Humeral Head Reconstruction using ActivaScrew™ and ActivaPin™

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Summary Table

Smoking: No  Sex: Male  
Use of alcohol: Normal use  Age: 26 years  
Other disease: No  Height: 186 cm  
Contin. medication: No  Weight: 75 kg  

Operator: Dr. Skaliczki Gábor  
Dg no.: S4220  
Dg: Fract. cap. hum. l.d.  
AO-classification: 11C1.3  
Operation: Humeral head osteosynthesis  
Operation no.: 1  

Description: Posterior approach to the joint between the teres minor and infraspinatus muscles. Opening of the glenohumeral joint capsule. Temporary reposition of the fragment with K-wires. Final fixation by one resorbable 3.5 x 40mm, Bioretec screw, ActivaScrewTM LAG and one resorbable 1.5x70mm ActivaPin™ that is cut into 2 pieces. Restoration of the joint line established.

Injury date: 2017.04.25  
Operation date: 2017.05.30  
Operation time: 75 min  
Hospital stay: 3 days  
Sick leave: 21 days  
Bloodless field during operation: Yes  

Implant 1: ActivaScrew  
Size: 3.5x40mm  
Implant performed: Excellent  
LOT: S16042  

Implant 2: ActivaPin  
Size: 1.5x70mm  
Implant performed: Excellent  
LOT: S16068  

Extra notice: No technical difficulties  
Altogether 2 pins were used, by cutting into half the one 1.5x70mm ActivaPin. During the implantation of the pins, a metal applicator with K-wire was used.  
Applicator: REF B-DIP-1500  
LOT: S16025  

Follow Up Protocol:

<table>
<thead>
<tr>
<th>Pre-op</th>
<th>Post-op</th>
<th>Follow up 1</th>
<th>Follow up 2</th>
<th>Follow up 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time after OP.:</td>
<td>-1 day</td>
<td>+1 day</td>
<td>+3 weeks</td>
<td>+2 months</td>
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<tr>
<td>Obj. Result:</td>
<td>-</td>
<td>-</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Subj. Result:</td>
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<td>Poor</td>
<td>Moderate</td>
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<tr>
<td>Joint Stability:</td>
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<td>Excellent</td>
<td>Excellent</td>
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<tr>
<td>Bone union:</td>
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<td>-</td>
<td>Signs of bone remodeling</td>
</tr>
<tr>
<td>Swelling:</td>
<td>No</td>
<td>-</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Redness:</td>
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<td>No</td>
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<tr>
<td>Pain:</td>
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<tr>
<td>Range of motion:</td>
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<td>Flexion: 30°</td>
<td>ER: 0°</td>
<td>IR: 30°</td>
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<tr>
<td>Physical activities:</td>
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</tr>
<tr>
<td>Infection:</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Reoperation:</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
</tbody>
</table>
1 Case Description

The patient is a 26-year old normal weight male, with no systemic disease, who sustained a proximal humeral head fracture in a car accident. At the emergency medical unit the fracture was unnoticed, therefore he received conservative therapy.

For persistent pain and functional loss, the patient was referred to our Clinic. On physical examination seriously limited range of motion was observed, the AP radiograph showed incongruent humeral joint surface. A CT scan was performed, which described a humeral head fracture, with a posteriorly dislocated 30 x 35mm fragment.
2 Surgical Procedure

The joint was exposed using a posterior approach. After opening the capsule, the fragment was released, and the fracture site was debrided.

![Opened glenohumeral joint](image)

*Figure 3*  
Opened glenohumeral joint

The reconstruction of the humeral head was performed by three steps. First, two K-wires were introduced to hold the fragment in the right place.

![The fragment fixed temporarily by k-wires](image)

*Figure 4*  
The fragment fixed temporarily by k-wires
Using a drill, a hole was created for the screw and a partially threaded 3.5mm x 40mm ActivaScrew™ was introduced.

The two K-wires were replaced with the 1.5mm x 70mm ActivaPin™, that was split in two. One ActivaPin™ was used to replace to k-wires. The installation was done with Bioretec Disposable Pin Applicator.
Restoration of the humeral joint surface was established. The shoulder was put in a sling for 12 weeks. Weight-bearing was not allowed at 2 months.

![Restored Joint surface](image)

**Figure 7**  
Restored Joint surface

### 3 Post-Operative Results

#### 3 Weeks Follow Up
- X-ray shows congruent joint lines.
- The patient still using sling.
- No weight bearing.

#### 2 Months Follow Up
- The patient has no subjective complaint.
- Brace wearing stopped 2 weeks ago.
- CT shows that the fragment is in the right position, signs of bone remodeling can be observed.
- Start of passive exercises.

#### 4 Months Follow Up
- The patient has no pain. Range of motion is still limited.
  - Abduction: 0-80°, Flexion: 0-110°,
- X-ray shows good positioning of the fragment.
- Start of active exercises.
4 Conclusion

ActivaScrew™ is a suitable tool for intra-articular fixation of large fracture fragments. Additional ActivaPin™ can be used for enhanced rotational stability. The cutting of ActivaPin™ helped to reduce costs of the operation, for one implant could be used in a similar manner as two implants.

The Bioretec Disposable Pin Applicator places implants securely below the joint line. This is an important aspect of the installation to allow great joint surface restoration. Grooved design and the Self-Locking SL™ mechanism of ActivaPins™ provides excellent implant anchorage.

5 Contact information concerning the Case

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