

Is bending the hook plate necessary in acromioclavicular joint dislocation?

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Hook plate placement to treat acromioclavicular joint dislocation has been used widely since the 1980s despite the inconvenience of having to remove the plate several months after surgery [1]. The reason for its continued use is that the operation is simple, and the effect is satisfactory [2,3]. However, several complications of this procedure are controversial.

One of them is subacromial erosion/osteolysis due to use of a plate hook [4,5]. The study, “The clinical outcomes of bending versus non-bending of the plate hook in acromioclavicular joint dislocation,” by Joo et al. [6] in the issue focuses on subacromial osteolysis of the hook plate and its associated deterioration of clinical outcomes. Several papers have demonstrated that friction pain and osteolysis are caused by compression of the subacromial area of the hook plate [7-10]. There also are reports of other complications, such as postoperative acromial fracture with severe osteolysis [11-15].

In a study by Joo et al. [6], the hook plate was bent with the angle of the plate hook an average of 21°, and patient outcomes were compared with those of the non-bending group. The results showed that the incidence of subacromial osteolysis was significantly reduced, and the clinical outcome prior to plate removal had improved considerably. Since then, several studies have described the effects of the bending of hook plates. Li et al. [16] reported improved clinical results by bending the hook by 15°.

They observed that the patients’ clinical outcomes were improved by reducing the amount of hook compression applied to the subacromial area by bending the hook plate. Hyun et al. [17] applied hook plate bending that followed the patient’s unique acromial arch through a modified fluoroscopic technique (hook view) and obtained better results than those in patients who underwent non-bending procedures.

As reported by Li et al. [16], bending the hook plate reduces the transmission of excessive compressive force from the clavicle to the subacromial area by decreasing the clavicle angle [18,19]. However, according to a finite analysis by Hung et al. [20], increasing the bending angle can shorten the lever arm of the hook and increase the stress applied to the contact surface between the acromion and the plate. Even though the maximum stress was lower than the yield strength of the hook plate, there were no reports of deformity or hook fracture after hook plate bending. However, compared to the small number of clinical studies on bending plates, there is a large number of studies on non-bending plates. This makes it difficult to conclude that there are no problems with bending the hooks because they simply might not have been discovered yet.

Despite these studies, design of the hook plate has not changed much for 30 years. There could be many reasons for this lack of redesign. In most cases, the hook plate is removed within a few

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months, and the induced complications do not worsen after removal, and the clinical results improve in most cases [21,22]. Many studies recommend early removal of the hook plate to prevent complications and aggravation of clinical outcomes [8,19]. In a study of Joo et al. [6], there was a significant difference in osteolysis between the bending and non-bending groups. However, the difference in clinical results was resolved after metal removal. Even if there are only minor complications caused by a non-bending hook plate, it is important not to induce a severe complication by proceeding with early removal [15,23]. In the study of Oh et al. [24], 38% of subacromial erosion cases were confirmed in the group where the hook plate was removed at 5.31 months, but 67% of the group who had the hook plate removed at 9.65 months demonstrated the same type of erosion.

Because a randomized controlled trial or meta-analysis has not been published, a conclusion cannot be made about this issue. The hook plate bending technique is thought to be worth considering in surgeries that use a hook plate. Hook plates can be bent at an appropriate angle to match the patient's unique anatomy or shaped according to the patient's specific acromial curve. The results of additional future studies are needed to determine the best method.

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