

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, it 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.

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