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

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M.D., Ph.D.

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Bioretec develops and produces globally innovative bioabsorbable products and surgical solutions for better patient outcome, user friendliness and cost-efficiency in clinical care.

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Summary Table

Smoking:	Yes	Sex:	Male
Use of alcohol:	Normal use	Age:	18 years
Other disease:	No	Height:	195 cm
Contin. medication	No	Weight:	90 kg

Operator:	**Tero Järvinen**		
Dg no.:	M93.2	Operation:	Other
DG:	OCD genu l.sin	Operation no.:	-

Description: Depridement 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) Bioretec`s resorbable 30 mm (4 pcs 2.0, 4 pcs 1.5) pins (ActivaPin™). Restoration of joint line established

Injury date:	2002		Immobilisation:	Free mobilisation
Operation date:	12.2010		Prim. weight bearing:	No weight be 6 weeks
Operation time:	120	min	Sec. weight bearing:	Partial weight 3 weeks
Hospital stay:	2	days		
Sick leave:	75	days		

Bloodless field during operation:	Yes
Prophylactic antibiotics:	Yes

Implant 1:	ActivaPin	REF B-AP-1530	LOT:	-
Implant performed:	Excellent			
Implant 2:	ActivaPin	REF B-AP-2030	LOT:	-
Implant performed:	Excellent			
Implant 3:	-		LOT:	-
Implant performed:	-			
Implant 4:	-		LOT:	-
Implant performed:	-			

Operation: No technical difficulties

Extra notice: 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: -

	Primary	0.5 weeks	6 weeks	3 months	6 months	1.5 years
Operator:	-	resident	-	-	-	-
Obj. result:	-	Moderate	Excellent	Excellent	Excellent	Excellent
Subj. result:	-	Moderate	Excellent	Excellent	Excellent	Excellent
Primary position:	Exact	-	-	-	Exact	-
Bone union:	-	-	-	-	Union	-
Swelling:	-	Impairment	No	No	No	No
Redness:	-	Moderate	Slight	No	No	No
Pain:	-	Occasional medic.	No	No	No	No
Second operation:	-	-	-	-	-	No
Range of motion:	-	deficit 10 to 30 degrees	deficit < 10 degrees	Normal	Normal	Normal
Sports activities:	-	-	ended sports activity	ended sports activity	ended sports activity	like before
Tissue reaction:	-	No	No	No	No	No
Infection:	No	No	No	No	No	No
Thrombosis:	No	No	No	No	No	No
Radiol. 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

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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

- **Operation #2 4/2007**
  - 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

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Figure 1 Loose OCD with fluid between the fragment and main bone.

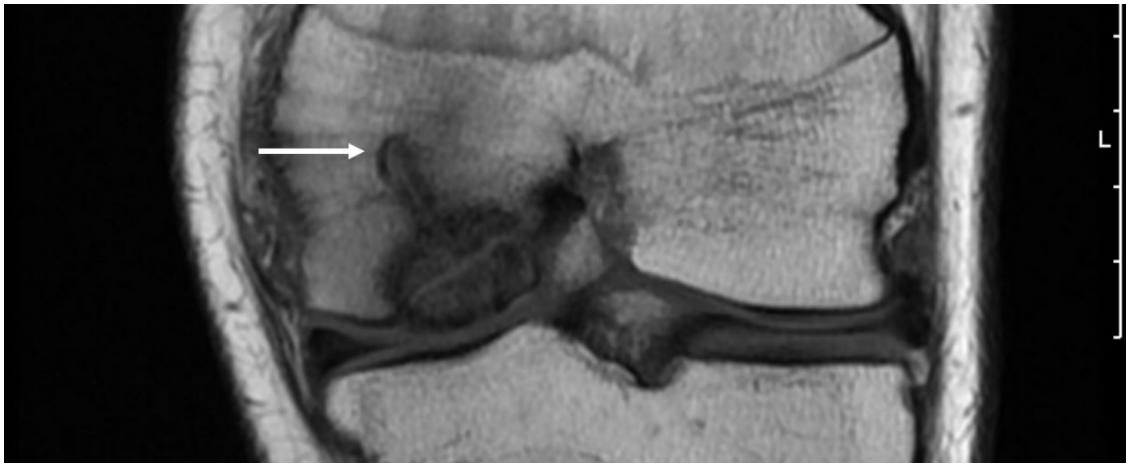

Figure 2 Biodegradable nail visible, but not holding the OCD fragment in place.

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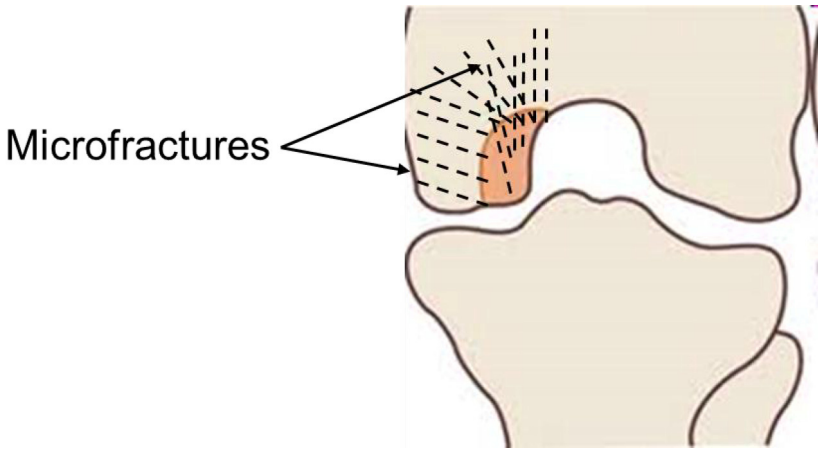
2 Surgical Procedure

- **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



- **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

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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.

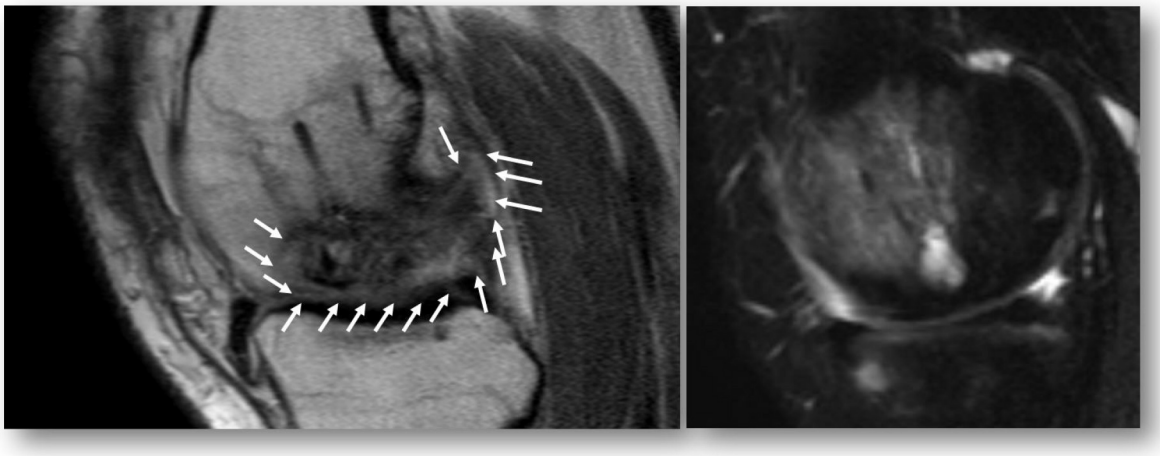

Figure 3 Six months follow up MRI

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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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