Case Study

Partial Weight Bearing

Rehabilitation Progress after Surgery of Bucket Handle Tear of Meniscus
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Summary
CS03-M – Partial Weight Bearing

1. Task: Walking in daily life and following MD's instructions
2. Subject: 38-year old, male, weight 82kg, height 1.91m
3. Relevance: 1) Documentation of rehab process
   2) Observation/control of weight bearing limits

4. Study Design Summary
   - Type: Longitudinal, Cross Sectional, Single Subject, Multi Subjects, Intervention, Observation
   - Purpose: Prevention, Training, Rehab, Other
   - Exercise: Gait, Jump, Balance, Other

5. Results
   - Skill: Endurance, Strength, Speed, Coordination, Flexibility
   - Parameters: Mean Ground Reaction Force, Cadence, Gait Cycle Time, Stance/Swing Duration, Gait Line Length

<table>
<thead>
<tr>
<th>Skill</th>
<th>2w post-OP Left to Right Asymmetry</th>
<th>2w to 6w Overall Comparison</th>
<th>6w post-OP Left to Right Asymmetry</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endurance</td>
<td></td>
<td></td>
<td></td>
<td>Mean Ground Reaction Force</td>
</tr>
<tr>
<td>Strength</td>
<td>-64.6%</td>
<td>-88.3%</td>
<td>23.7%</td>
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<tr>
<td>Speed</td>
<td>44.4%</td>
<td>19.7%</td>
<td>8.9%</td>
<td>Cadence, Gait Cycle Time</td>
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<td>Stance/Swing Duration</td>
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<tr>
<td>Coordination</td>
<td>-47.0%</td>
<td>-37.2%</td>
<td>-9.8%</td>
<td>Gait Line Length</td>
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<tr>
<td>Flexibility</td>
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</table>

6. Outcomes
   - Use of Moticon's SCIENCE system for daily life monitoring of patient's rehabilitation process feasible
   - Subject shows good compliance to weight bearing limits
   - Data from 6 weeks post-OP indicates slightly asymmetric gait and hence no full rehabilitation yet
The study was designed as a longitudinal test including a single subject observed – Patient (male, 38y, 82kg).

The study was carried out to document the rehabilitation process and observe the patient’s compliance to weight bearing limits.

Walking in daily life

3 skill types were considered: strength, speed, and coordination.
Methods – Materials

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Moticon SCIENCE Pro Sensor Insole (Insole2), Size 7 (EU44/45), 50Hz recording rate, operation mode: Smart Recording</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software</td>
<td>Moticon SCIENCE Pro+ Software (01.11.00)</td>
</tr>
</tbody>
</table>
Methods – Protocol

Overview
Image indicates post-OP weight bearing regime during rehabilitation

Affected Body Part
Left medial meniscus (knee)

Data Capture Time Points
Daily life monitoring
Results
Results 1 – Gait Line

1. Mean gait line length asymmetry is 6w post-OP 37.2% lower compared to 2w post-OP
2. Asymmetry with regards to mean gait line width is 6w post-OP 33.5% lower compared to 2w post-OP
3. 2w post-OP left leg shows both a shorter mean gait line length (-47.0%) and a narrower mean gait line width (-64.6%) compared to right leg
4. 6w post-OP left leg shows still a shorter mean gait line length (-9.8%) and a narrower mean gait line width (-31.1%) compared to right leg

<table>
<thead>
<tr>
<th>Statistics</th>
<th>2w post-OP</th>
<th>Diff.</th>
<th>6w post-OP</th>
<th>Unit</th>
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<tbody>
<tr>
<td>Steps</td>
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<td>6710</td>
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<tr>
<td>Gait Line Length R</td>
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<td>Gait Line Width L</td>
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<td>mm</td>
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<td>L to R</td>
<td>-64.6%</td>
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<td>Gait Line Width R</td>
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</table>
1. Asymmetry with regards to mean ground reaction force is 6w post-OP 88.3% lower compared to 2w post-OP
2. 2w post-OP left leg shows a 64.6% lower mean ground reaction force compared to right leg
3. 6w post-OP left leg shows a 23.7% higher mean ground reaction force compared to right leg

*Mean Forces are processed from forces during entire ground contact time (significantly lower than peak forces)
Results 3 – Gait Timing

1. Mean gait cadence is 6w post-OP 8.9 strides per minute or 26.8% higher than 2w post-OP
2. Mean gait cycle time is 6w post-OP 0.34s or 18.8% lower compared to 2w post-OP
3. Left to right difference with regards to mean stance duration is 6w post-OP 45.7% lower compared to 2w post-OP
4. Left to right difference with regards to mean swing duration is 6w post-OP 116.6% higher compared to 2w post-OP
Results 4 – Weight Bearing Histogram*

1. 2w post-OP partial weight bearing threshold of 20kg is exceeded in 20.0% of all steps (yellow bars)

* Weight bearing histogram is processed for stance phase only
Discussion
## Discussion

1. Asymmetry with regards to mean ground reaction force is considerably lower (88.3%) 6w post-OP compared to 2w post-OP

2. Performance parameters related to speed of motion, mainly gait timing parameters, are overall 19.7% better 6w post-OP compared to 2w post-OP

3. Asymmetry of gait line length has significantly decreased from -47.0% at 2w post-OP to -9.8% at 6w post-OP

4. Subject showed good compliance to weight bearing limits

5. For all performance parameters related to strength, speed and coordination there is still some degree of asymmetry present 6w post-OP

### Table: 20 Hop Jumps Performance

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Contact

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