Fixation of Osteochondritis Dissecans (OCD) Lesions Using ActivaPin™s

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### Summary Table

<table>
<thead>
<tr>
<th>Smoking:</th>
<th>Yes</th>
<th>Sex:</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of alcohol:</td>
<td>Normal use</td>
<td>Age:</td>
<td>18 years</td>
</tr>
<tr>
<td>Other disease:</td>
<td>No</td>
<td>Height:</td>
<td>195 cm</td>
</tr>
<tr>
<td>Contin. medication</td>
<td>No</td>
<td>Weight:</td>
<td>90 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operator:</th>
<th>Tero Järvinen</th>
<th>Operation:</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dg no.:</td>
<td>M93.2</td>
<td>Operation no.:</td>
<td>-</td>
</tr>
<tr>
<td>DG:</td>
<td>OGD genu i.sin</td>
<td>Description:</td>
<td>-</td>
</tr>
</tbody>
</table>

- Description: Debridement of the bed and the OCD fragments softly by shaver. 30 – 50 microfractures to all directions (comprising the condyle) in the bony "bed" with K-wire. Fixation of the OCD fragments by 8 (4+2+2) Bioretex's resorbable 30 mm (4 pcs 2.0, 4 pcs 1.5) pins (ActivaPin™). Restoration of joint line established.

<table>
<thead>
<tr>
<th>Injury date:</th>
<th>2002</th>
<th>Immobilisation:</th>
<th>Free mobilisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation date:</td>
<td>12.2010</td>
<td>Prim. weight bearing:</td>
<td>No weight be 6 weeks</td>
</tr>
<tr>
<td>Operation time:</td>
<td>120 min</td>
<td>Sec. weight bearing:</td>
<td>Partial weight 3 weeks</td>
</tr>
<tr>
<td>Hospital stay:</td>
<td>2 days</td>
<td>Sick leave:</td>
<td>75 days</td>
</tr>
</tbody>
</table>

- Bloodless field during operation: Yes
- Prophylactic antibiotics: Yes

#### Implant 1: ActivaPin REF B-AP-1530
- Implant performed: Excellent

#### Implant 2: ActivaPin REF B-AP-2030
- Implant performed: Excellent

#### Implant 3:
- Implant performed: -
- LOT: -

#### Implant 4:
- Implant performed: -
- LOT: -

- Operation: No technical difficulties
- Extra: Altogether 8 pins used to fix 3 x OCD fragments. All easy to insert and all of them 1 mm below joint line

**Metal implants:** No

**More information:** -

<table>
<thead>
<tr>
<th>Primary</th>
<th>0.5 weeks</th>
<th>6 weeks</th>
<th>3 months</th>
<th>6 months</th>
<th>1.5 years</th>
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</thead>
<tbody>
<tr>
<td>Operat.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Obj. result</td>
<td>- Moderate</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
</tr>
<tr>
<td>Subj. result</td>
<td>- Moderate</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
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<tr>
<td>Primary position</td>
<td>Exact</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bone union</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Unknown</td>
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<tr>
<td>Swelling</td>
<td>-</td>
<td>Impairment</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Redness</td>
<td>-</td>
<td>Moderate</td>
<td>Slight</td>
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<td>No</td>
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<tr>
<td>Pain</td>
<td>-</td>
<td>Occasional med.</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Second operation:

| Range of motion | - | - | - | - | - |
|                 | Flex 0 to 10 degrees | Flex 0 to 10 degrees | Normal | Normal | Normal |
| Sports activities | - | Veld sports activity | Veld sports activity | Veld sports activity | Like before |
| Tissue reaction | - | No | No | No | No |
| Infection | - | No | No | No | No |
| Thrombosis | - | No | No | No | No |
| Radial, final posit. | - | - | - | - | Stable |

**Extra notices:** Blood extravasation to the knee joint after the operation due to large number of microfracture and osteotomy. Drained in the ER by orthopaedic resident. A suspicion of purulent arthritis, inflammatory blood markers started to decrease. No antibiotics provided.
1 Case Description

- 18-year old male patient
- Left knee pain started at the age of 12 years; active floorball player at the time

- MRI 2/2005
  - Osteochondritis dissecans lesion in medial femoral condyle.
  - Diameter 3.3 cm

- Operation #1 5/2005
  - Arthroscopy
  - Cartilage intact -> Microfracture (x 6 using K-wire)
  - Outcome: Symptoms persisted

  - Arthroscopy
  - Fixation with two biodegradable nail-implants (SmartNail)
  - Outcome: Symptoms persisted
    - Pain even in minor physical activity
    - Development of flexion and extension deficit
    - Compensation in gait; turns spontaneously the knee joint into external rotation to avoid pain while walking.

