# Turn of the screw

Fixing fracture bones with plates and screws can offer a horse a fighting chance of returning to soundness, as **Andrea Oakes** discovers

AS the X-ray images appeared on screen, Leila Loveday didn't need her veterinary training to see that the outlook was bleak for her Irish sport horse Bambi.

The mare had been kicked in the elbow by one of Leila's geldings after escaping from her own paddock to join them. The impact had smashed the bone to pieces.

"Her elbow was shattered," recalls Leila, an equine vet, who co-owns Bambi with Sue Cross. "I feared the worst when she came in hopping lame with a nasty wound, unable to bear weight on the leg. The prognosis was dire – we were close to putting her to sleep."

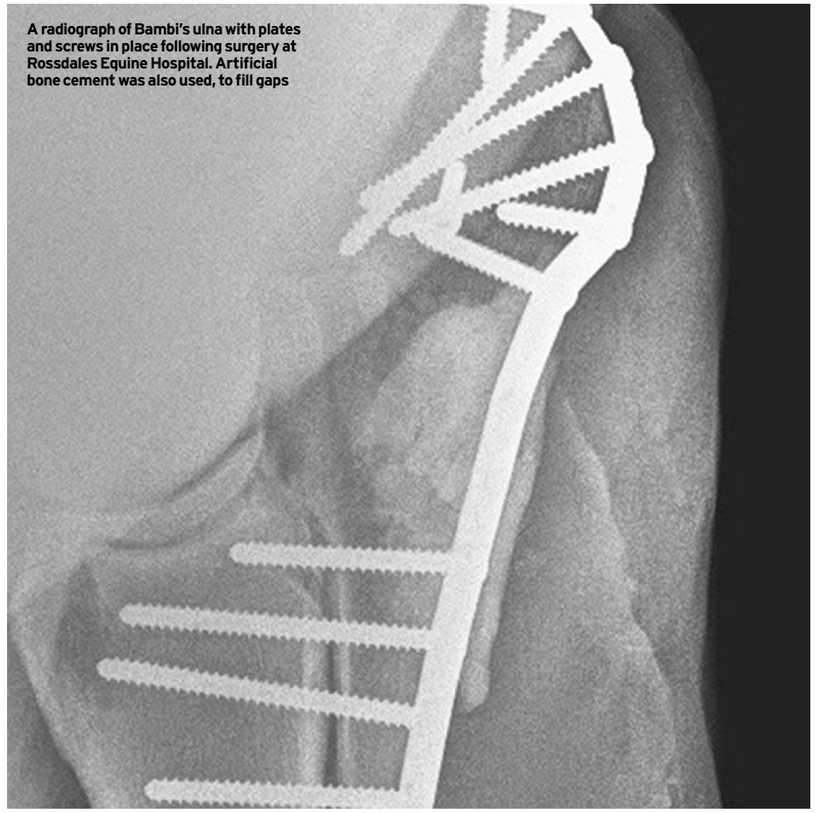
Bambi was taken to Rossdales Equine Hospital, where surgeon Tim Barnett discussed the options with her owners. While surgical repair of the fracture was a possibility, there was a significant risk that the site would fall apart after surgery or fail to heal. The greatest challenge would be returning Bambi safely to her feet after her anaesthetic and nursing her through the critical early weeks.

"She's a very amenable mare, so I knew that the aftercare would be easy if she could just get through the operation," says Leila. "We decided to go for it."

The location of the injury made the 13-year-old mare a good candidate for surgery.

"She had suffered a comminuted fracture of the ulna," says Tim, explaining that this term is applied when a bone breaks into two or more pieces. "There were a lot of free fragments of bone, with fracture lines opening up into the joint. These injuries can heal well, however, with the use of plates and screws to keep the bone together – providing that the horse gets up after surgery and keeps as still as possible for a few weeks.

"We are able to make the horse comfortable and to bear weight on the injured limb immediately following the repair of an elbow fracture," continues Tim. "With fractures of long bones, such as the radius or femur, it can be extremely difficult to make the horse comfortable enough to weight-bear. Laminitis can develop very quickly if the opposing leg is overloaded, often proving fatal."



A radiograph of Bambi's ulna with plates and screws in place following surgery at Rossdales Equine Hospital. Artificial bone cement was also used, to fill gaps


Pictures by Rossdales Equine Hospital and Sue Cross

## Inserting metalwork

WITH Bambi fully anaesthetised, the team at Rossdales could start the lengthy and complicated process of fixing the splintered pieces of bone back together.

"Infection is always a risk because injuries to this area are usually associated with a wound," explains Tim, who operated on Bambi with senior surgeon Tim Greet.

