

The Modified Oral Palatopharyngoplasty or Modified Ahern Procedure

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Abstract: An oral palatopharyngoplasty, was a surgical procedure developed in the 1980's and first published in 1992. The purpose of the procedure was to reduce the incidence of palatal instability (PI) and subsequent dorsal displacement of the soft palate (DDSP). In the years following the first publication, the procedure underwent numerous modifications to improve the likelihood of obtaining useful increases in tension in the tissues supporting the palatine aponeurosis and at the same time reducing the incidence of wound breakdown. These changes have led to the present technique now referred to as a Modified Oral Palatopharyngoplasty or Modified Ahern Procedure.

Keywords: Palatal instability, palatoplasty, oral, DDSP.

INTRODUCTION

The Oral Palatopharyngoplasty (OPP) or Ahern Procedure first published in 1992 [1] like many other surgical procedures continued to evolve with continued modification to deal with inherent issues such as inadequate tension resulting in lesser rates of clinical improvement and conversely over tensing with resultant suture dehiscence and poor outcomes.

The rationale behind the procedure has as its base the theory of the existence of a seal mechanism that was responsible for maintaining the soft palate in a ventral position during respiratory exercise. This seal was referred to as the oropharyngeal seal (OPS) [2-4]. Cook described this mechanism as an 'oral compartment subatmospheric pressure' [5]. Once the seal was broken air could enter the space between the tongue and ventral soft palate (oropharynx). This was initially described as OPS disruption [2] and then in 2006 as Palatal Instability (PI) [3]. The role of this seal was further demonstrated when in an experiment where the bilateral hypoglossal and glossopharyngeal nerves were blocked and the epiglottis subsequently retroverted and partially obstructed the airway during inspiratory efforts, DDSP did not occur [6]. The OPP procedure was performed to increase tension in the mid and rostral area of the soft palate. Anatomically, this area of the palate was also defined by the margins of the palatine aponeurosis or broad tendon. This structure was tensed when the paired Tensor Veli Palatini muscles contracted. The caudal margin of the aponeurosis could be palpated intra-operatively and extended caudally approximately 2cm past the Isthmus

Faucium or palatoglossal pillars. It was also noted that in a study where both TVP tendons were transected, dorsal billowing of the mid and rostral section of the palate occurred during high-speed treadmill examination but dorsal displacement of the soft palate (DDSP) did not follow [6]. In another study instability of the rostral half of the soft palate and a modest inspiratory upper airway obstruction was noted with similarly tenectomised horses [7]. This dorsal billowing was more recently referred to as PI and in a study with clinical cases rather than tenectomised horses significant increases in inspiratory negative pressures were reported [8]. The modification to the original surgery involved creating two tension release incisions. Their purpose was to reduce the opportunity for wound breakdown when greater degrees of palatine tension was achieved.

MATERIALS AND METHOD

The modified OPP procedure was performed with the horse in lateral recumbency using an appropriate intravenous anaesthetic protocol for induction and maintenance. As per the original procedure a Hausmanns gag provided the optimum exposure. An assistant applied tension to the tongue to also improve exposure. A pair of tissue forceps was used to grasp the mucosa centrally at the rostral end of the proposed surgical incision (Figure 1). This was at the level of the horizontal plate of the palatine bone [9]. The mucosa only was then incised rostral to and as close as possible to the forceps. One tip of a pair of long curved blunt dissecting scissors was then introduced into the incision and longitudinal pressure was applied to further divide the mucosa lateral to the midline in an elliptical form to the caudal edge of the palatine aponeurosis. The introduced tip of the scissors would in most cases also divide submucosal glandular and

