

Parotid duct laceration repair in two horses

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ABSTRACT

Repair of parotid duct lacerations in 2 horses is described using intraluminal silastic tubing as a stent. The duct was lacerated traumatically at the facial vessel notch (*incisura vasorum facialium*) in the 1st horse, and iatrogenically after removal of an intraluminal sialolith after development of infection within the duct in the 2nd horse. In both cases, a silastic tube was passed retrograde into the duct *via* the salivary papilla, past the wound until the end lay rostroventral to the parotid salivary gland. The severed salivary ducts and the wounds were sutured. The external portion of the silastic tube was sutured to the skin and the tube left in place. Recovery in the 1st case was uneventful. In the 2nd case a salivary duct/cutaneous fistula formed at a wound distant from the sutured wound, which healed spontaneously. This technique differs from a similar described technique in that the stent tube exits the oral cavity and is attached to the outer skin surface.

Key words: ductoraphy, equine, laceration, parotid duct, salivary-cutaneous fistula.

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INTRODUCTION

The parotid duct of the horse is formed by the convergence of numerous large ductules at the rostroventral border of the parotid gland. From here the duct runs rostrally on the medial surface of the mandible and accompanied by the facial artery and vein moves laterally at the facial vessel notch (*incisura vasorum facialium*). The duct continues dorsally on the rostral border of the masseter muscle, penetrates the buccinator muscle and opens at the parotid papilla, level with the buccal surface of the 4th maxillary premolar^{3,5,8,10}. Owing to its superficial location, the parotid duct is prone to laceration, blunt trauma and iatrogenic injuries⁸.

Newton *et al.*⁹ described a surgical technique where the lacerated duct was sutured over a dog urinary catheter that acted as a stent. This catheter exited at the papillary duct inside the mouth. In a case where the ductal defect was 15 cm long, Kannegieter and Ecker⁷ performed a successful interpositional tube graft using polytetrafluoroethylene tubing.

Salivary flow may also be restored by a translocation technique, whereby the proximal portion of the duct caudal to the wound site is catheterised, leaving the rostral tip of the catheter to exit into the buccal lumen through a stab incision into the oral cavity^{4,6}. The outer wound is then sutured or allowed to granulate by 2nd intention.

Chronic salivary duct fistulae have also been treated by ligation of the duct¹¹, surgical removal² or chemical ablation¹² of the parotid gland. Spontaneous closure of the fistula may occur if treatment is deferred¹³.

The technique described in this paper allows re-anastomosis of the parotid duct over a temporary intraluminal silastic tube, which results in normal secretion of saliva at the parotid papilla, with minimal disruption of normal anatomical architecture.

CASE HISTORIES

Case 1

A 15-year-old Thoroughbred mare was presented to the Equine Clinic, Onderstepoort, with a vertical 6 cm-long laceration, approximately 1 cm deep, at the ventrolateral border of the right mandible, approximately 2 cm caudal to the facial vessel notch. Prior to admission, profuse haemorrhage was controlled by the referring clinician by means of a pressure bandage. Clinical examination revealed

no obvious injury to adjacent structures and the horse was discharged 3 days later, after treatment as an open wound. Three days later a clear fluid dripped from the wound when the horse was presented with food. The horse was re-admitted to the clinic and a diagnosis of parotid salivary duct/cutaneous fistula was made.

To establish the location of the rostral opening of the proximal duct segment, salivation was stimulated by presenting the horse with food¹³. A FG 5 silastic infant feeding tube (Viking) was inserted retrograde into the aperture. The tube was left in place. The duct's distal aperture could not be found in the granulation tissue. A decision to catheterise the distal duct and attempt sialoductoraphy under general anaesthesia was made.

The horse was administered 6×10^6 IU procaine benzylpenicillin (Depocillin, Intervet) intramuscularly prior to surgery and was premedicated with 0.5 ml 1 % propionyl promazine (Combelen, Bayer, AH) intramuscularly. Anaesthesia was induced with 25 g glyceryl guaiaccol ether (GGE Powder Kyron, Kyron) and 1 g thiopentone sodium (Intraval sodium, Rhône-Poulenc) intravenously. Inhalation anaesthesia was maintained using 2 % halothane (Fluothane, Zeneca) and oxygen.

