>0.1 (0 to 0.3) (n=29)</td>
<td>0.001</td>
</tr>
<tr>
<td>PSFS</td>
<td>4.3 (2.8 to 5.5) (n=37)</td>
<td>6.3 (5.0 to 7.6) (n=31)</td>
<td>2.3 (-0.3 to 3.3) (n=31)</td>
<td>0.016</td>
</tr>
<tr>
<td>1RM leg press (std) - affected (kg)</td>
<td>59.6 (40.2 to 71.3) (n=35)</td>
<td>73.3 (65.1 to 97.6) (n=29)</td>
<td>24.2 (9.6 to 35.9) (n=28)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1RM leg press (std) unaffected (kg)</td>
<td>73.0 (55.1 to 85.5) (n=36)</td>
<td>81.8 (75.4 to 107.0) (n=30)</td>
<td>13.5 (1.0 to 24.4) (n=29)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1RM leg extension (std) affected (kg)</td>
<td>10.7 (3.2 to 22.4) (n=31)</td>
<td>8.1 (10.3 to 28.7) (n=28)</td>
<td>28 (3.9 to 14.0) (n=24)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1RM leg extension (std) unaffected (kg)</td>
<td>19.8 (11.6 to 31.7) (n=36)</td>
<td>25.8 (17.7 to 35.2) (n=29)</td>
<td>5.4 (1.7 to 7.4) (n=28)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table 1: KneeFit outcome scores at 1 and 12 weeks

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