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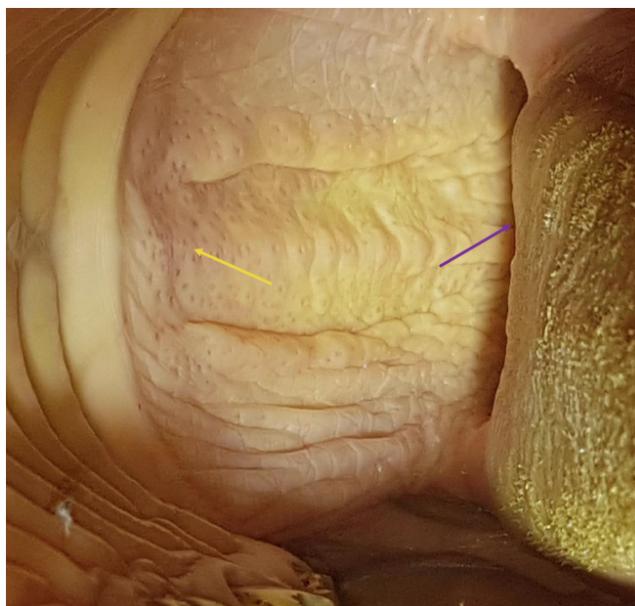


Figure 1: Ventral soft palate pre-operatively. Yellow arrow marking rostral end of incision and purple arrow caudal end.

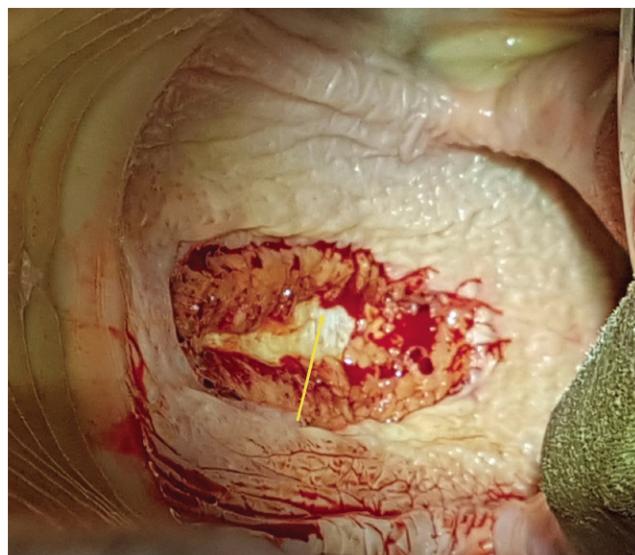


Figure 2: Ventral soft palate following excision. Exposed palatine aponeurosis (yellow arrow). Note lateral borders of incision have retracted exaggerating width of resected tissues.

connective tissues. In a similar fashion a second elliptical incision was made on the contralateral side (Figures 2 and 3). The bi-elliptical incision was at its widest point (centrally) from 1cm to 2cm in width. Those horses with narrower rostral palates and or inherent lesser degrees of flaccidity (palpable) required lesser resection. It was recommended that surgeons should take a conservative approach when resecting this tissue. Widening of the incision if required, could be accomplished by shaving 2 - 3mm of mucosa from one edge or both. This approach to widening the

incision conserved the submucosal tissues which once compressed would help to eliminate any dead space. Simple interrupted sutures were placed beginning at the caudal extremity of the wound (Figure 4). Sutures included all submucosal tissues down to the level of but not including the palatine aponeurosis. Once the surgeon was satisfied that the palate was now 'tight' tension release incisions (TRI) could be created (Figure 5). This element of the procedure was performed by firstly puncturing the mucosa lateral to the central incision at the level of the saltine bone. These were then extended caudally by dividing the mucosa with scissor whilst careful not to venture too deeply where several small arteries were prominent. These were the same length as the central incision. These tension release incisions were only incorporated where the postoperative palate was taught. If only mild tension increases were evident then TRI's were not utilised.



Figure 3: Resected mucosa and submucosal glandular and connective tissues. Arrow shows position of forceps.

