The Efficacy of New Total Knee Arthroplasty Rehabilitation Protocol for Good Range of Motion after Follow-up of 2 years

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Financial Disclosure

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Objective

• Total knee arthroplasty (TKA) have good clinical result and longevity. However, many patients unsatisfied with their range of motion (ROM).

• We modified our TKA rehabilitation protocol to obtain good post-operative ROM.

• We evaluated the efficacy of new TKA rehabilitation protocol compared with old one for good ROM after follow-up of 2 years.
### Materials

<table>
<thead>
<tr>
<th></th>
<th>Old rehabilitation</th>
<th>New rehabilitation</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>47 knees (Mean ± SD)</td>
<td>46 knees (Mean ± SD)</td>
<td></td>
</tr>
<tr>
<td>Gender (M/F)</td>
<td>7/40</td>
<td>7/39</td>
<td>0.97</td>
</tr>
<tr>
<td>Ht (cm)</td>
<td>153.3 ± 8.0</td>
<td>153.4 ± 6.6</td>
<td>0.78</td>
</tr>
<tr>
<td>BW (kg)</td>
<td>62.6 ± 12.9</td>
<td>60.1 ± 11.2</td>
<td>0.41</td>
</tr>
<tr>
<td>BMI(kg/m²)</td>
<td>26.5 ± 4.6</td>
<td>25.5 ± 4.3</td>
<td>0.31</td>
</tr>
<tr>
<td>Ext(°)</td>
<td>-16.0 ± 9.3</td>
<td>-14.0 ± 7.6</td>
<td>0.32</td>
</tr>
<tr>
<td>Flex(°)</td>
<td>124.2 ± 12.4</td>
<td>126.4 ± 20.3</td>
<td>0.10</td>
</tr>
</tbody>
</table>

*Chi-square test, Mann-Whitney’s U test*
Old rehabilitation:
• CPM and a standing gait exercise program @ POD 2

New rehabilitation:
• Discontinuance of CPM
• Introduction of self ROM exercise using triangular shaped knee rehabilitation cushion.
• Discouragement of standing gait exercise
• Recommendation of the elevation of operated lower leg to avoid swelling
• All rehabilitation exercise @ POD 1
Old rehabilitation

New rehabilitation

Evaluations

- ROM
- Flex% (100%: pre-Ope Flex)
- ROM% (100%: pre-Ope ROM)

@ pre-Ope, 1w, 2w, 3w, 2M, 6M, 1Y, 1.5Y, 2Y
Results-1

Graph showing changes in ROM over time. The x-axis represents time points post-operation (Pre-Ope, 1w, 2w, 3w, 2M, 6M, 1Y, 1.5Y, 2Y). The y-axis represents angle in degrees (°). Two lines are plotted:

- **Old reha ext** (blue line with square markers)
- **New reha ext** (red line with circle markers)

Three lines are plotted for comparison:

- **Old reha flex** (green line with triangle markers)
- **New reha flex** (purple line with diamond markers)

The graph includes significance levels:

- *p* < 0.05
- **p** < 0.01
Results-2

Flexion (Flex(%)) over time with comparison between Old reha Flex(%) and New reha Flex(%)

** p<0.01
Results-3

- Old reha ROM(%)
- New reha ROM(%)

** p<0.01
CPM is passive exercise and patients are able to exercise at only setting angle and time.

The self ROM exercise using triangular shaped knee rehabilitation cushion is active exercise and patients are able to exercise at maximum angle and time as much as possible.

This exercise is easy to encourage patients’ motivation for ROM exercise.

All rehabilitation exercise were started @ POD 1; one day earlier that previous protocol.
Discussions

CPM

Positive

CPM 90.2° vs Control 87.7° @ Hp discharge ¹)
ROM↑, analgesic use↓ @ 2w ²)

Negative

No benefit ³-⁵)

Alternative device of CPM

Slider Board ⁶)

Sling exercise ⁷)

Self exercise, Cost effective
Conclusions

• This ROM exercise in early post-operative period is able to start before post-operative joint contracture.

• These modifications of TKA rehabilitation protocol are considered to contribute good ROM after follow-up of 2 years.

• However, this protocol is not suitable for the unmotivated or upper extremity disability patients such as dementia, post-operative delirium, and rheumatoid arthritis.