The horse was positioned in left lateral recumbency and the right cheek area was surgically prepared. The parotid papilla was located by means of a buccotomy directly over the centre of the 4th maxillary premolar. A 2nd skin incision was made 2 cm rostral to the buccotomy site. The tip of the FG 5 silastic infant feeding tube was inserted at this skin incision and advanced subcutaneously to the buccotomy site and passed into the parotid papilla opening by visual observation through the buccotomy site. The feeding tube was passed retrograde into the rostral portion of the severed parotid duct. The tip of the tube emerged from the wound site.

The parotid duct had been only partially severed laterally. The silastic tube's tip was advanced retrograde into the proximal duct segment approximately to the rostral border of the parotid gland. Excessive granulation tissue was surgi-

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cally removed until the lacerated edges of the duct could be clearly identified. The lacerated duct was closed over the silastic tubing using single interrupted sutures of 6/0 polydioxanone (PDS, Ethicon). Routine wound closures were performed at the various sites. The external portion of the feeding tube was sutured to the skin (Fig. 1).

Following recovery, the horse was given flunixin meglumine (Finadyne, Centaur) intravenously, and 6×10^6 IU procaine benzylpenicillin (Depocillin, Intervet) intramuscularly daily for 3 days post-operatively. When presented with food, saliva flowed from the external tube opening (Fig. 2). To prevent the horse from prematurely pulling the feeding tube out, a tube gauze was applied over her head.

The horse was discharged from the clinic 2 days post-operatively. The owner was advised that the tube should stay in place for 6 weeks. Four weeks post-operatively the horse pulled the tube out and was re-admitted. Clinical evaluation showed no abnormalities and the horse was discharged. Seven months post-operatively, the owner reported that the horse appeared to have no salivary duct problems.

Case 2

An 11-year-old Thoroughbred gelding was presented to the clinic with a history of an intermandibular swelling and mild icterus. The referring clinician had suspected an abscess, possibly involving a mandibular tooth. The teeth had been floated and purulent material had been found on the float and in the mouth. No abnormal haematological parameters had been found. The horse had been given physiotherapy and was treated with antibiotics and non-steroidal anti-inflammatory drugs. However, the swelling had not responded to treatment and had enlarged considerably in 5 days. On examination, the horse had a temperature of 38.9°C , had difficulty masticating and showed pain on palpation of the swelling. The swelling extended from the right retromandibular area to rostral to the right masseter muscle. It filled the intermandibular space and was palpable lateral and ventral to the right horizontal mandibular ramus. The retromandibular portion of the mass had a few palpably fluctuant areas. Fine-needle aspirate of these areas yielded pink, purulent material. Clinical pathological results revealed only a mild hyperglobulinaemia (61.1 g/l).