- MRI 5/2009
  - Loose OCD with fluid between the fragment and main bone
  - Biodegradable nail visible, but not holding the OCD fragment in place
  - See Figures 1 and 2

- Consultation with orthopaedic surgeon at the age of 18 years
  - Flexion and extension deficit, ROM 5-135. "Limping"
  - Pain in normal physical activity, participation in sports not an option due to the pain -> Mutual decision: Re-operation
Figure 1  Loose OCD with fluid between the fragment and main bone.

Figure 2  Biodegradable nail visible, but not holding the OCD fragment in place.
2 Surgical Procedure

- **Operation #3 12/2010**
  - Arthroscopy -> mini-arthrotomy
  - Findings:
    - Three OCD fragments
      - 3 cm x 3 cm round main fragment
      - Two 2 cm x 2 cm fragments posteriorly (see flexion-deficit, not good access by arthroscopy)
      - Total area 7 cm x 2.5 cm, comprising essentially the weight-bearing part of the condyle
    - Cartilage pieces held together loosely by fibrous tissue filaments
    - Cartilage pieces "floating" (0-7 mm above the joint line), held loosely to the main bone by fibrous tissue
    - Debridement of the bed and the OCD fragments softly by shaver
    - 30 – 50 micro fractures to all directions (comprising the condyle) in the bony "bed" with K-wire
    - Fixation of the OCD fragments by 8 ActivaPin™s (4 pcs of 2.0x30 mm and 4 pcs of 1.5x30 mm), main fragment was fixed with 4 pins and smaller fragments with two pins each
    - Restoration of joint line established

![Microfractures](image)

- **Post-operative Program**
  - Immediate mobilization
  - Full ROM exercises immediately
  - Isometric quadriceps training started
  - First 4 weeks: no weight bearing
  - At weeks 5-6: partial weight bearing
  - At 6 weeks: full weight-bearing, walking exercises
3 Results

3.1 6 Weeks Follow Up

- Full ROM established
- No symptoms
- Full-weight bearing started
- Subjective evaluation: “Better than ever!”

3.2 3 Months Follow Up

- No symptoms
- Normal gait established
- Weight training started

3.3 6 Months Follow Up

- No symptoms, no pain, no detectable quadriceps atrophy
- Knee can withstand strenuous physical activity such as volleyball and floorball
- Heavy weight lifting
- Considering return to competitive sports after 6 year-hiatus

- MRI 5/2011
  - Complete osteointegration of OCD fragments
  - No fluid between the main bone and OCDs
  - Active remodeling, the pins still visible.

Figure 3  Six months follow up MRI
3.4 1.5 Years Follow Up

- No symptoms, no pain
- Has returned to active sports; recreational floorball
- Full ROM regained, normal knee status in clinical examination
- Subjective evaluation: Excellent

4 Conclusion

- ActivaPin™s are very easy and convenient to use in OCD fragment fixation.
- Orientation of polymers makes the pins almost “unbreakable”; no implant breakage encountered.
- Grooved surface provides outstanding rotational stability for the implant.
- Self-locking™ feature of the ActivaPin™ provides outstanding locking of the material as well as auto-compression at the fracture line. Crucial for small fragment fixation.
- No adverse reactions nor implant breakage during the insertions encountered by the operating surgeon using ActivaPin™s and ActivaScrew™s (approximately 50 - 100 implants; 2009 - 2012)
- The instrumentation (Pin applicator) positions the implants just below the joint line (1 mm below), which guarantees smooth flexion-extension movement of the joint, whereas the self-locking feature of the implant provides strong attachment of the implant to small OCD fragments.
- The idea of multiple micro fractures is to convert the healing conditions of OCD to resemble those of cancellous bone fracture.
- Despite extensive micro fracturing of femoral condyle, the secondary fracture is no concern; the patients are instructed to have no weight-bearing for 6 weeks due to the OCD fragments. This will provide ample time for bone to heal.

5 Contact Information Concerning the Case

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Finland