Is 1-to-1 therapy superior to group- or home-based programs after TKA? A randomised trial.

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Background

What makes an effective and efficient rehabilitation programme?

- Type of intervention
- Dosage
- Duration and timing
- Setting
- Mode of delivery
How is rehabilitation delivered after TKA?

- **TKR Surgery**
  - Inpatient Rehabilitation
    - One-to-one Physical Therapy
  - Outpatient Rehabilitation
    - Class-based Physical Therapy
    - Home-based exercise programme
    - Tele-rehabilitation
Evidence

- Lack of research in the area of peri-operative rehabilitation for joint arthroplasty (NIH consensus statement, 2004)

- 3 RCTs and 1 cohort study comparing the more common modes of physical therapy after TKA
Discrepancy between evidence & clinical practice

**Evidence**
- Home exercise programs (Monitored or unmonitored)

**Clinical Practice**
- One-to-one PT
- Group-based PT
Aim of Study

To determine whether One-to-one physical therapy is superior to Group-based therapy, or Monitored home program in improving function up to one year after knee arthroplasty

Design:

- Multi-centre, parallel-arm, randomized trial
Methods

Subjects:

- Recruited during pre-admission education class
- Inclusion: Primary unilateral or bilateral TKA
  Physical therapy at 4 participating hospitals
- Exclusion: Unable to comprehend protocol (English, Spanish, Arabic)
  NWB post-operatively
  Deep Site Infection
  Joint instability
Methods

Outcomes:

- **Self-reported function:**
  - Oxford Knee Score
  - WOMAC Osteoarthritis Index (Pain, Function)
  - SF-12 Health Questionnaire (Physical, Mental)

- **Physical tests:**
  - Knee Range of Motion (Flexion, Extension)
  - 6 Minute Walk Test
  - Timed stair ascent and descent
Methods

- Attendance to physical therapy
- Preference for mode of rehabilitation
- Satisfaction with rehabilitation programme
- Satisfaction with recovery at one year
Enrolment
Pre-op Education Class

Randomization
Wk 2 after TKR

- One-to-one Physical therapy
  12 sessions in 6 weeks

- Group-based Physical therapy
  12 sessions in 6 weeks

- Monitored Home Program (MHP)
  2 one-to-one sessions
  1 review phone call
Methods

- Common initial home exercises
- Exercise at moderate intensity
- Assistance with transport if needed
Results

- Commenced October 2008 and Completed August 2011

- No. of patients at each facility
  - Fairfield 38.5%
  - Camden 28.5%
  - Liverpool 18%
  - Bankstown 15%
Screened participants
n = 554

Consented
n = 283

Randomized
n = 249

Excluded
n = 207
- 127 language
- 61 out of area
- 13 medically excluded
- 6 already in trial