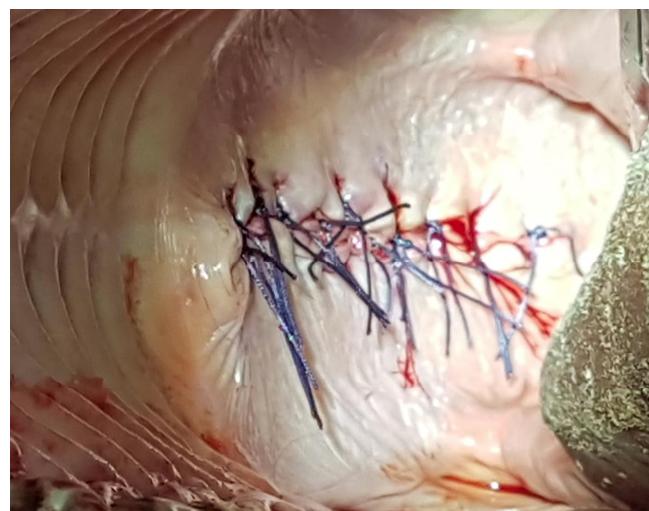


Figure 4: Sutured wound.

An OPP procedure also involved stripping of mobile subepiglottic mucosa as previously described [1]. This mucosa could be palpated and elevated manually and

resected via a laryngotomy with the horse in lateral recumbency. Another approach was to have the horse in dorsal recumbency and with an assistant using atraumatic forceps to retrovert the epiglottis the mucosa could be grasped and elevated for resection.

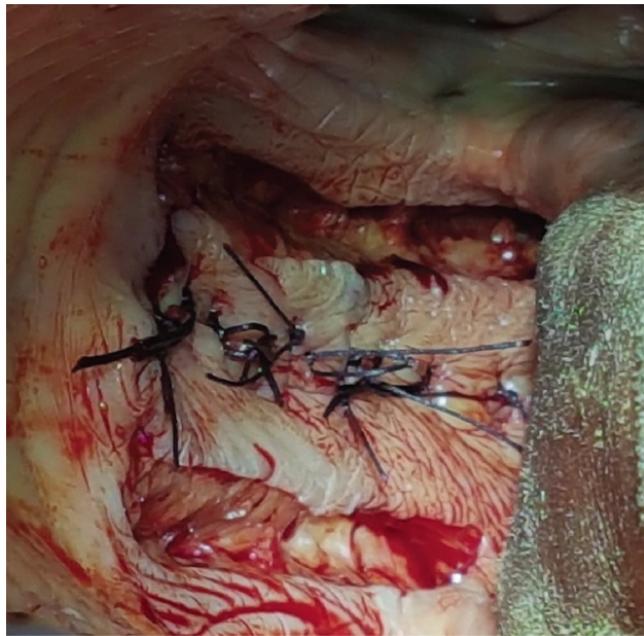


Figure 5: Tension release incisions lateral to surgical wound.

A single dose of analgesic was administered preoperatively and a further dose at 24 hours. Antibiotics were administered preoperatively and for 5 days postoperatively. Horses were boxed and fed limited soft rations for 8 days. Following this 6 weeks, paddock rest was a requirement to ensure any concurrent pulmonary inflammation had subsided.

RESULTS

Clinical

In general, owners reported their horses had improved appetites, particularly when in full work and were more relaxed in training and at events. Post race or exercise respiratory recovery rates that preoperatively were extended returned to normal ranges. Abnormal noises were not always eliminated, but these rarely appeared to influence outcomes.

Performance

In many postoperative studies, varied assessments were made of racing performance [10,11]. The assumption being that a more competent upper airway would result in improved performance. An early report on race performance following OPP surgery [12]

presented in many cases lifetime earnings rather than that of a limited number of pre and postoperative races [13]. A more recent assessment of race performance following OPP surgery on 78 thoroughbreds [14] reported no significant effect of surgery on racing post ratings, earnings or performance index in horses suspected to have DDSP. In another publication, the authors [15] when referencing this study [14] stated that the surgical wounds frequently broke down, probably due to a combination of tension on the suture line and continuing gross contamination from the oral cavity. It was assumed that in such cases the secondary intention healing with subsequent fibrosis [14,15] would provide adequate increases in tension and useful outcomes. This was at odds with the author's experiences. He had previously stated that the prognosis would seem to be poor with second intention healing [1].

