

Are Hook Plate Complications Inevitable?

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The clavicle hook plate is employed for treating acromioclavicular (AC) and coracoclavicular (CC) ligament injuries, or distal clavicle fractures with comminution. The hook plate does not penetrate the articular cartilage of the AC joint and demonstrates a firm resistance to upward displacement of the distal clavicle.¹⁾ Several studies report promising results using the hook plate for displaced lateral clavicle fracture²⁻⁵⁾ and for AC and CC ligament injuries.^{6,7)}

However, several drawbacks are associated with the hook plate. Location of the hook in the subacromial space makes this area more crowded. Additionally, the hook plate can induce subacromial impingement,⁸⁾ resulting in discomfort from the hardware. Furthermore, some cases have reported torn rotator cuffs.⁸⁾

Secondly, placing the hook under the acromion may cause acromial erosion. Sim et al.⁹⁾ reported erosion in 62% of their cases, whereas Kim et al.¹⁰⁾ reported the incidence in all cases. Oh et al.¹¹⁾ observed subacromial erosion in AC joint dislocation and distal clavicle fractures, with significantly greater frequency in the group of distal clavicle fracture (66.7%) than in AC joint dislocation (56.4%). However, in the study by Oh et al.,¹¹⁾ the hook plate was removed earlier in the AC joint dislocation group (mean, 5.31 months) than in the distal clavicle fracture group (mean, 9.65 months). The difference in the duration from surgery to removal could affect the incidence or severity of the complication arising due to hook plate.

Other case studies have reported occurrence of acromion fractures at the weakened location,¹²⁻¹⁴⁾ with one study reporting a hook cutting through the acromion.¹⁵⁾

The causes resulting in these complications need to be analyzed to prevent future difficulties. Some biomechanical studies with hook plate have been performed. Lin et al.⁶⁾ described the preservation of rotation of the AC joint during shoulder abduc-

tion and flexion after hook plate; however, they did not provide any objective data. Kim et al.¹⁰⁾ analyzed the AC joint motion using a three-dimensional (3D) reconstruction model of 3D computed tomography images. In the normal joint, the axis of rotation of the AC joint is assumed at the center, whereas in a hook plate the hook is located posterior to the center of the AC joint. This causes an inconsistency between the center of rotation of the distal clavicle and the rotation axis of the plate, thereby resulting in erosion of the acromion or limitation of motion. This hook also blocks the sagittal rotation of the AC joint inhibiting the posterior tilt of the acromion, resulting in decreased internal rotation of the distal clavicle.¹⁰⁾

Most authors recommend removal of the hook plate to decrease incidence of complications. Lin et al.⁶⁾ advocated removal of the hook plate as soon as the bony union is achieved. Although complications of the hook plate are inevitable, all complications resolved after removal of the hook plate.¹⁴⁾ However, earlier removal of the hook plate only resulted in decreased complications.

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