HEALTH BASICS

Periosteum

The periosteum is a sensitive layer of tissue covering most bone surfaces.

WHAT IT IS
A living tissue layer covering most bone surfaces

WHERE IT COMES UP
Bone injuries, imaging reports, surgery, and anatomy discussions

WHY IT MATTERS
Supports bone sensation, blood supply, growth, and repair

WHAT IT IS NOT
Not a disease or diagnosis

WHO TO ASK
A primary care clinician, radiologist, or orthopedic specialist

HOW IT IS CHECKED
Physical examination and imaging when medically needed

Overview

The periosteum is a thin layer of living tissue that covers most of the outside surface of a bone. It is not a disease or diagnosis. It is a normal part of your anatomy.

The word comes from "peri," meaning around, and "osteum," referring to bone. Although people often picture bone as a solid, inactive material, bone is living tissue. The periosteum is one part of the system that supplies, senses, maintains, and repairs it.

The periosteum covers areas such as the shafts of the long bones in your arms and legs. It does not cover every bone surface. At a movable joint, the ends of bones are generally covered by smooth articular cartilage instead. Cartilage helps the joint surfaces move against each other with less friction.

The periosteum is different from the endosteum. The periosteum covers the outer surface of a bone, while the endosteum lines many of its inner surfaces.

How it works

The periosteum has two main layers, although the boundary between them is not always

sharply defined.

The outer layer is tough, fibrous connective tissue. It contains collagen, a strong structural protein. This layer helps protect the bone surface and provides attachment points for some tendons and ligaments. Bundles of collagen called perforating fibers, or Sharpey fibers, help anchor the periosteum firmly to bone.

The inner layer is sometimes called the cambium layer. It contains cells that can contribute to new bone formation. This layer is especially active during childhood, when bones are growing, and after an injury such as a fracture.

Blood vessels travel through the periosteum and connect with vessels inside the bone. Bone has other sources of blood as well, including vessels that enter through openings in the bone. The periosteal circulation is particularly important to the outer part of the dense layer known as cortical bone.

The periosteum also contains many sensory nerves. These nerves can detect pain, including pain caused by injury, inflammation, pressure, or stretching around a bone. This is one reason an injury involving the bone surface may be very painful even when nearby skin damage looks limited.

During fracture healing, cells associated with the periosteum can help form a callus. A callus is temporary repair tissue that stabilizes the broken area while it is replaced and reshaped by stronger bone. The periosteum is one contributor to this process; healing also involves bone marrow, blood vessels, immune cells, and surrounding soft tissues.

Children generally have a thicker and more active periosteum than adults. It may remain partly intact around some childhood fractures, helping hold the broken bone in position and supporting repair.

Why it matters for your health

Most people never need to think about their periosteum. It does its work without requiring routine testing, monitoring, or special care.

It becomes relevant when a clinician is assessing bone pain, a fracture, an infection, or an unusual finding on an imaging test. Surgeons also consider the periosteum when operating on bone because preserving healthy tissue and blood supply may support healing.

An X-ray report may mention a periosteal reaction . This means new bone has formed along the outer surface in response to irritation or injury. It is an imaging observation, not a diagnosis.

The appearance, location, and speed of a periosteal reaction can provide clues about its cause.

For example, new bone may develop after a healing fracture, repeated mechanical stress, infection, or a bone lesion. Some causes are harmless or temporary, while others need further assessment. The imaging pattern alone does not always identify the cause.

The periosteum may also help explain why pain does not always match the visible size of an injury. Because it has a rich nerve supply, pressure or pulling at the bone surface can produce focused pain.

What can go wrong

Several conditions and situations can involve the periosteum:

Pain beside a bone does not prove that the periosteum is involved. Muscles, tendons, ligaments, joints, nerves, and skin can cause pain in the same area. A clinical assessment may be needed to distinguish among them.

- Fractures: A break can tear, lift, or stretch the periosteum. The tissue may then contribute to callus formation and bone repair.
- Periostitis: This term means inflammation around the periosteum. It can occur with repeated physical stress, infection, or other irritation. It describes a process rather than one single disease.
- Medial tibial stress syndrome: Often called shin splints, this exercise-related condition causes pain along the inner edge of the shinbone. Stress involving bone and nearby tissues, including periosteal attachments, may contribute.
- Subperiosteal hematoma: Blood can collect between the periosteum and bone after an injury. The significance depends on the location, size, cause, and surrounding structures.
- Osteomyelitis: This is an infection of bone. Infection can spread through bone and may lift the periosteum away from the surface, particularly in children.
- Bone tumors and tumor-like lesions: Some benign and cancerous bone conditions cause a periosteal reaction. A reaction does not by itself mean that cancer is present.
- Surgical or traumatic stripping: A severe injury or operation may separate periosteum and nearby soft tissues from bone. This can affect local blood supply and healing.

What you can do

If you are learning about normal anatomy and have no injury or concerning test result, there is nothing specific you need to do for your periosteum. It does not need routine screening.

If an imaging report mentions "periosteal reaction," useful questions include:

Plain X-rays often show new bone produced by a periosteal reaction. MRI can provide more detail about bone marrow and surrounding soft tissues. CT can show fine bone structure. Tests are chosen according to the clinical situation; there is no single routine test of periosteal health. Blood tests may help when infection or inflammation is suspected, but they do not directly measure the periosteum. Occasionally, a biopsy is needed to identify a concerning bone lesion.

Arrange routine clinical follow-up for persistent or recurring pain over a bone, unexplained swelling, or an imaging finding you do not understand. Prompt assessment is appropriate when localized bone pain or swelling occurs with fever, drainage, a recent operation, or a weakened immune system.

Seek emergency care after a major injury if bone is visible, a limb is badly deformed, bleeding is difficult to control, or the area beyond the injury becomes cold, pale, numb, or difficult to move.

- Where is the reaction, and what pattern does it have?
- Is there evidence of a fracture, infection, or bone lesion?
- Does it match the location and timing of my pain or injury?
- Is comparison imaging, follow-up imaging, or another test needed?

Common questions

Can you feel the periosteum?

You cannot normally identify it as a separate layer through your skin. Pressure over a bone may stimulate nerves in the periosteum and surrounding tissues, particularly where there is little muscle or fat over the bone.

Is the periosteum the same as bone marrow?

No. The periosteum covers most of the bone's outer surface. Bone marrow is soft tissue inside certain bone spaces and is involved in making blood cells and storing fat.

Does every bone have periosteum?

Most bones have periosteum over much of their outer surface. It is generally absent where articular cartilage covers the ends of bones within movable joints.

Does a periosteal reaction mean cancer?

No. It can occur with healing fractures, repeated stress, infection, benign lesions, and cancerous tumors. Its meaning comes from the full imaging appearance, your history,

examination findings, and sometimes additional tests.

Can the periosteum heal?

The periosteum is living tissue and participates in repair. How well an injury heals depends on factors such as the extent of damage, blood supply, bone stability, infection, and overall health.

Why are injuries near bone sometimes so painful?

The periosteum has many pain-sensitive nerves. Other nearby structures, including joints, tendons, muscles, and nerves, can also contribute to pain.

Sources

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