CQ HAND + UPPER LIMB
SPECIALIST ORTHOPAEDIC SURGEON

PATIENT INFORMATION

How Muscles Work and Heal

Muscles are the body's engines — they turn the brain's instructions into movement and force, and they make up much of your body weight. Unlike cartilage, muscle has a genuine ability to **repair and even rebuild itself**, thanks to a reserve of dedicated stem cells. But that repair has limits: a small strain heals well, while a large tear or a long-neglected injury can heal with scar and never quite recover. This page explains, in plain language, what muscle is and how it mends — then, for the curious, goes deeper into how a muscle actually contracts and why some injuries leave lasting weakness.

What muscle is and what it does

A muscle is a bundle of long, thread-like cells (muscle fibres) packed together like the strands of a rope and anchored to bone by tendons. When the brain sends a signal down a nerve, the muscle fibres shorten, pulling on the tendon and moving the joint. That is the whole job: convert an electrical signal and chemical energy into pulling force.

Muscle is richly supplied with blood — which is why it bleeds and bruises when torn, but also why it has a far better capacity to heal than poorly-supplied tissues like cartilage.

How muscle heals

After a strain or tear, muscle heals in overlapping stages:

1. **Bleeding and inflammation (first days).** The injury bleeds and swells; clean-up cells move in. This is the painful, bruised phase.
2. **Regeneration (first weeks).** Reserve stem cells wake up and build new muscle fibre to bridge the gap — genuine new muscle, not just scar.
3. **Remodelling (weeks to months).** The new fibre matures and re-aligns with use, and strength gradually returns.

The catch is that regeneration and **scarring compete**. A small, clean injury regenerates well. A large tear lays down fibrous scar (and sometimes fat) faster than new muscle can form — and scar is weaker and less elastic than muscle. That is why big tears, and tears left too long, can leave permanent weakness.

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What helps muscle recover

- **Early, graded movement.** Gentle movement and then progressive loading guide the new muscle to rebuild and align — prolonged complete rest causes wasting and stiffness.
- **Not overdoing it early.** Loading a fresh tear too hard re-injures it and feeds scarring.
- **Good general health.** Adequate protein, not smoking, and well-controlled diabetes all support repair.
- **Timely treatment of big tears.** Some complete tears (for example certain tendon-muscle ruptures) do best repaired promptly, before the muscle retracts and wastes.

See also

- How nerves work and heal — the nerve and motor end plate that drive muscle
- How tendons work and heal — how muscle's pull reaches the bone
- Smoking and musculoskeletal healing — why smoking slows muscle repair

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