Modern Techniques in Oronasal Fistula Repair
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Oronasal fistula repairs seem to be notorious for failing, and are often a source of frustration for both veterinarians and their clients. Modern surgical techniques in flap creation and meticulous preparation of recipient tissue beds will dramatically increase the success rate for this repair. Oronasal fistula’s can be associated with any number of maxillary teeth, but seem to classically be associated with the loss of periodontal integrity of the canine teeth.

Oronasal fistulas can present in one of two forms. The first is the easily visualized defect leading into the sinus cavity at the location previously occupied by the maxillary canine tooth. Depending on the chronicity of the fistula, the patient may present with chronic nasal discharges and may sneeze when attempting to eat or drink. The second form, an unapparent oronasal fistula, is far less obvious to the casual glance. In these cases, the maxillary canine tooth is still present and accounted for leading one to believe that there may be nothing wrong at this site. Using a periodontal probe to assess for palatal pockets associated with the tooth will demonstrate the presence of the fistula. While typical sulcus depths on the palatal aspect of a healthy maxillary canine tooth will be 1-2mm, the patient with an unapparent fistula will demonstrate depths of 8mm or more, as the probe sinks into the space of the nasal sinus. Bleeding will occasionally be seen from the corresponding nostril after the probing has occurred. In this case, the canine tooth must be extracted followed by closure of the fistula.

Prior to performing surgical closure of an oronasal fistula, it is important to assess the site radiographically for the presence of foreign bodies, bony sequestra, and even tumors. Indeed, entire teeth can be found intruded into the nasal sinus, and must be retrieved before proceeding with the closure of the defect. The ring of epithelialized tissue surrounding the classic oronasal fistula can often appear pliable and mobile, given the lack of supporting alveolar bone. The palatal and buccal margins may even be found to meet when folded inward toward the sinus. It can be tempting to place sutures in this site to keep the margins in apposition with the expectation that the defect will go on to heal. Unfortunately, this approach will fail, as it violates three principles of fistula repair. One, apposed epithelialized surfaces will not heal together. Two, the suture line should exist over a region of underlying support, not directly over the fistula. And, three, there should be no tension placed in the tissues with an appropriate closure.

Successful closure of an oronasal fistula involves creating an appropriately sized, full thickness, rectangular mucoperiosteal flap of healthy tissue. One common mistake is to create flaps of insufficient width to provide proper coverage over the defect. It is always wise to anticipate the defect will be larger once a flap is elevated and the site is appropriately debrided of epithelial tissue. Again, pre-operative radiographs will assist the oral surgeon in determining where the bony margins of support reside, and where to place vertical releasing incisions for an adequately wide flap. Once the flap is raised, and the bony margins of the defect are exposed, gentle and cautious debridement of the bony tissue with a high speed diamond bur is typically necessary to ensure a smooth and healthy surface. Traditional surgical texts will discuss debridement of surrounding alveolar bone with rongeurs. This is likely too aggressive an approach and can easily remove additional supporting bone that is actually needed to affect a viable repair.

It is also important to assess the dentition adjacent to the site of the fistula before committing to the repair. Additional teeth may need to be extracted, and such sites may
become part of the repair. Be sure and evaluate how the opposing dentition of the mandible may affect the repair. It is always possible that a mandibular canine tooth could traumatize the surgical site and cause a dehiscence.

Vertical releasing incisions can diverge slightly as they travel apically past the attached gingiva. But care should be given not to create too extreme of a divergent pattern, as this can transect additional capillaries, and create a shape that is cumbersome to close once the flap is advanced over the defect. Vertical incisions that converge as they travel apically should absolutely be avoided, as this produces a flap base that is narrower than the leading edge, and compromises the vascular supply of the flap. The horizontal incision serves to create a de-epithelialized border that, if possible, is fashioned to meet the vertical incisions in a curved pattern rather than a sharp 90 degree angle. This will facilitate the adaptation of the flap against the palatal mucosa, and will offer a more predictable healing response.

Careful elevation of the flap is essential to avoid rips or tears in the mucosa. Sharp periosteal elevators and periosteotomes are necessary to raise a full thickness flap which includes any remaining attached gingiva, the oral mucosa, and the underlying periosteum. Sufficient length of the vertical releasing incisions and sufficient undermining of the periosteum will procure enough tissue to advance over the defect. The oral mucosa is a highly elastic tissue, while the periosteal tissue is not. Since elasticity of the flap is crucial for advancement, a periosteal releasing incision must be made at the base of the flap. This will then allow the flap to be advanced over the fistula without tension.