A critical performance based assessment of the now Modified oral palatopharyngoplasty had yet to be carried out.

DISCUSSION

The major modification to the original OPP procedure was to utilise two tension release incisions (Figure 1) to reduce suture tension on the oral mucosa without reducing the increased tension that was attained in the deep glandular and connective tissues that abutted the palatine aponeurosis. The likelihood of suture dehiscence with wound breakdown had always increased with increases in the tension achieved intraoperatively. At the same time better outcomes accompanied greater increases in tension. Tension release incisions allowed the surgeon to achieve greater tension and thus outcomes without the high risk of wound breakdown. This maintenance of deep tension was both visibly and palpably apparent after the tension release incisions had been created (Figure 5). In addition with the original procedure [1], the cross-sectional area at the Isthmus Faucium was significantly reduced postoperatively which could reasonably create an uncomfortable situation for the horse. This narrowing was also evident with thermal cautery [11] and extreme narrowing was apparent following heavy or deep firing. The tension release wounds healed in a matter of weeks and to a large extent preserved the glossal space at the Isthmus. This approach resulted in a significant increase in tension without interfering with the horse's oral comfort. It was hoped that these release incisions would also further reduce the likelihood of wound breakdown.

If there was concern about the course of healing (wound breakdown), a postoperative examination of the surgical site under anaesthetic was required. This could be performed at any time from ten days postoperatively onwards. With a standing oral examination, one could only view the rostral section of the surgical incision. If primary union had occurred, aside from a central scar, which would also be evident with secondary intention healing, horizontal scars conforming to the sutures would be evident. The absence of suture scars at any section of the incision was highly suggestive of secondary intention healing only.

It had been reported that horses appeared to suffer significant postoperative discomfort and reduced appetite [16,17]. Postoperative pain and subsequent inappetence were not a feature of either OPP or the Modified OPP in this author's experience. This situation may have occurred with over resection and subsequent extreme tension on sutures. Extreme tension intra-operatively often resulted in wound breakdown and subsequent poor outcomes.

In determining results following different upper respiratory tract procedures the author found it disconcerting, that given a veterinarian's duty of care to his/her patient, it was rare to see reports on or discussions of the general health and wellbeing of the horse or horses. Racetrack or event performance appeared to be the major measure of surgical success. In addition, results based purely on race performance failed to address one of the most significant variables in racing. The trainer. It was widely accepted and statistically evident that individual trainers had greater or lesser strike rates (winning %). Indeed the author has trainers who over a considerable period of time demonstrated around 80% form improvement with patients postoperatively whilst others struggled to achieve a 30% improvement rate.

One of the hallmarks of the OPP procedure was that post-operatively most horses had improved appetites, gained weight and were more relaxed and willing in their athletic pursuits. These changes were evident for many years following surgery and in some cases, still evident 12-13 years later. If these changes were not evident, the author would recommend the horse be reassessed. In some of these cases further increasing tension by performing a Maximum Tension Palatoplasty [18] provided a positive outcome.

Interestingly when canine patients underwent URT procedures it was not their speed or race results, that

were assessed postoperatively [19]. Their general health and well being, ability to breathe comfortably and in addition the secondary benefits to pulmonary and cardiac function were all assessed. And additionally sleep quality, which was a subject yet to be broached in equine medicine despite the potential for episodes of nasopharyngeal collapse during sleep, was also assessed.

Robert Cook discussed a cascade of disconcerting events that could potentially follow an episode or episodes of nasopharyngeal asphyxia [5].

It is hoped that in the future the horse's health and wellbeing will assume as much importance as race performance in assessing the worth of surgical and medical procedures.

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