"There is very little muscle cover over the elbow, so the wound typically reaches down to the surface of the bone. It's important to remove any foreign material from these 'open fractures', making sure they're as clean as possible, because any infection will cause repairs to loosen and fail.

"When we opened up the region we found lots of damaged bone that could not be pieced back together," adds Tim. "We had to remove some of these fragments and use an artificial bone cement to fill the gaps, to allow the plate to fit neatly."

Tim explains that plates are used to counteract forces that might cause instability of the break and prevent proper alignment of the edges of the bone.

"It's vital to place the broken pieces in the correct anatomical place, or as close as you can get them," he says. "We shaped a plate to fit the bone contours, bending the metal with instruments. We then lined up the holes in the plate with areas of bone that were suitable to be drilled into, filling every hole with a screw. This gave the best chance that Bambi's repair would hold."

The critical moment was approaching, as Bambi regained consciousness after surgery. Any sudden or awkward movement could pull the metalwork clean out.

Her owners endured the long, anxious wait for news.

"We were on tenterhooks all day," recalls Leila, of the nail-biting episode in September 2015. "The operation took a few hours, but eventually Tim rang to say that she was up."

Bambi's placid nature proved a bonus during recovery. The mare stood quietly during several weeks of nursing at the hospital, before returning home for three months of box rest.

"Provided the fracture is brought close together and stabilised, with no infection, the prognosis for initial healing is good," says Tim. "The bone reacts, growing across the fracture line to form a scar.

"After around two months, the site may well be strong enough for the metalwork to be taken out. If the horse is comfortable, however, plates and screws are usually left in place with repairs such as this one. The callus [the bony healing tissue] will often wrap itself around or alongside the plate with time, making removal difficult."

Bambi makes a winning comeback to the dressage arena after her elbow fracture was fixed – 'The more work she does, the better she moves,' says Leila

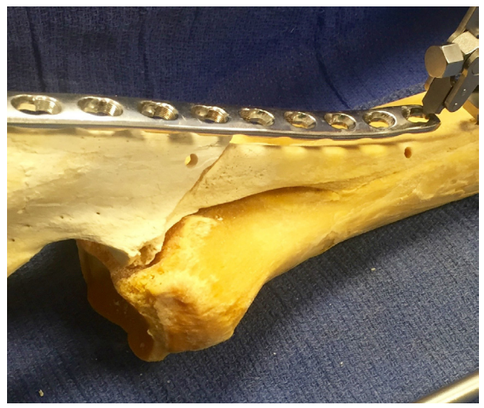
## Long-term prognosis

JUST five months after the accident, Bambi was back in light ridden work. Leila then gave the mare a further two months' rest before starting a gradual rehab programme and stepping up the schooling.

Remarkably, Bambi won both novice classes on her return to affiliated dressage in July.

"The more work she does, the better she moves," says Leila. "There's very little scarring around the elbow and you can't really feel the plate. She has even popped over a few logs in the forest.

"The plan was that she would be a hack, or, failing that, a broodmare," adds Leila, who recently qualified the mare for the Petplan Area Festival finals at elementary. "Her recovery has surpassed all our expectations. We're forever in Tim's debt, and extremely grateful to the whole team at Rossdales."



A plate being held in place on a cadaver model, with a similar fracture to Bambi's, which is how specialist surgeons practise

As for the long-term prognosis, Tim is cautiously optimistic.

"With any fracture line that leads into a joint, there's always the chance that arthritis will develop with age," he says. "But the elbow tends to cope well with this – it's a very forgiving joint.

"Of all the fracture locations, the elbow has the best potential for a positive outcome," adds Tim. "It's challenging surgery, however, and each case must be assessed on an individual basis.

"Sadly, repair is not always an option. As a surgeon, it's important to recognise the limits of the fracture you're presented with." H&H

● **NEXT WEEK: CT scans**



## MENDING BREAKS

### Fast facts

- Bone is one of the fastest-healing tissues in the body, able to regain full strength after successful healing. Outside of racing, devastating fractures are rare. The most common cause is a one-off traumatic injury – typically a kick from another horse, a road accident or collision with a solid object such as a fence post.
- Fracture repair plates are made of steel alloy, with the same type used for many species. Very few are equine-specific.
- Modern equipment and techniques now allow the repair of many distal (lower) limb fractures under standing sedation, without the need for general anaesthetic.
- A successful outcome depends upon accurate diagnosis of the fracture and careful planning of the surgical repair.
- Tim Barnett is one of the relatively few European and RCVS specialists in equine fracture surgery – and one of six such surgeons based at Rossdales Equine Hospital.

"Those of us who train as surgeons attend specific fracture repair courses," he says. "We practise on artificial cadavers and models."