

Plate Removal

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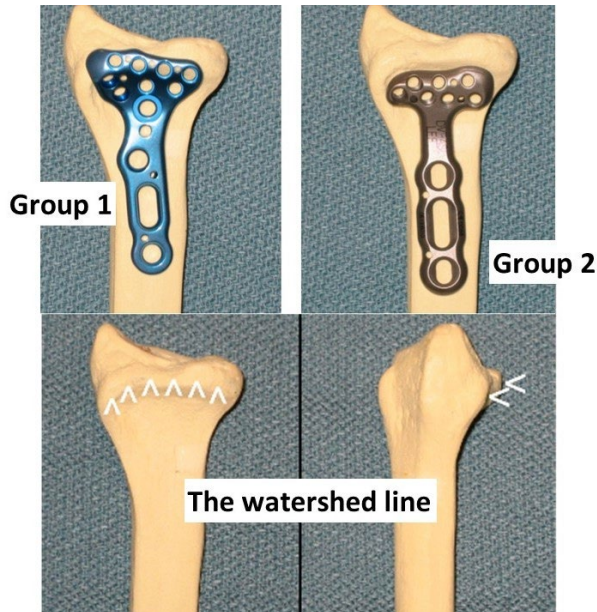
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The vast majority of volar plates used for the treatment of Colles fractures do not require removal.

The major indications for removing the plate are if there is irritation of tendons from either the plate or the screws.

Occasionally the plate is inserted very close to the joint surface because of the fracture configuration. I.e. beyond the "Watershed Line". Under these circumstances one can predict that the plate will need to be removed and this is usually done once the fracture has solidly united. Usually about 4 -6 months post fracture.



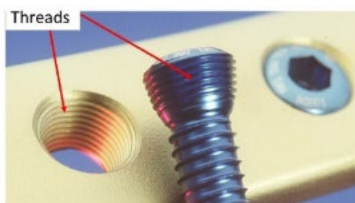
Some plate designs have an increased tendency to cause tendon irritation.



Newer designed plates are much lower profile and have smoother edges.

The locking screws have very sharp edges both in the head and at the tip of the screw.

Locking Screws



Screw head has threads that lock into threaded hole in the plate – creates a "fixed angle"

If locking screws are in any way prominent they have a great potential to cause tendon irritation.

Symptoms

The commonest symptom is discomfort on the volar or dorsal aspect of the wrist with grasping or leaning on the hand.

Sometimes swelling from the tendon irritation can cause secondary nerve entrapment such as carpal tunnel syndrome. This can be associated with numbness and tingling in the hands either with use or at night.

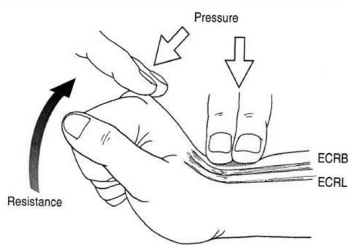
At times there are no symptoms at all.

Occasionally patients present many years after the fracture with a tendon rupture.

Examination

There may be localised discomfort or a crackling feeling (Crepitus) over the end of the plate or over the screws with finger and thumb range of motion.

2nd Compartment



- ECRL
 - 2nd MC base
 - Ext + Rad Dev
- ECRB
 - 3rd MC Base
 - Ext > Rad Dev

EPL Rupture



Investigations

An ultrasound may be very useful in determining whether there is tendon irritation and or whether tendons are at risk of rupture.

X-rays or a CT scan can often give a clue as to whether there is a risk of tendon irritation.

In general the plate is protected by the pronator quadratus muscle on the volar side of the wrist.

On the dorsum of the wrist the tendons are directly in contact with the bone and there is little protection.

If the plate is placed very close to the joint surface or protrudes in front of the volar critical line the plate may need to be removed. See diagram.

The Soong classification is a useful grading system to predict whether a plate requires removal.

Soong Grading:

- Grade 0 Plate dorsal to Volar critical line
- Grade 1 Plate volar to Volar critical line
 - Proximal to volar rim
- Grade 2 Plate dorsal to Volar critical line
 - Plate at Volar Rim

Grade 0



Grade 1

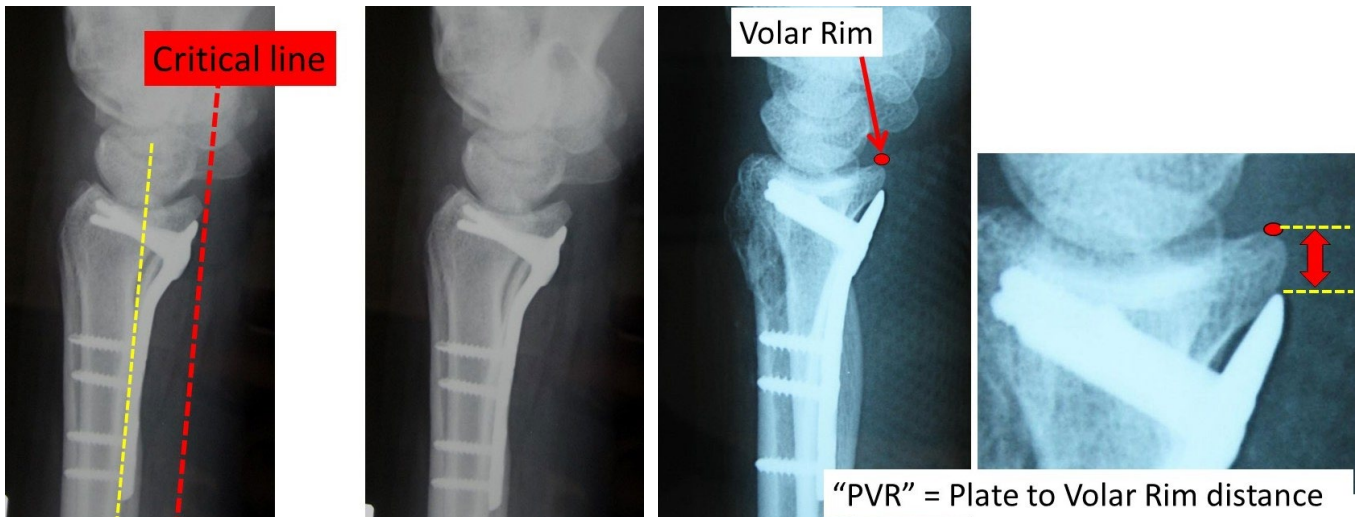


Grade 2



Consider elective hardware removal after fracture union in symptomatic patients with:

- Plate prominence greater than 2.0 mm volar to the critical line
- Plate position within 3.0 mm of the volar rim



Surgery

Removing the plate is usually done as a day only procedure. The recovery is much quicker than the initial fracture. One is not restricted by waiting for the bone to heal. The wrist can be utilised as soon as the wound has healed. The bone will go through a relatively weaker phase initially after plate removal and so contact sport should be avoided for a minimum of 6 weeks after the plate is removed. It will not reach maximum strength for at least 6 - 12 months.

When plates are removed the adjacent tendons are inspected to see whether they are at risk of rupture.

Research

Soong M., Earp B.E., Bishop G., et al:

Volar locking plate implant prominence and flexor tendon rupture.

J Bone Joint Surg Am 2011; 93: 328-335

Kitay A., Swanstrom, M., Daluiski, A et al:

Volar Plate Position and Flexor Tendon Rupture Following Distal Radius Fracture Fixation

J Hand Surg Am , 2013;38:1091-1096