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Otolaryngology -- Head and Neck Surgery 2011 145: 182 originally published online 10 February 2011
DOI: 10.1177/0194599811398606

The online version of this article can be found at:
http://oto.sagepub.com/content/145/1/182
A Case of Variant Thyroid Cartilage Anatomy

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No sponsorships or competing interests have been disclosed for this article.

Keywords
thyroid cartilage, superior cornu, odynophagia, foreign body sensation

Received October 30, 2010; revised December 27, 2010; accepted January 7, 2011.

The causes of symptoms of odynophagia and pharyngeal foreign body sensation are clinically difficult to determine. It is well known that these symptoms can derive from gastroesophageal reflux disease, Eagle syndrome, or hyoid bone syndrome. The variant thyroid cartilage anatomy has been described as a cause of dysphagia and pharyngeal foreign body sensation.¹² In this article we describe a case of a displaced superior cornu of thyroid cartilage leading to symptoms of odynophagia and a pharyngeal foreign body sensation. A review of the postulated developmental causes is presented. A decrease in deglutition frequency before the complete union of superior cornu fracture may avert the patient’s symptoms in the future.

Case Report
A 48-year-old male patient presented to an otolaryngologist’s office with a 2-month history of an unremitting odynophagia and pharyngeal foreign body sensation, which were aggravated gradually. He denied any other discomfort in the throat and was not taking any medications. He had no history of endotracheal intubation or cervical manipulation and denied any history of cervical or craniofacial trauma except for a minor but definite neck collision when playing football 4 months ago. The neck collision left nothing but an hour of pain at that time. Examination of the neck was normal. Fiberoptic nasopharyngoscopy revealed a submucosal mass in the right lateral pharyngeal wall, which protruded into the pyriform sinus and almost abutted the arytenoids (Figure 1). That this was the site of the sensation was confirmed with the patient by palpation of the area with the endoscope. A 3-dimensional reconstruction of thyroid cartilage demonstrated a medial displacement of the right superior cornu (Figure 2). We obtained consent from the patient and approval of the ethical committee of Capital Medical University to write this article.

Discussion
The superior cornu of thyroid cartilage is the weakest part of thyroid cartilage. Although the lateral thyrohyoid ligament connects the hyoid with the superior cornu of the thyroid cartilage, lateral displacement of the larynx caused by external forces can easily give rise to fracture of the superior cornu. This may result from collisions or injuries due to sports, cervical manipulation, strangulation, tracheal intubation, and so on. In fact, among the reported cases of variant superior cornu of thyroid cartilage,

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most patients did not have a clear injury history, and the cause of the variant superior cornu in these patients may be less clear. Hypotheses including pressure by the overlying inferior constrictor, fourth branchial arch maldevelopment, or the ossification of ligaments and cartilage are unsubstantiated. Browning and Whittet postulated that progressive medial deviation of the tip of the cornu may occur as a result of a differential calcification of the root of the cornu or as a result of the action of the inferior constrictor muscle. This explains causes of bilateral medial displacement of the superior cornu. Hirano et al reported that the root of the superior cornu may change subtly with age in its length and relationship to other thyroid cartilage landmarks. In our patient, throat discomfort did not appear immediately after fracture but rather appeared 2 months later. We thought that not only the neck collision, which directly caused the medial displacement of the superior cornu by root fracture, but also the pressure derived from the overlying inferior constrictor muscle further predisposed the superior cornu to displace medially into the hypopharynx. In other words, the deglutition may aggravate the extent of medial displacement of the superior cornu by pressure caused by the inferior and middle constrictor muscle before the union of superior cornu fracture. The inferior pharyngeal constrictor, the thickest of the 3 constrictors, arises from the sides of the cricoid and thyroid cartilage. The superior fibers of inferior pharyngeal constrictor muscle ascend backward and medially and cover the superior cornu of thyroid cartilage. In addition, the inferior fibers of middle pharyngeal constrictor muscle are involved in the cover of the superior cornu of thyroid cartilage. So the superior cornu of thyroid cartilage may suffer medially directed pressure when the inferior and middle pharyngeal constrictors contract for deglutition. The odynophagia and a pharyngeal foreign body sensation gradually appeared and could have been aggravated along with the fracture healing of the superior cornu. If this is the case, a decrease in deglutition frequency before the union of fracture may relieve or diminish clinical symptoms in patients with fracture of the superior cornu of thyroid cartilage.

**Author Contributions**
Peng-long, write and revise the article; Ning-yu, revise and submit the article.

**Disclosures**
Competing interests: None.
Sponsorships: None.
Funding source: None.

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