

Compartment Syndrome

A plain-English guide for you and your family

WHAT IS HAPPENING

Your muscles sit inside tough wrapping called fascia—think of it like a firm sock around your calf or forearm. Normally the pressure inside that sock is low, so blood flows easily in and out to feed the muscle. When an injury (a broken bone, a bad bruise, a crush, a burn, or even a cast wrapped too snugly) makes the inside swell or bleed, the fascia cannot stretch. The pressure climbs until it pinches the blood vessels closed. Without fresh blood, the muscle and nerves run out of oxygen fast—usually within four to six hours. The first warning is pain that feels way worse than the injury should cause, and it gets sharper when someone gently stretches that muscle. Next come tingles or numbness, then weakness. A missing pulse and total paralysis show up late, after serious damage is already done. If the compartment stays closed, the muscle dies, spilling toxins (myoglobin and potassium) into the bloodstream that can stop the heart or wreck the kidneys. The only fix is emergency surgery to slice open the fascia and let the pressure out—saving the limb means acting before the pulse disappears, not after.

What you might feel

- Very bad pain that gets much worse when you stretch the muscle
- The compartment feels firm and tight, like a blown-up balloon
- Numbness or tingling in the area past the swelling
- Weakness or trouble moving the fingers or toes beyond the injury
- Pale or shiny skin over the area
- Pain that does not get better with rest or usual pain medicine
- A pulse that is hard to feel or missing below the injury

Call the doctor right away if...

- Pain that keeps getting worse even after rest, ice, or pain medicine
- Numbness, tingling, or cannot feel light touch in the fingers or toes beyond the swelling
- Cannot move fingers or toes, or movement is very weak

- Skin looks very pale, blue, or feels cold past the injury
- Pulse is weak or cannot be felt below the injured area

What the care team will do

- Remove or loosen any cast, splint, tight bandage, or wrap down to the skin immediately and notify the provider right away.
- Assess and document pain level, firmness of the compartment, ability to move fingers or toes, sensation to light touch, skin color, skin temperature, and pulses distal to the injury every 15 to 30 minutes.
- Keep the affected limb at heart level—do NOT elevate it above the heart.
- Start or maintain IV access with a large-bore IV catheter and give aggressive IV fluids such as normal saline or lactated Ringer's solution at 200 to 300 milliliters per hour as ordered.
- Insert a urinary catheter and monitor urine output every hour, watching for dark brown or tea-colored urine.
- Prepare the patient for emergency fasciotomy by keeping them NPO (nothing by mouth), obtaining informed consent, and coordinating with the operating room.
- Monitor serum potassium, creatinine, and creatine kinase (CK) levels closely and report dangerous values to the provider immediately.
- Have emergency high potassium (hyperkalemia) treatment at the bedside: calcium gluconate, insulin with dextrose, and sodium bicarbonate, ready to give if potassium rises above 6.0 milliequivalents per liter.

Medicines you may be given — and why

Fasciotomy (surgical procedure, not a drug)

The surgeon cuts open the tight tissue wrapper (fascia) around the muscle compartment so the swelling can escape and blood can flow again. This lowers the pressure inside the compartment immediately, which saves the muscle and nerves from dying.

Intravenous normal saline

Saline is salt water given through an IV to flush damaged muscle proteins (myoglobin) out of the blood and through the kidneys before those proteins clog the kidney filters. It also keeps blood pressure stable and dilutes dangerous potassium that leaks from crushed muscle cells.

Sodium bicarbonate (baking soda solution given IV)

Bicarbonate makes the blood and urine less acidic (more alkaline). When urine is alkaline, myoglobin is much less likely to clump together and clog the kidney's tiny tubes, so it flows out safely in the urine instead of causing kidney failure.

Calcium gluconate (IV)

Calcium gluconate does not lower blood potassium, but it protects the heart muscle from dangerous rhythms caused by high potassium. It works by stabilizing the heart cell membranes so they are less likely to fire incorrectly, even while potassium is still high.

Regular insulin (with dextrose/glucose)

Insulin pushes potassium from the bloodstream into cells, which lowers the blood potassium level temporarily. Glucose is given at the same time to prevent blood sugar from dropping dangerously low.

Albuterol (inhaled, nebulized)

Albuterol activates beta-2 receptors on cell surfaces, which turns on the sodium-potassium pump and drives potassium from the blood into cells. This is the same drug used for asthma, but here it is given in higher doses to shift potassium.

Hemodialysis

A dialysis machine removes blood from the body, runs it through a filter that takes out potassium, myoglobin, and other waste, and returns clean blood to the body. This is the only treatment that actually removes potassium and toxins permanently when the kidneys cannot do the job.

Where this information comes from

- American Academy of Orthopaedic Surgeons (AAOS) 2022
- Journal of Orthopaedic Trauma consensus statement 2019
- UpToDate clinical reference
- New England Journal of Medicine clinical practice review

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