

Distal Radius Malunion (and Corrective Osteotomy)



Distal radius malunion: a wrist fracture that heals in a poor position can leave the 'dinner-fork' deformity, with reduced strength and rotation.

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What you're feeling

You broke your wrist some time ago (perhaps from a fall onto an outstretched hand) and it healed. But it has not gone back to normal. The wrist may look slightly bent, crooked or shorter than the other side, sometimes with a visible bump on the back. More than the look, it often does not work the way it used to: the grip feels weak, the wrist is stiff, and turning your palm up and down (as if turning a key or a doorknob) can be awkward or painful.

Many people notice an ache on the little-finger side of the wrist (the side away from the thumb) that flares with twisting, leaning on the hand, or heavier tasks. Some feel a clunk or instability when rotating the forearm. A few develop **pins and needles** in the thumb and fingers if the healed position crowds a nerve at the wrist. These are all signs that the bone did not heal in quite the right shape.

What's actually happening

The distal radius is the larger of the two forearm bones, on the thumb side, right at the wrist. When it breaks and then heals in a poor position, we call that a **malunion**: the bone is solidly healed, just in the wrong shape. The most common pattern is that the end of the radius tilts backwards (toward the back of the hand) and the bone settles shorter, so it no longer lines up properly with the neighbouring ulna bone.

That small change in shape has knock-on effects. A shorter, tilted radius throws off the grip mechanics, so power drops. It also unbalances the joint where the two forearm bones meet near the wrist (the DRUJ), which is the joint that lets you rotate your forearm, making rotation stiff or sore. And because the radius has dropped, the ulna can effectively sit too "long," pressing on the small bones and cartilage on the little-finger side and causing that **ulnar-sided pain**. If the break ran into the joint surface itself and healed with a step, the cartilage wears unevenly and can lead to arthritis over time.

What we can do about it

At Mater Private Hospital Rockhampton, Dr Kieran Hirpara leads our upper-limb team in managing these wrist injuries. We typically begin with non-surgical care, but if pain or stiffness persists, we consider surgery after a thorough assessment of your history and imaging.

Not every crooked-healed wrist needs surgery. If the deformity is mild and you are managing well, hand therapy, activity changes, a supportive splint and simple pain relief are entirely reasonable, and we often start there.

When the deformity is significant and it is genuinely limiting you (pain, weak grip, restricted rotation) the operation that fixes the underlying problem is a **corrective osteotomy**. In plain terms, the surgeon carefully re-cuts the bone at the site of the old fracture, swings it back into the correct alignment, and holds it there with a metal plate and screws. Where the bone is opened up to restore length, the gap may be filled with **bone graft** (your own bone, donor bone, or a bone-substitute material), though with modern plates many corrections now heal reliably without a graft. If the little-finger-side bone is the main problem, the surgeon may instead (or also) **shorten the ulna** to take the pressure off that side.

These days the operation is often planned in advance on a 3D computer model of your own wrist, and the surgeon may use a custom-made guide so the cut and the realignment match the plan precisely; this is especially useful when the break went into the joint surface.

What to expect

It helps to know up front that this is a **bigger undertaking than the original fracture surgery**: the surgeon is reshaping healed bone rather than simply fixing a fresh break, so recovery is more involved and takes longer. The bone needs to knit in its new position, which typically takes a couple of months, and the plate is usually left in place.

The good news is that, for the right wrist, the gains are real and lasting: studies consistently show improved pain, better grip and better forearm rotation, and patients generally report being satisfied years later.

Correcting the shape early, before the joint and surrounding ligaments have adapted to the bad position, tends to give the best result. It is not a guarantee of a perfectly normal wrist, and if arthritis has already set in the benefit is more limited, but for a symptomatic malunion this operation reliably makes the wrist work better than it did.

When to see someone

- A wrist that healed crooked and stays painful, weak or stiff months after a fracture; it is worth having the alignment assessed, because correcting it earlier generally works better.
- **Pain on the little-finger side of the wrist** that flares with twisting or leaning on the hand, especially with a clunky or restricted forearm rotation.

- **Worsening loss of grip or rotation**, or trouble with everyday tasks like turning keys, pouring, or using tools.
- **Pins and needles or numbness** in the thumb and fingers after a wrist fracture; a nerve may be irritated and should be checked.

In more depth

This section goes further than you need for your own treatment decisions. Distal radius malunion is worth the extra reading because the corrective operation has a clear technical answer that is only recently established – and because the decision to do it at all rests on function rather than on how the X-ray looks.

THE APPROACH DETERMINES THE REOPERATION RATE

Correcting a malunion means cutting the healed bone, restoring its alignment, and holding it with a plate. That plate can be placed on the front of the radius or on the back, and the choice has been treated as a matter of preference.

The comparison across **403** patients does separate them. **Anterior plating was associated with fewer reoperations – 9% versus 28% – and less hardware removal, 3% versus 18%**, with **comparable major complications at 5% and 6%**. The authors advise that surgeons should be fully aware of the increased risks of dorsal plate fixation after corrective osteotomy [1].

The mechanism is anatomical rather than technical. On the back of the wrist the extensor tendons run directly over the bone with almost nothing between them and a plate, so hardware there is prominent, irritating, and frequently removed – and in the worst case can wear a tendon through. On the front, a layer of muscle separates the plate from the flexor tendons.

Note what did not differ: **major** complications were the same. The advantage is in avoiding a second operation for hardware, not in avoiding disaster.

WHY THE X-RAY DOES NOT DECIDE IT

A malunited distal radius healed in a poor position is visible on any film, and the deformity looks like something requiring correction. The measurements – how much the joint surface tilts, how much the radius has shortened – are what a follow-up report emphasises.

But the deformity itself is not the complaint. What people present with is loss of forearm rotation, loss of grip, pain at the ulnar side of the wrist, or an appearance that bothers them. The link between the radiographic numbers and those symptoms is loose, particularly in older patients, where substantial deformity is often well tolerated.

That is why corrective osteotomy is considered for symptoms and function, not for the appearance of a scan. A wrist that works acceptably, in a person whose demands it meets, does not need correcting because the angles are wrong.

WHAT THE OPERATION IS ACTUALLY CORRECTING

Two consequences drive most symptomatic malunions.

The first is loss of forearm rotation. When the radius heals short or tilted, it no longer rotates truly about the ulna, and turning the palm up becomes restricted – the movement needed to carry a tray, take change, or turn a key.

The second is ulnar-sided pain from relative lengthening. The radius shortens as it collapses, so the ulna becomes comparatively long and is driven against the carpal bones, producing an impaction problem as a secondary consequence of the fracture. This is treatable either by restoring the radius to length or by shortening the ulna, and which is appropriate depends on how much of the deformity sits in each bone.

Understanding those two mechanisms explains why correction is often worth considering even years after the original injury: it is addressing an ongoing mechanical problem, not repairing an old fracture.

REFERENCES

1. Essa A, Paul R, Khan S, Avisar E, Chan A, Persitz J. A meta-analysis comparing complications of anterior versus dorsal osteotomy and plate fixation for distal radius malunion. J Hand Surg Eur Vol. 2024;49(8):956-64.