CQ HAND + UPPER LIMB
SPECIALIST ORTHOPAEDIC SURGEON

PATIENT INFORMATION — IN DEPTH

How Ligaments Work and Heal

Ligaments are the joint's straps — tough bands that tie bone to bone, hold joints in line, and quietly tell your brain where the joint is in space. When a ligament is overstretched or torn (a "sprain"), the joint can feel loose or give way. One of the most useful things to understand about ligaments is that **where a ligament lives decides whether it can heal**: some, like the collateral ligaments at the side of the thumb or elbow, mend on their own; others, like the small but vital ligaments *deep inside* the wrist, famously do not. This page explains, in plain language, what ligaments do and how they heal — then, for the curious, goes deeper into why that difference exists.

What a ligament is and what it does

A ligament is a short, strong band of mostly **collagen** running from one bone to another across a joint. It does two jobs: it is a **check-rein** that stops the joint moving too far or in the wrong direction, and it is a **sensor** — packed with nerve endings that feed back the joint's position and movement (a sense called proprioception). That sensing is why a joint with a damaged ligament can feel unstable or untrustworthy even when it looks normal.

How ligaments heal (and why some don't)

A sprained ligament heals much like other tissues — bleeding and inflammation, then new collagen laid across the gap, then slow remodelling and strengthening over months. **Many ligaments heal well this way**, especially with a period of protection (a splint or brace) and graded return to load.

But not all. A ligament's ability to heal depends heavily on **where it sits**:

- Ligaments **outside** the joint capsule (like the **collateral ligaments of the thumb or elbow**) have a good blood supply and can form a healing bridge — these often recover without surgery.
- Ligaments **inside** the joint (like the **scapholunate ligament** deep in the wrist) sit bathed in joint fluid, which prevents a healing clot from forming across the torn ends. These tend **not** to heal, and when stability matters they are usually **repaired early or reconstructed** surgically rather than left alone.

CQ HAND + UPPER LIMB
Dr Kieran Hirpara — Specialist Orthopaedic Surgeon
Suite 2, Level 1, Mater Private Hospital Rockhampton, 31 Ward Street, The Range, QLD 4700
Phone 07 4863 6556 · office@cqupperlimb.com.au · cqupperlimb.com.au

What helps

- **Protected loading.** A splint or brace that allows controlled movement guides healing collagen to align, while preventing the over-stretch that would re-injure it.
- **Rehabilitation for the sensors, not just the strap.** Because ligaments provide position sense, balance and proprioception exercises are a key part of recovery and of preventing re-injury.
- **Strengthening the surrounding muscles**, which share the job of stabilising the joint.
- **Time.** Ligament remodelling runs for many months; a "healed" sprain keeps gaining strength well after it stops hurting.

In more depth

This section steps up to a more detailed, student-level explanation. It isn't needed to understand a sprain — but if you're curious about *why* a ligament deep in the wrist won't heal when a thumb ligament a few centimetres away will, read on.

LIGAMENT AS LIVING TISSUE

Like tendon, a ligament is built mostly of **type I collagen** in aligned bundles, giving it great tensile strength, with resident cells (fibroblasts) maintaining the matrix and a relatively sparse blood supply. Compared with tendon, ligament collagen is a little more **interwoven** (bundles run in slightly varied directions), suiting it to resist loads from several directions as a joint moves. Ligaments are also rich in **specialised nerve endings** that sense stretch and position — they are sensory organs as much as mechanical straps.

WHY LOCATION DECIDES HEALING: THE WRIST VERSUS THE THUMB

The principle is **inside the joint versus outside it**, and the upper limb shows both sides clearly.

The **scapholunate ligament** sits *inside* the wrist joint, between two of the small carpal bones, bathed in **synovial fluid**. When it tears completely, that fluid washes away any clot, so **no bridge ever forms** for repair cells to cross; its blood supply is poor and the torn ends pull apart. The cells are willing — but with no scaffold spanning the gap, the ends simply never reconnect. So a complete scapholunate tear generally does **not** heal on its own, and, if missed, the wrist bones gradually fall out of line and wear out (a pattern surgeons call SLAC). That is why these injuries are **repaired early or reconstructed** when stability matters.

Contrast that with the **collateral ligaments** at the side of the thumb or elbow, which lie *outside* the main joint cavity. They have a better blood supply, a clot can bridge the torn ends, and most partial tears heal well with a period of splinting — the classic example being a sprained thumb ("skier's thumb"). There is a neat exception that proves the rule: in a *complete* thumb-collateral tear, the torn end can flip back out of reach of its bony attachment (a "Stener lesion"), and then — just like the wrist ligament — it cannot heal because the two ends are no longer in contact, so it needs surgical repair.

CQ HAND + UPPER LIMB
Dr Kieran Hirpara — Specialist Orthopaedic Surgeon
Suite 2, Level 1, Mater Private Hospital Rockhampton, 31 Ward Street, The Range, QLD 4700
Phone 07 4863 6556 · office@cqupperlimb.com.au · cqupperlimb.com.au

LIGAMENT RECONSTRUCTION AND "LIGAMENTISATION"

When a key ligament won't heal — a chronic scapholunate tear, or a high-demand elbow or thumb ligament — surgeons may **reconstruct** it from a **graft** (a piece of the patient's own tendon, or a donor tendon) threaded across the joint where the ligament used to be. At first the graft is essentially non-living collagen. Over the following year it undergoes **ligamentisation**: the body's cells and blood vessels invade it, the dead collagen is gradually replaced, and it remodels into something ligament-like. This takes **many months**, the graft is temporarily *weaker* during the early remodelling phase (one reason return to heavy use is staged carefully), and the result, while good, is never a perfect copy of the original — including some loss of the natural position-sensing.

PROPRIOCEPTION AND WHY A STRETCHED JOINT FEELS UNSTABLE

Because ligaments carry position-sensing nerve endings, a damaged ligament doesn't just weaken the mechanical check-rein — it also degrades the joint's **sense of where it is**. This is why a joint after a sprain can feel like it might "give way" even when it is mechanically reasonable, and why rehabilitation deliberately retrains **balance and proprioception**, not just strength. Restoring that sense is a real part of preventing the next injury.

WHAT HELPS AND HARMS LIGAMENT HEALING

- **Controlled load and proprioceptive training** are the key stimuli; immobilising a joint completely weakens both the ligament and its sensing.
- **Blood supply and location** set the ceiling — extra-articular ligaments heal, intra-articular ones often don't.
- **Smoking, diabetes and age** impair healing, as they do across all tissues.
- **Instability left untreated** lets the joint repeatedly shift out of line, which can wear out the cartilage over time — a reason some ligament injuries are repaired or reconstructed even when the ligament itself isn't especially painful.

See also

- How tendons work and heal — ligament's close cousin (bone-to-bone vs muscle-to-bone)
- How cartilage works — what an unstable joint can wear out
- How bone heals and remodels — the bone these straps anchor into

CQ HAND + UPPER LIMB
Dr Kieran Hirpara — Specialist Orthopaedic Surgeon
Suite 2, Level 1, Mater Private Hospital Rockhampton, 31 Ward Street, The Range, QLD 4700
Phone 07 4863 6556 · office@cqupperlimb.com.au · cqupperlimb.com.au