A diagnosis of inter- and retromandibular abscessation of unknown aetiology

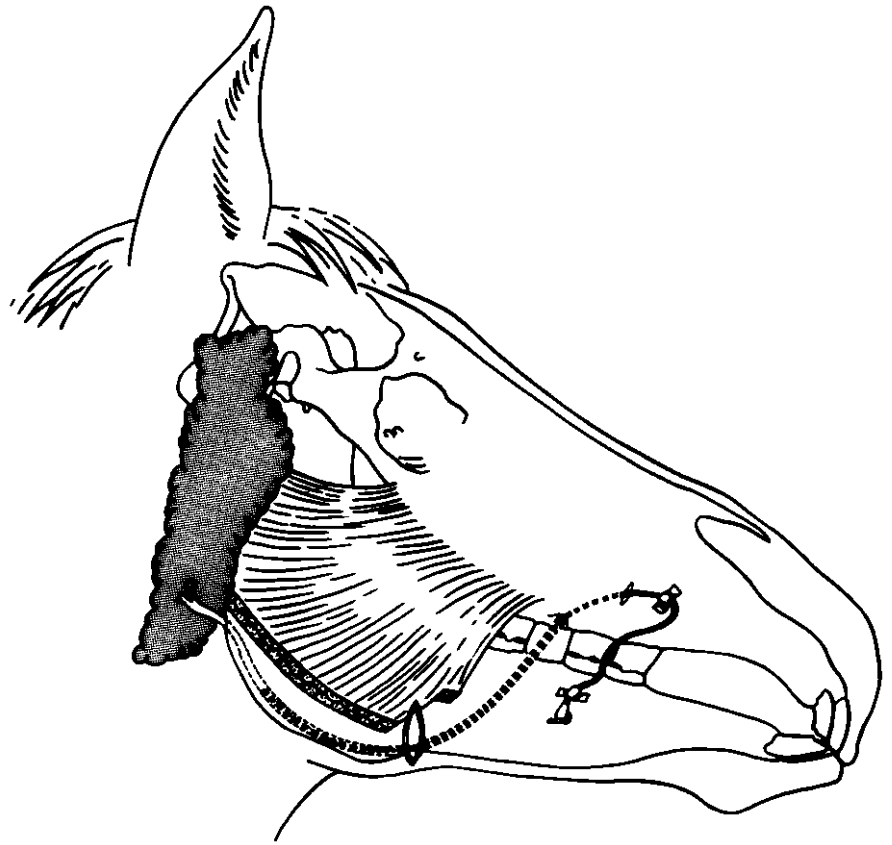


Fig. 1: Silastic stent tubing in place within parotid duct, exiting from separate skin incision and sutured to skin.

was made. Radiographs revealed increased density of the peri-mandibular soft tissues and radiolucent areas indicative of gas in the abscess area. The abscess was lanced at 2 dependent sites, drained and lavaged with copious amounts of tap water. This lavage was repeated daily until discharge. The horse was treated with 6×10^6 IU procaine benzylpenicillin (Depocillin, Intervet) intramuscularly b.i.d. and 1 g of phenylbutazone (Equipalazone, Kyron) orally every 24 h. At discharge the swelling had nearly resolved. A 7-day course of oral potentiated sulfonamides (Purbac, Lennon Medicines) at 15 mg/kg b.i.d. was prescribed and the owner advised to ensure that the lanced openings were kept patent by daily cleaning of the wounds. The wounds healed uneventfully.

Approximately 2 months later, a swelling was evident on the right lateral ramus of the mandible. It was hard and could be moved back and forth in a rostro-caudal plane. An incision was made over the mass at the extreme rostral aspect of the masseter muscle at the level of the occlusive surface of the cheek teeth. A white ovoid mass approximately $2 \times 2 \times 1.5\text{ cm}$ was removed. The wound was left open. When the horse was presented with

food, saliva flowed from the incision site. A salivary duct fistula was diagnosed.

Laboratory analysis described the material as consisting of typical calculus tissue with protein-rich homogenous matrix and calcified stromal tissue, consistent with the diagnosis of a sialolith.

The horse was re-admitted to the Equine Clinic and anaesthetised using a similar regime to that described for Case 1 and a sialoductography was performed. The horse was positioned in left lateral recumbency and the right cheek surgically prepared. The distal severed duct opening in the wound was isolated and the rounded tip of a length of 2 nylon suture material (Ethilon, Ethicon) was passed rostrally, until it emerged from the papillary duct. A 15 G needle was placed from the skin surface through the cheek immediately rostral to the papillary duct opening into the buccal cavity. The tip of a FG 5 silastic infant feeding tube (Viking) was inserted through the needle into the buccal cavity. The nylon emerging from the papillary duct was threaded into the feeding tube and the feeding tube then guided over the nylon, threaded retrograde through the papillary duct opening until it exited from the wound. The feeding tube was then placed into the caudal



Fig. 2. Saliva dripping from silastic stent tubing when the horse (Case 1) was presented with food.

duct opening at the wound and threaded retrograde until the tip rested at the ventral aspect of the parotid gland. The nylon and 15 G needle were then removed. Ductoraphy over the tubing was performed using single interrupted 5/0 polydioxanone sutures. Routine wound closure was performed. The external portion of the feeding tube was sutured to the skin.

Post-operatively the horse was given 6×10^6 IU procaine benzylpenicillin (Depocillin, Intervet) intramuscularly every 24 h for 3 days. When presented with food, saliva flowed from the external tube opening. To prevent the horse from prematurely pulling the feeding tube out, a tube gauze was applied over his head and attached behind the ears.

The horse was discharged from the clinic 4 days post-operatively. He was re-admitted 10 days later with a complaint that a clear fluid was leaking from one of the abscess lance wounds when the horse was presented with food. Contrast radiography of the wound revealed only a

short dorsally-directed fistulous tract. This tract was left open and healed with no salivary leakage after 3 months of conservative treatment. Full recovery was reported 1 year post-operatively.

