

# Bilateral laryngeal paralysis secondary to traumatic nerve damage in two dogs

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## Introduction

Cervical traumas are common in dogs as a consequence of bite injuries, road traffic accidents, choke chains, and gunshot injuries.<sup>1</sup> Penetrating wounds of the cervical region may be a disaster given the number of vital structures present in the area.

Laryngeal paralysis is the inability to abduct the arytenoid cartilages. Traumatic damage to the vagus or recurrent laryngeal nerve is identified as a possible cause of acquired laryngeal paralysis.<sup>2</sup> However, its occurrence remains rare.

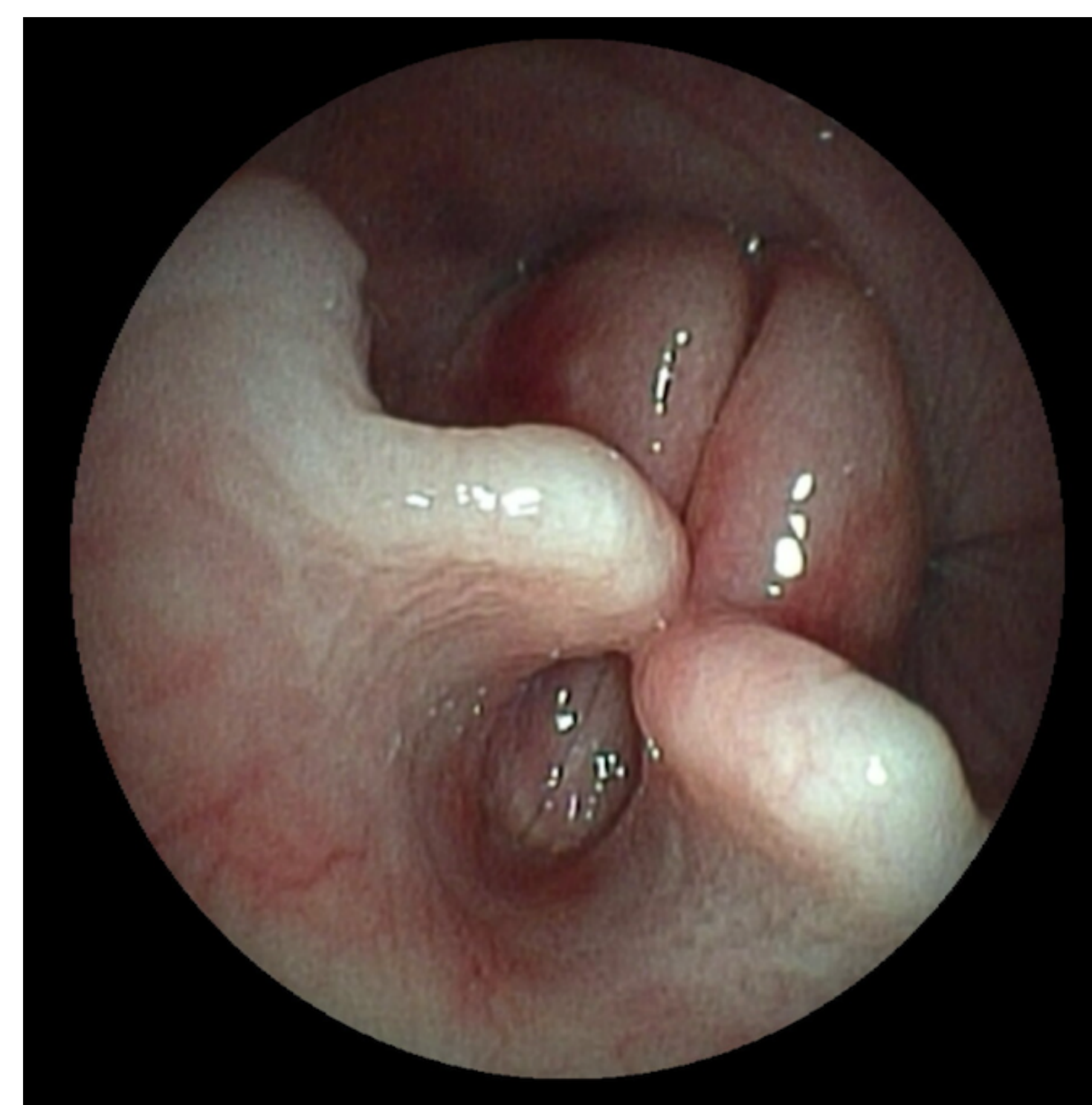
## Cases description

Two dogs were presented in emergency for cervical bite wounds.

