



Levator labii superioris muscle transposition to treat oromaxillary sinus fistula (OSF) in 4 horses

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Orosinus fistula (OSF) formation is a reported complication (7-33%) after removal of the caudal four maxillary teeth in horses. Repulsion of sinus associated cheek tooth in horses creates communication between the oral cavity and paranasal sinuses. Typically, the oral aspect of vacant alveolus is temporarily protected until the alveolus fills with granulation tissue to prevent fistula formation. If conventional treatment fails to resolve OSF, muscle transposition can be considered. In horses, two facial muscles, the temporal, and levator labii superioris (LLSM), muscles have been used for correction of sinocutaneous fistulae and the levator nasolabialis muscle (LNLM) has been used for prevention of OSF and for reconstruction of maxillary sinus defects. LNLM transposition to an OSF is complicated because the muscle is difficult to mobilize and fit in the dorsal aspect of the fistula. This report describes a technique for LLSM transposition to treat OSF in 3 horses.

The fistula was exposed by a skin incision centered over the healed trephine site. The fistula was debrided, to remove epithelial tissue and leaving bleeding surfaces. The wound, fistula, and paranasal sinus cavity were lavaged. The palpable LLSM tendon was exposed through a 2 cm skin incision directly over the tendon and transected. A suture was inserted in the tendon. The LLSM was bluntly separated from the bone and subcutaneous tissue to the muscle's origin beneath the orbit. A 20-cm forceps was inserted through the incision over the fistula and advanced rostrally beneath the LNLM until it emerged at the rostral incision. The tendon suture ends were withdrawn to retract and expose the muscle. A 2 cm, longitudinal, orobuccal incision was created and a forceps were introduced into the oral cavity. The tendon suture ends were fed through the fistula into the oral cavity with hand assistance through the mouth and grasped with the forceps. The tendon and LLSM belly were advanced through the fistula and buccal incision until the muscle filled the fistula. A 5 mm longitudinal skin incision was made ventral to the buccotomy. The suture ends were grasped with subcutaneously tunneled forceps and pulled until the tendon emerged through the ventral incision. The tendon was securely fastened under slight tension to the skin and buccal musculature. The clinical cases consisted of Horse 1 with OSF next to the buccal aspect of the right maxillary fourth premolar and Horse 2+3 with OSF after repulsion of a diseased maxillary 2nd molar.

Antibiotics were administered for 11-25 days. Feed was withheld for 24 hours after surgery and slurry fed for 1-2 weeks. The oral portion of the LLSM was observed to slough 5-11 days after surgery but the fistula remained sealed with apparently still vital muscle. In all 3 horses, the devitalized segment of muscle and tendon was easily removed through the mouth after cutting the sutures anchoring the tendon. Horse 1 resolved the OSF without problems (9 years follow-up). Horse 2 showed flaccidity of the left aspect of the lower lip. At 6 months, the surgical wound and fistula had healed. The flaccidity had improved but was still apparent. At 15 months, the surgical site was only faintly visible, but mild flaccidity remained. Horse 3 healed the OSF completely and is still racing 6 years after surgery.

Development of OSF is a serious complication to repulsion of sinus associated molariform teeth. LNLM transposition has been used to prevent fistula formation but has not been evaluated for treatment of horses with established OSF. Unlike the LNLM which is flat, the LLSM is ellipsoid in its transverse plane, and has a diameter of ~2.5-3 cm at its base decreasing rostrally, in a conical shape, toward a 4-6 mm diameter tendon of insertion (500-kg horse). The LLSM originates beneath the orbit and unites with the contralateral LLS tendon at the nose to form a tendinous plate that inserts on the upper lip. The anatomic location, neurovascular supply, shape, and size of the LLSM were ideal for transposing the muscle into the fistula of these 3 horses. Upper lip elevation maintained by the contralateral intact LLSM. LLSM transposition resulted in successful healing of the 3rd or 5th maxillary cheek teeth OSF in these 3 horses. Muscle transposition did not appear to have adverse effects on labial and nasal function. Flaccidity of the lower lip in horse 2 may have been caused by damage to the ventral buccal branch of the facial nerve during buccotomy or occurred during recovery from anesthesia. Damage to this relatively wide nerve branch can be avoided by perforating the buccal musculature and oral mucosa with a blunt instrument inserted through a small, horizontal skin incision. Based on experience with these 3 horses, removal of exposed necrotic muscle and tendon stump is recommended at 1-2 weeks. Use of LLSM transposition should be considered in preference to LNLM transposition because the muscle shape is more suited to the profile of OSF.