Clinical Commentary

Fracture fixation in the standing horse: for surgeons who dare

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In the article by Perez-Olmos et al. (2006), 4 cases of surgical repair of spiral longitudinal metacarpal or metatarsal condylar fractures in the standing horse, using sedation and local anaesthesia are described. The main reason for performing a standing repair is to avoid the risk of catastrophic fracture of the third metacarpal/metatarsal bone during the recovery period. It is indeed generally accepted that medial condylar fractures, which often propagate in a spiralling configuration into the diaphysis, are particularly prone to catastrophic failure (Richardson 1984, 2006; Schneider and Jackman 1996). The one horse in the preceding report showing a lateral condylar fracture with a spiral configuration is more an exception since most lateral condylar fractures typically exit the lateral cortex a few centimetres above the physeal scar remnant and do not have a high risk of diaphyseal fracture (Richardson 2006).

To avoid post surgical catastrophic fracture of the metacarpus/metatarsus in horses with medial condylar fractures, the use of special recovery systems (raft recovery or a special hydro pool system) is strongly recommended (Bettschart-Wolfensberger 2006; James and Richardson 2006). Unfortunately these systems are not available in most equine clinics, and therefore surgeons can often only rely on the use of a full-limb cast or Robert-Jones bandage in combination with hand-assisted recovery. Although the number of fatalities associated with head and tail rope recovery is very limited, catastrophic failure after medial condylar fracture repair cannot always be avoided (Wilderjans 2004). Therefore, the proposed standing surgical repair certainly offers an important advantage in avoiding the risk of injury during recovery.

However, the value of the standing technique needs to be proven with further cases, as is also stated by the authors. First of all, the hindlimb was involved in only 1 out of 4 cases whereas it is generally accepted that the metatarsus is much more prone to catastrophic failure after medial condylar fracture compared to the metacarpus (Richardson 1984, 2006). Secondly, complications after medial condylar fractures can occur as well before surgery, during the recovery or even several weeks after repair of the fracture with lag screws. In the case series described by Richardson (1984), 3 catastrophic mid-diaphyseal metatarsal fractures occurred several days after surgery, despite a good fracture fixation with 3 or 4 distal lag screws. These metatarsal fractures were uniformly Y-shaped and in no case could the medial or lateral branch of the complete Y-fracture be seen on preoperative radiographs. A standing surgical lag screw technique can certainly avoid the important rotational forces on the limb during the recovery phase, but this approach is probably not a guarantee against catastrophic failure later on. One could imagine similar stresses acting on the metacarpus/metatarsus when the horse gets up in his stable or during a (more or less tumultuous) transport 1 week after surgery. When placing 2 or 3 lag screws for the repair of a condylar fracture that is visible on radiographs over a length of 9–12 cm, only a very small portion of the fracture is being fixed. These screws will certainly provide good compression at the level of the joint and will enhance cartilage healing, but they are probably not as effective in avoiding a mid-diaphyseal ‘Y-shaped’ fracture compared to the plating technique that has been recommended for medial condylar fracture repair (James and Richardson 2006; Richardson 2006). Therefore, the advantage to avoid a recovery should be weighed against the risk of a less stable fixation. Indeed, in a recent article describing a similar standing surgical repair technique, one catastrophic hindlimb fracture occurred 3 days after surgery (Russell and Maclean 2006).

Surgery on the standing horse is again becoming more and more popular in veterinary medicine together with the advancements in techniques and improvements in agents for sedation and analgesia. Standing surgery not only avoids the risks of general anaesthesia and recovery for the horse, but also results in a lower client cost and a more efficient use of hospital personnel and time compared to general anaesthesia (Bertone 1991; Elce and Richardson 2002; Johnston et al. 2004). Nevertheless, orthopaedic surgery on the lower limbs can in our opinion not just be compared to any other soft tissue surgery in the standing horse. As appointed by Perez-Olmos et al. (2006), several disadvantages can be related to condylar fracture fixation in the standing horse.

Although no problems were observed with post surgical infection, maintaining a sterile surgical field during the entire procedure seems to be difficult. Elce and Richardson (2002) described a draping protocol for the arthroscopic removal of dorsoproximal chip fractures of the proximal phalanx in standing horses and did also not encounter any postsurgical infection. Nevertheless, their procedure was straightforward.

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and accomplished in 5–10 min, whereas the presently described technique is certainly longer. It also involves taking radiographs during surgery and lifting up the limb when tightening the screws, procedures that may compromise aseptic surgery.

Obtaining a good fragment apposition is another concern in the repair of condylar fractures in the standing horse. The use of a bone reduction forceps to compress the fragments before drilling could have avoided the awkward widening of the fracture gap that was observed in one case. Application of a bone reduction forceps is in our opinion certainly indicated when approaching a medial condylar fracture from lateral to avoid pushing away the fragment when drilling. In lateral condylar fractures, arthroscopically assisted repair in the recumbent horse has now become a standard procedure (McIlwraith et al. 2005; Richardson 2006). Arthroscopic inspection of the dorsal and palmar/plantar joint pouches allows assessment of fracture reduction and helps to characterise pre-existing or fracture-associated cartilage damage. In a standing fracture repair technique, only radiography can be used to control fracture apposition. Although cumbersome, a dorsal arthroscopic approach could theoretically be performed in combination with standing lag screw fixation, but a palmar approach that requires flexion of the fetlock joint can certainly not be done in the standing horse (Elce and Richardson 2002). In the treatment of nondisplaced fractures, control of perfect fragment apposition is however less critical.

Finally, the possibility of injury to the operating personnel is also a important concern when considering a standing repair technique. The combination of a good protocol of sedation and regional anaesthesia and the use of a padded floor to absorb the vibrations when drilling certainly reduces the likelihood of movement of the horse. Nevertheless, withdrawal reflexes or even kicking can never be completely avoided. When inadvertent movement occurs while drilling, it can result in a broken drill bit, damage to the expensive equipment and a decrease of the sterility of the surgical field. More importantly it can result in physical harm to the surgeon, certainly when performing a medial condylar fracture repair in a hindlimb.

As appointed by the authors, the presented standing surgical technique in certainly an option to be considered in cases where there is indeed an increased risk of catastrophic failure during recovery. For hindlimb condylar fractures, the feasibility of the technique will in our opinion depend on the horse, the surgical expertise of the surgeon and his/her courage: one dares more than another.

References


