

BY HARRY J. MARKWELL, BVSC, DACVS-LA
REGISTERED SPECIALIST IN EQUINE SURGERY, WESTVETS ANIMAL HOSPITALS

WHAT IS A SEQUESTRUM?

The most common clinical sign of a sequestrum is a wound that won't heal or is slower to heal than expected. Radiographs are essential for the diagnosis and are indicated for wounds failing to heal normally 3-5 weeks after injury. A sequestrum is essentially a small piece of bone that has lost blood supply and is acting as a foreign body, trying to be expelled from the tissues. A sequestrum has the ability to form on any bone, however they are most frequently identified on the lower limbs, particularly on the cannon bone region.

Bone biology is essential in the understanding of how sequestrums occur as well when and how to treat. A normal bone, described from outer layer to inner layer is comprised of the following:

- 1. Periosteum** – outer fibrous layer of blood vessels and nerves, completely surrounds the bone, supplying up to 30% of blood supply in younger animals.
- 2. Cortex** – thick calcified bone responsible for bone strength, thicker at the middle of the long bones and thinner at the end.
- 3. Medulla** – spongy region in the center of the bone containing haemopoetic bone marrow (stem cells) and over 70% of the blood supply.

The development of a sequestrum usually occurs slowly and from two causes; 1) direct trauma to the periosteal blood supply, or 2) infection of the bone. As horses age, the component of the blood supply from the periosteum to the cortex rapidly declines with the incidence of sequestrums higher in younger horses. Due to long bones of the distal limb (usually cannon bone) lacking muscle and soft tissue coverage, they are most often subject to blunt trauma. When trauma occurs with either an open laceration or closed blunt force, the periosteal blood supply can be stripped from the outer cortex.

This may occur with a complete degloving injury (laceration) when no obvious damage to the bone is observed; or can occur after closed trauma such as when a horse has had an interference injury or kicked with no break in

the skin occurring. The response to this loss of blood supply is slow. The inner layer bone (cortex) usually starts to thicken, laying down new bone in response to a change in blood supply. This cortical response maintains weight bearing strength of the bone, with development of complete fractures after a sequestrum rare. As the inner cortex thickens and becomes an 'involucrum', the outer cortex becomes a 'sequestrum' starts to detach from the bone. After a period of 2-5 weeks, horses are often left with just an infected draining tract 'cloaca' visible on the surface. Closed injuries can occur in rare cases, but in all instances have an intense inflammatory response and low-grade infection as the body try to expel the dead piece of bone.

Treatment of sequestrums can be undertaken either surgically or medically. Medical treatment aims to reduce infection surrounding the sequestrum and allow a normal inflammatory reaction to expel the bone. Medical treatment is often prolonged and can be unsuccessful with larger sequestrums. Surgical treatment is therefore indicated in most cases. Following surgical removal, most cases respond rapidly and can return to training in 4-6 weeks. Prognosis is typically excellent.