**A 2-year-old spayed female French bulldog** was presented for dyspnea, cyanosis and severe cervical subcutaneous emphysema. Cervical radiographs showed laryngeal and dorsal tracheal wall thickening with severe narrowing of laryngeal lumen. Laryngeal ultrasonography revealed a probable cricoid cartilage tear, and intraluminal secretions and/or hematoma. Since the patient's condition deteriorated, upper digestive and respiratory tract endoscopy were realized. An elongated soft palate, bilateral laryngeal paralysis associated with edema and hematoma (figure 1), and severe tracheal injuries were observed. Surgical intervention was decided. A complete right caudal laryngeal nerve section (figure 2) was observed and the left caudal laryngeal nerve was not visualized. Tracheal tears were sutured with simple interrupted pattern. Temporary tracheostomy and soft palate resection were performed. In absence of significant improvement, upper respiratory tract endoscopy was repeated three days after surgery. Laryngeal paralysis was still present, confirmed by a doxapram hydrochloride stimulation test. After three more days of conservative treatment, the dog could still not be extubated from its tracheotomy tube and a left cricoarytenoid cartilage lateralization was realized. The dog recovered uneventfully, breathing properly.

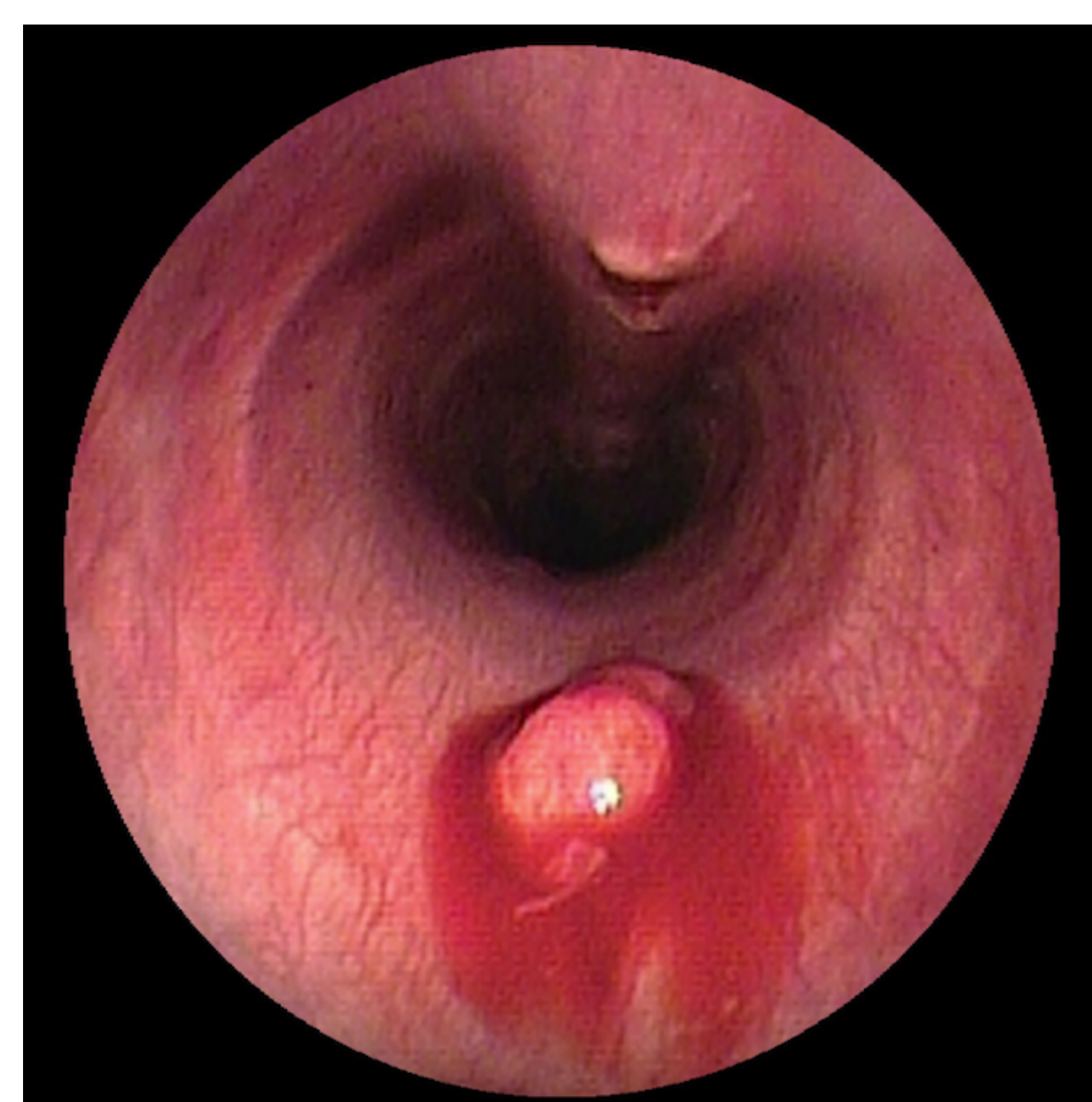
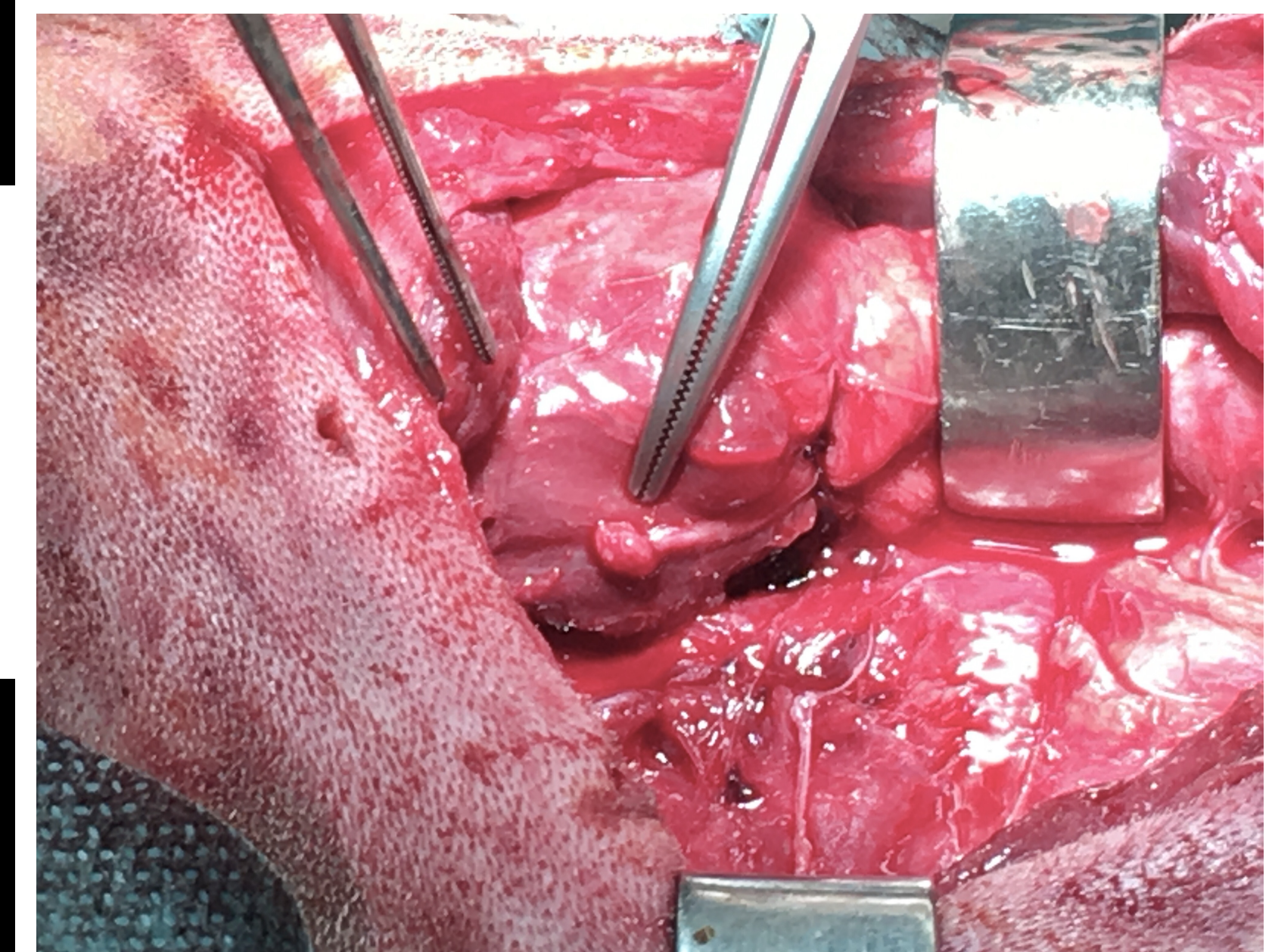
**A 9-year-old neutered male Pinscher** was breathing properly during his examination. Cervical subcutaneous emphysema was however present. Thoracic and cervical radiographs showed severe cervical subcutaneous emphysema, a pneumomediastinum, a thickened dorsal tracheal wall ventrally to C5. Endoscopy was performed. Two minor punctiform tracheal tears (figure 3) were noticed. Bilateral laryngeal paralysis associated with moderate hematoma of the surrounding tissues was diagnosed and confirmed by doxapram hydrochloride administration. Since the respiratory symptoms and lesions were only moderate, conservative treatment was initiated. After five days, the dog was discharged without any surgery.

