

Mini Review

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Have You Ever had Impingement of PHILOS After MIPO for Proximal Humeral Fracture?- Clinical Advantage of Arthroscopic Removal of PHILOS

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Rec date: Jun 04, 2016; Acc date: Sep 27, 2016; Pub date: Sep 29, 2016

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Abstract

The proximal humeral fracture is a commonly encountered bone fracture. Elderly persons with osteoporosis are especially susceptible to fragility fractures as a result of minor trauma. Conservative treatment is applied for proximal humeral fractures with little transposition, but for 3 part or 4 part fractures and dislocation fractures, surgical treatment is required.

Keywords: Proximal humeral fracture; PHILOS; Subacromial impingement syndrome; Arthroscopic removal

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Strong fixation is needed in cases of fragility fractures. In recent years, a rocking plate with strong fixation has been used instead of a conventional plate, resulting in better than humeral head replacement [1,2]. One reason for the better results is less invasiveness since the procedure is performed using the MIPO method. Another is active motion can be trained at an earlier phase due to strong fixation.

Still, complications such as cutting of the screw out humeral head, humeral head osteonecrosis, impingement of the plate to the acromion, may occur even with this surgical method, resulting in restricted motion range and in occurred pain [3]. Plate impingement is the highest occurrence rate among complications. Geiger et al., reported the highest rate of plate impingement at 21.4%, Faraj et al., reported 11.9%, Siwatch et al., reported 8%, Shliemann et al., reported 18.5% and Handschin et al. reported 6% [4-6].

In cases of impingement, the plate must be removed. Removal rate is 6% to 9% [7-10]. During x-ray measurement, the following procedures were carried out to determine if the plate is set in the ideal position.

A center line is drawn along the humeral axis. A vertical line is drawn from the top of the humeral head toward the center line. The distance between the vertical line and the greater tubercle is determined as the head/greater tubercle distance (hereinafter referred to as "HGD"), and the distance between the vertical line and the top of the plate is determined as head/plate distance (hereinafter referred to as "HPD") (Figure 1).

According report from Iannotti et al. [11], since the average length of HGD is 10 mm, more than 10 mm of HPD was set as the optimum position. Even in cases of this optimum position, impingement is occurred.



Figure 1: Head greater tubercle distance and head plate distance.

Regarding this mechanism, even if postoperative rehabilitation is started in the early phase, operative damage and pain can lead to a decrease in muscle strength of the rotator cuff. As a result, the bone head is lifted upward during active elevation and abduction, and it is thought that the plate becomes stuck on the acromion and is unable to slide under it. If this is not improved, recovery of muscle strength of the rotator cuff is not considered possible.

In such case, the plate must be removed. Usually removal is performed with open surgery, and clinical results are improved. However, arthroscopic removal is more advantageous, since arthroscopic removal is less invasive.

Arthroscopic Removal Procedure

First arthroscopic capsular release around glenoid and sub acromial decompression is performed. At this time, the overall view of the plate is found with the lateral portal which is set more towards the outer side than usual.

Second the plate is exposed while confirming the axillary nerve in the back of radiofrequency probe. Two portals are placed, one in proximal region and one in the distal region, so that removal of all screws is possible. A short-cut cannula (Figure 2A) is pressed in, and a driver is inserted into the head of the screw under arthroscopic control. In Figure 2B the screw is removed while avoiding engulfing the soft tissue. If the screw head protrudes from the skin, the skin is pressed in with Kocher or something, and the screw is removed while avoiding including the skin.

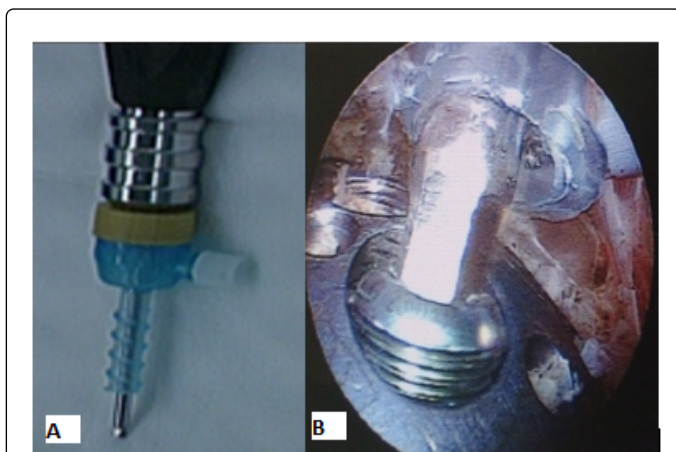


Figure 2: A driver is inserted into a short-cut cannula (A) and a driver is inserted into a screw head and a screw is removed (B).

Finally, the lateral portal is spread until plate size, and the plate is removed. No complications such as axillary nerve palsy were experienced.

We experienced 10 cases of arthroscopic removal. The average time period after PHILOS until removal is 9 months. Average range of

motion before removal was flexion 110.6°, abduction 89.0°, external rotation 22.6°. After removal, flexion 167.8°, abduction 159.2°, external rotation 44.1° VAS significantly improved from 54.9 to 4.9. Satisfaction also significantly improved from 1.2 to 4.7. The author recommends arthroscopic removal surgery to limit damage of the deltoid muscle as much as possible, and to check and evaluate rotator cuffs and sub acromial space at the same time.

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