Declined
n = 64

Surgery postponed/
Excluded post-op/
Inpatient Rehab
n = 34

One-to-one PT
n = 85

Lost to follow-up
n = 4

Group-based PT
n = 84

Lost to follow-up
n = 5

MHP
n = 80

Lost to follow-up
n = 7

12 month Follow-up
n = 233
(6% lost to follow-up)
## Patient Characteristics

<table>
<thead>
<tr>
<th></th>
<th>1-to-1 (n=85)</th>
<th>GBT (n=84)</th>
<th>MHP (n=80)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age, yrs</strong></td>
<td>67.3 (8.5)</td>
<td>67.5 (8.6)</td>
<td>67.1 (8.4)</td>
</tr>
<tr>
<td><strong>Gender (% female)</strong></td>
<td>68.2</td>
<td>60.7</td>
<td>61.3</td>
</tr>
<tr>
<td><strong>Height, m</strong></td>
<td>1.63 (0.09)</td>
<td>1.62 (0.09)</td>
<td>1.64 (0.1)</td>
</tr>
<tr>
<td><strong>BMI</strong></td>
<td>33.08 (5.69)</td>
<td>33.81 (6.04)</td>
<td>31.64 (4.93)</td>
</tr>
<tr>
<td><strong>Co-morbidities, (Charlson index)</strong></td>
<td>0.94 (0.85)</td>
<td>0.69 (0.88)</td>
<td>0.76 (0.78)</td>
</tr>
<tr>
<td><strong>Presence of back or other lower limb pain, n (%)</strong></td>
<td>52 (61)</td>
<td>63 (75)</td>
<td>53 (66)</td>
</tr>
<tr>
<td><strong>Oxford Knee Score</strong></td>
<td>15.50 (11.00-21.25)</td>
<td>16.00 (11.00-23.00)</td>
<td>18.00 (11.00-23.75)</td>
</tr>
<tr>
<td><strong>WOMAC Function</strong></td>
<td>114.05 (98.55-129.48)</td>
<td>110.20 (79.60-134.28)</td>
<td>104.5 (74.08-128.70)</td>
</tr>
<tr>
<td><strong>WOMAC Pain</strong></td>
<td>29.45 (20.00-36.3)</td>
<td>20.00 (14.00-23.55)</td>
<td>28.20 (22.03-37.50)</td>
</tr>
<tr>
<td><strong>Knee Flexion, degrees</strong></td>
<td>110.00 (96.00-122.00)</td>
<td>109.00 (90.00-118.50)</td>
<td>113.00 (97.75-123.25)</td>
</tr>
<tr>
<td><strong>Knee Extension, degrees</strong></td>
<td>10.00 (5.00-14.75)</td>
<td>10.00 (5.25-13.00)</td>
<td>8.50 (5.00-13.00)</td>
</tr>
<tr>
<td><strong>Quadriceps lag, degrees</strong></td>
<td>2.00 (0.00-6.00)</td>
<td>3.00 (0.00-7.00)</td>
<td>3.50 (0.00-6.25)</td>
</tr>
<tr>
<td><strong>SF12 Physical</strong></td>
<td>28.53 (25.25-34.27)</td>
<td>30.56 (23.93-39.19)</td>
<td>29.92 (24.07-34.13)</td>
</tr>
<tr>
<td><strong>SF12 Mental</strong></td>
<td>44.67 (37.68-54.30)</td>
<td>42.21 (36.34-52.00)</td>
<td>51.09 (41.26-57.64)</td>
</tr>
</tbody>
</table>
Percentage of patients with high attendance

<table>
<thead>
<tr>
<th>(MHP: 2 sessions)</th>
<th>(Centre-based: &gt; 8 sessions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHP</td>
<td>83%</td>
</tr>
<tr>
<td>One-to-one PT</td>
<td>80%</td>
</tr>
<tr>
<td>Group-based PT</td>
<td>77%</td>
</tr>
</tbody>
</table>
WOMAC Pain

- WOMAC Pain over Weeks from surgery
- MHP, 1 to 1, and Group lines with error bars

WOMAC Function

- WOMAC Function over Weeks from surgery
- MHP, 1 to 1, and Group lines with error bars
Patient Satisfaction with Physical Therapy and Recovery

<table>
<thead>
<tr>
<th></th>
<th>MHP</th>
<th>1 to 1</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 10 Satisfaction with Physical therapy</td>
<td>73%</td>
<td>90%</td>
<td>84%</td>
</tr>
</tbody>
</table>
Patient satisfaction with treatment frequency and duration

**Frequency of treatment**

- Not Often Enough
- Just right
- Too Often

- MHP
- 1 to 1
- Class

**Overall duration of treatment**

- Not Long Enough
- Just right
- Too Long
Patient preference for mode of rehabilitation

<table>
<thead>
<tr>
<th>Intervention received</th>
<th>Preference at Wk 10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MHP</td>
</tr>
<tr>
<td>MHP (n=29)</td>
<td>55%</td>
</tr>
<tr>
<td>1 to 1 (n=41)</td>
<td>8%</td>
</tr>
<tr>
<td>Class (n=28)</td>
<td>7%</td>
</tr>
</tbody>
</table>
### Patient Satisfaction with Physical therapy and Recovery

<table>
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<th>MHP</th>
<th>1 to 1</th>
<th>Group</th>
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</thead>
<tbody>
<tr>
<td><strong>Week 10</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction with Physical therapy</td>
<td>73%</td>
<td>90%</td>
<td>84%</td>
</tr>
<tr>
<td><strong>Week 52</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction with Recovery</td>
<td>85%</td>
<td>85%</td>
<td>91%</td>
</tr>
</tbody>
</table>
Barriers / enablers to implementing new models

Changing from 1-to-1 approach to a group or home program
- Clinician bias/resistance
- Benefits to an outpatient waitlist
- Patient satisfaction /preference

Changing from an inpatient to an outpatient approach
- Patient/spouse/carer preference (privately insured)