Both dogs were rechecked respectively 6 and 5 months after traumatism. Owners confirmed full recovery of their dog. Respiratory function and clinical examination were within the normal limits. The Pinscher was controlled endoscopically and the laryngeal function was normal.



**Figure 1:**  
 Endoscopic view allowing diagnosis of bilateral laryngeal paralysis associated with edema

**Figure 2:**  
 Surgical view of the right caudal laryngeal nerve section



**Figure 3:**  
 Endoscopic view of two minor punctiform tracheal tears

## Discussion / Conclusion

Traumatic acquired laryngeal paralysis remains a rare condition. This type of condition is known but is to the author's knowledge still not described in the literature in the context of bites. Management can be challenging as concomitant lesions are common.

Diagnosis of laryngeal or tracheal perforation can be difficult. The presence of subcutaneous emphysema should raise suspicion for an upper airway injury.<sup>1</sup> Endoscopy of the respiratory tract may be necessary for the diagnosis of upper airway perforation. Even if endoscopy could aggravate tracheal tear and pneumothorax<sup>1</sup>, it was essential for the investigation of upper respiratory tract lesions and help in the decision for medical versus surgical intervention.

Recovery after peripheral nerve damage is frequently unpredictable. A return of laryngeal function can be expected in cases of recurrent laryngeal nerve neurapraxia. In human medicine, recurrent laryngeal neurapraxia is well described after thyroidectomy and is associated with invasive cancer and variant anatomic course of the nerve.<sup>3</sup> Electromyography of intrinsic laryngeal muscles, particularly the cricoarytenoidus dorsalis muscles, could have been performed to demonstrate denervation potentials 5 days after trauma and could give a prognosis.<sup>4</sup> However, normal laryngeal function can still be observed in some animals with electromyography results indicative of denervation.<sup>2</sup> In this case-report, a full recovery of the laryngeal function was observed in the Pinscher and was in favor of a traumatic recurrent laryngeal nerve neurapraxia.

Primary nerve repair was not attempted in this case. Primary nerve repair is not always feasible after a trauma.<sup>5</sup> Multiple methods of recurrent laryngeal nerve reconstruction have been described. Several nerve graft techniques are reported with variable recovery results.<sup>5</sup> Moreover, their use seems unlikely because of the delay of the recovery (<5 months).<sup>6</sup>

→ Cervical bite wounds can lead to laryngeal paralysis, which may be transient or require surgical treatment. Endoscopy is essential for the management of cervical traumas, especially secondary to bite wounds.

## References

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