DISCUSSION

In both cases, the lacerated ends of the parotid duct could be brought in apposition and re-anastomosed. An indwelling silastic stent catheter was necessary to allow normal flow of saliva without stressing the anastomosed site and to prevent stricture of the duct lumen prior to healing. The minimum time period that the stent tube should be left in place has not been determined. The horse in Case 1 pulled the tube out 4 weeks post-operatively with no apparent adverse effects. Reports in the literature do not indicate the healing time of the equine parotid duct. The technique described here differs from that reported by Newton *et al.*⁹ in that the stent catheter emerges through a buccotomy site, making it easier to remove the catheter and possibly

precluding any damage to the oral cavity around the papillary opening. Salivary flow could also be seen at the catheter opening, proving patency of the duct.

A buccotomy was performed in Case 1 to locate the papillary duct, which could not be visualised from the oral cavity. The tube was then fed into the papillary duct opening and advanced retrograde towards the lacerated area. No complications were experienced at the buccotomy site. Effective healing of the duct resulted in a normal salivary flow through the parotid duct into the oral cavity *via* the papillary duct opening. Ductoraphy using nylon suture material as a guide to the stent tube is a refinement of the technique used in Case 1 and was possible because the rostral duct opening in the wound was identifiable.

The aetiopathogenesis of the lesion in Case 2 leading to its presentation at the clinic is unclear. The intra- and retro-mandibular abscess may have been caused by irritation as result of the presence of the sialolith, only found later. The sialolith may have obstructed the salivary flow, resulting in accumulation of saliva proximal to the obstruction, which then became infected. On re-examination of the radiographs to determine whether the presence of the sialolith had inadvertently been missed, no signs of a radiodense structure conforming to the removed sialolith's description was seen. The referring clinician described the hard object palpable under the skin of the ventrolateral mandible as 'able to be moved at least 20 cm in a rostral to caudal plane'¹⁶. This indicates that the space in which the sialolith moved was relatively large: possibly a dilated or ruptured parotid duct forming the abscess lumen. Abscessation and fistula formation secondary to the presence of a sialolith have been reported⁸.

In both cases it would have been diagnostically rewarding to perform contrast radiography prior to removal of the stent tube to assess the length, patency and epithelial surface of the parotid duct. In both cases, however, the stent tube was removed by the patients prior to re-examination.

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REFERENCES

1. Bouayad H, Ouragh L, Johnson DW, Tnibar M, Azrib R 1991 Sialoliths in the horse. *Equine Practice* 13: 25-27
2. Bracegirdle J R 1976 Removal of the parotid

- and mandibular salivary glands from a pony mare. *The Veterinary Record* 98: 507
3. Dyce K M, Sack W O, Wensing C J G 1996 The digestive apparatus. In Dyce K M, Sack W O, Wensing C J G (eds) *Textbook of veterinary anatomy* (2nd edn). W B Saunders, Philadelphia: 103–477
 4. Ford T S 1992 Salivary glands. In Auer J A (ed.) *Equine surgery*. W B Saunders, Philadelphia: 306–308
 5. Sisson S 1975 Equine digestive system. In Getty R (ed.) *Sisson and Grossman's The anatomy of the domestic animals* (5th edn). W B Saunders, Philadelphia: 470–471
 6. Hofmeyr C F B 1974 The digestive system. In Oehme F W (ed) *Textbook of large animal surgery* (2nd edn). Williams and Wilkins, Baltimore: 425–426
 7. Kannegieter N J, Ecke P 1992 Reconstruction of the parotid duct in a horse using an interposition polytetrafluoroethylene tube graft. *Australian Veterinary Journal* 69: 62–63
 8. Koch D B 1982 The oral cavity, oropharynx and salivary glands. In Mansmann R A, McAllister E S, Pratt E S (eds) *Equine medicine and surgery* (3rd edn). American Veterinary Publications, Santa Barbara: 458–476
 9. Newton S A, Knottenbelt D C, Daniel E A 1997 Surgical repair of the parotid gland in a gelding. *The Veterinary Record* 140: 280–282
 10. Nickle R, Schummer A 1979 Digestive system. In Nickle R, Schummer A (eds.) *The viscera of the domestic mammals* (2nd edn). Verlag Paul Parey, Berlin: 43
 11. O'Connor J J 1950 Operations. In O'Connor J J (ed) *Dollar's veterinary surgery* Baillière, Tindall and Cox, London: 264–265
 12. Schmotzer W B, Hultgren B D, Huber M J, Watrous B J, Riebold T W, Wagner P C, Shires G M 1991 Chemical involution of the equine parotid salivary gland. *Veterinary Surgery* 20: 128–132
 13. Schumacher J, Schumacher J 1995 Diseases of the salivary glands and ducts in the horse. *Equine Veterinary Education* 7: 313–319