Prior to suturing the full thickness flap into position, it is critical to ensure all palatal tissues accepting the flap margins are fully de-epithelialized. This is readily andatraumatically accomplished with a football shaped high speed diamond bur. Even with unapparent oronasal fistulas, one will find prominent epithelial tissue extending apically into the palatal periodontal pocket. Once the canine tooth has been extracted, the epithelial downgrowth will readily be appreciated.

Suturing the full thickness flap into place is accomplished with simple interrupted 4-0 or 5-0 monofilament absorbable sutures. The corners are sutured first to ensure appropriate flap apposition. Sutures are placed 2-3mm apart, with wide bites taken through the flap and surrounding oral mucosa.

Patients are sent home with strict instructions to the client to feed a softened diet for 3-4 weeks. Elizabethan collars may be necessary if the patient shows any indication of pawing at the surgical repair, or rubbing the face on carpets in the house. Patient induced trauma can be a very real cause for surgical failure, and is always disheartening to discover after a promising repair has broken down.

The single layer closer described above will serve to repair the vast majority of oronasal fistulas. However, if a surgical repair has failed, it is important to keep several points in mind. Despite the dismay of a failed oronasal fistula repair, it is important not to rush in and immediately attempt a second (or third) repair. The tissues may be infected. The vascular and collagen supplies have been disrupted. With the overall compromised health of the tissue beds, time must be given for healing to occur. Rushing to close tissues in such a compromised state will greatly increase the chances of successive failure. Waiting six to eight weeks prior to attempting another closure is very reasonable. This will give the tissues a chance to stabilize and re-establish critical blood supplies.

When pursuing a repeated attempt at closure, one must consider available options. One is to simply pursue another single layer closure. Other options include a double layer closure, which involves elevating a palatal flap to create an initial closure, followed by a full
thickness flap closure over top. Keep in mind that with such a repair, the full thickness mucoperiosteal flap will then need to be advanced further into the palatal tissue to complete the two layer closure. If the oronasal fistulas are bilateral, one may have to stage the repairs, given the limited supply of palatal tissue available for a double layered closure.

Recently, ancillary techniques have been developed that offer additional tissue support when closing an oronasal fistula, and may be worth pursuing if traditional techniques have failed to yield a lasting repair. One of these newer procedures involves harvesting a cartilage graft from the patient’s ear, and trimming it to size to cover the defect prior to closing over, if possible, with a traditional full thickness mucoperiosteal flap. If necessary, bilateral defects can be closed with grafts harvested from each ear of the patient.

The dorsal pinna is shaved and prepped for a surgical incision. A straight incision is made through the skin, and parallel to the vasculature. (An alternate technique is to make a “U” shaped incision through the skin to more efficiently expose the cartilage surface. The base of the flap is oriented toward the base of the ear to best preserve the blood supply to the skin flap). The edges are undermined to reveal the auricular cartilage. A segment of cartilage slightly larger (2mm beyond margins of the fistula) than the shape of the defect is harvested and placed in saline soaked gauze sponges. Since there is no shrinkage of the cartilage tissue, the size of the auricular graft only needs to be slightly larger than the fistula to allow the edges to be sandwiched between the bone and mucoperiosteal tissue. Once tacked into place, a single layer flap is ideally closed over the auricular graft. The cartilage provides effective scaffolding for healing of the full thickness flap over the defect. In cases where no full thickness flap can cover the graft, the cartilage surface still provides a surface for re-epithelialization to occur.

An alternative approach to harvesting an auricular cartilage graft is to incorporate a silicone prosthesis into the repair of the oronasal fistula. A silicone nasal septal button can be trimmed appropriately to create a silicone disc that exceeds the dimensions of the oronasal fistula. Like the auricular graft, the implant edges are sandwiched in between the bone and mucoperiosteal tissues, and tacked into place with suture. The full thickness mucoperiosteal flap is then closed over the implant material, as before.

Given the frustration of obtaining a lasting closure of an oronasal fistula, it is always worth discussing potential pitfalls with the clients, and warning them of the possibility for multiple surgeries for a favorable repair. Keep in mind that what ever surgical procedure is selected for repair of the fistula, proper technique and gentle tissue handling is essential for a successful outcome.

References:


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