

STATE OF THE ART:

After an amputation was performed on a Thoroughbred mare named Callie, X-ray images show that the coffin bone has been removed.



For protection and comfort, frog tissue was removed from Callie's remaining hooves and grafted onto her stump. The frog tissue, which eventually hardens, continues to grow and requires periodic trimming just as it would on a normal hoof.



Supported by a sling, Callie has her prosthetic limb fitted. The sling plays a critical role in the recuperation of an equine amputee, providing support immediately after surgery and later on in the recovery period when medical treatment is necessary or adjustments are made to the prosthesis.



sessions. These practice runs not only accustom the horse to the sling, says Grant, they provide valuable insights into how accepting the patient will be of the changes and stresses that lie ahead.

On the day of surgery, the horse is placed under general anesthesia and positioned on either his side (lateral recumbency) or his back (dorsal recumbency). To determine how much of the limb will be removed, the surgeon examines radiographs of the area and visually inspects the tissues to determine which are healthy and which are dead or dying. "You want to leave only perfectly healthy tissue and tissue that has ample blood flow," says Grant. Typically, he removes the leg an inch or so above a damaged joint. For an injury that is elsewhere on the lower leg, he amputates an inch or so below the next highest joint to minimize stress on the remaining bone.

Prior to the amputation, the surgeon inserts two metal pins in the bone near the site. Technically known as transfixation pins, they will transfer the horse's weight around the surgical site to a temporary prosthesis, allowing him to walk immediately after surgery without placing weight on the healing stump. The pins are placed at a 30-degree angle, a recent modification that has improved the success rate of the procedure. "Pins used to be placed in the bone parallel to the ground, and fractures at the pin site during recovery from anesthesia used to be a common complication," says Vlahos. But when surgeons began placing the pins at an angle, the incidence of fractures dropped dramatically. "There is simply less concentration of stress on the bone when the pins are placed at 30-degree angles," Vlahos explains.

With the pins in place, the amputation begins. Typically, the surgeon first creates an elliptical or semicircular flap of tissue on the fleshy back side of the limb. This flap includes skin, subcutaneous fat and tissue and, if it is healthy, the stump of the flexor tendon. Later, this flap will be pulled over the bone end and sutured to the front of the limb to create a covering.

As the operation proceeds, the surgeon isolates and severs nerves, using a cryosurgery probe to freeze the endings, a technique that will minimize pain following surgery. The suspensory ligament is cut and then the bone. The end is smoothed and rounded and covered with wax to reduce bleeding.

The next step involves the most recent—and what some surgeons consider the most important—innovation in equine amputation: frog grafting and transplantation. Developed by Redden, the technique involves taking healthy frog tissue from