

# Minimally invasive balloon dilation for congenital and acquired anterior glottic webs

Gabrielle Wolter MD, Julina Ongkasuwan MD

Baylor College of Medicine Bobby R Alford Department of Otolaryngology Head and Neck Surgery

## Abstract

**Introduction:** Anterior glottic webs involve scarring at the anterior commissure of the vocal folds and can be congenital or acquired secondary to laryngeal trauma. Patients often present with dysphonia but can present with respiratory distress. Varied approaches, both endoscopic and open, are employed to manage anterior glottic webs, however the condition still shows high rates of recurrence. The objective of this presentation is to describe a minimally invasive method to manage anterior glottic webs using balloon dilation

**Methods:** Patients with either congenital or acquired anterior glottic webs that underwent balloon dilation were identified and operative and clinic notes were reviewed.

**Results:** Four patients at our institution have been managed with this technique. Two patients have RRP-related webs and two have 22q deletion syndrome-related webs. The 22q patients required 3 and 4 treatments respectively with an average of 6.2 days between treatments with no recurrence of symptoms noted at follow up of 18 months and 6 months, respectively. The RRP patients have both had mucosal rotational flaps in the past with recurrence of web. Since being treated with balloon dilation, they have required 9 and 2 treatments, respectively. The first patient has an average of 76.9 days between procedures and is still undergoing regular procedures. The second patient was last treated 7 months ago and is doing well with no further web noted.

**Conclusions:** Balloon dilation is a minimally invasive procedure that addresses both congenital and congenital anterior glottic webs without inducing trauma leading to new scarring

## Introduction

Anterior glottic web refers to the presence of scar tissue at the level of the anterior commissure of the vocal folds and represent a form of laryngeal stenosis. Very small webs may be asymptomatic. When symptomatic, patients with AGW often present with dysphonia but may develop dyspnea in the setting of large or extensive scarring.

Webs can be either congenital or acquired in origin. Congenital webs are often associated with subglottic stenosis and other congenital conditions such as Fraser syndrome, fetal alcohol syndrome, duodenal atresia, and cardiac defects. 65% of patients presenting with congenital anterior glottic web are ultimately diagnosed with chromosome 22q11.2 deletion syndrome. Congenital anterior glottic webs result from failure of recanalization during embryogenesis. Other conditions resulting from failure of recanalization include congenital subglottic stenosis and laryngeal atresia

Acquired anterior glottic webs result from trauma, often in the form of endotracheal intubation, radiotherapy, infectious/inflammatory processes, or laryngeal surgery near the anterior commissure. Recurrent respiratory papillomatosis is a condition that often requires frequent surgeries to ablate disease. This places these patients at risk for development of anterior glottic scarring, particularly in cases with disease at the anterior commissure

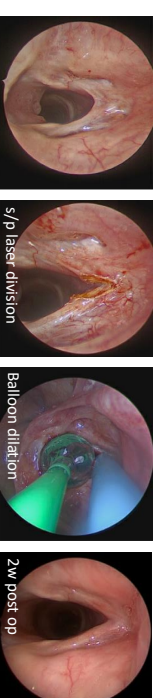
Options to address small/thin glottic webs include laser or cold steel division or excision. Thicker webs, particularly those that extend to involve the subglottis, may require open approaches (i.e. laryngofissure) and/or stent placement. Regardless of approach, anterior glottic webs are prone to recurrence. The ideal treatment is one that addresses the web while minimizing additional trauma that may induce further scarring

## Results

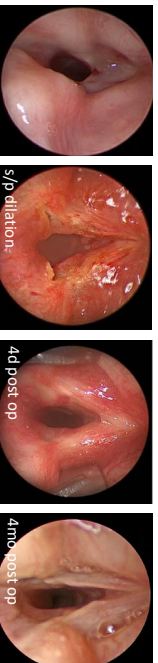
**Patient 1 - 19F with RRP, history of mucosal rotation flap**



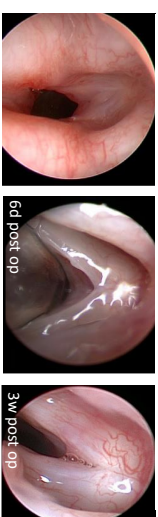
**Patient 2 - 12F with RRP, history of mucosal rotation flap**



**Patient 3 - 4F with 22q deletion syndrome**



**Patient 4 - 14moF with 22q deletion syndrome**



## Discussion

Anterior glottic webs can be treated with a variety of techniques ranging from minimally invasive to open laryngeal framework surgery. In this study, we present a case series of patients managed conservatively with balloon dilation with or without division of the scar band. 75% of patients received multiple dilation procedures in a short period of time. This allowed for early intervention on formation of scar tissue with good endoscopic result. The remaining patient has active RRP with dilation procedures completed concurrently with ablation of papilloma.

Open techniques such as laryngofissure with keel placement to address severe anterior glottic web have been shown to provide promising results. However, laryngofissure is relatively invasive and places the patient at risk of scarring and destabilization of the anterior commissure. Patients may also require a temporary tracheostomy to allow for adequate stenting and healing.

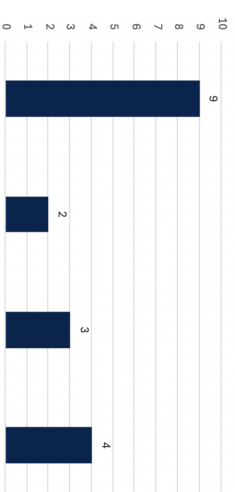
Multiple endoscopic microflap techniques have also been described in the literature. These techniques involve division of the scar band followed by elevation of mucosal flaps which are then laid down to cover the raw mucosal edges, thus reducing the risk of recurrent scar reform. Notably, the two patients in this series with RRP had undergone previous microflap surgeries with recurrence of anterior glottic web. While promising results have been obtained by the authors publishing these techniques, it is worth noting that these techniques are highly specialized and not widely accessible outside of academic institutions.

When considering the most appropriate approach for management of anterior glottic web, it should be considered that patients with active recurrent respiratory papillomatosis will likely require multiple procedures. Therefore, treatment may be focused on addressing existing scar but should also avoid causing trauma leading to formation of additional scarring

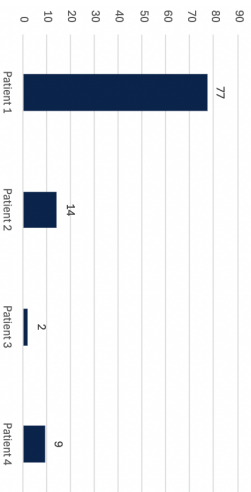
## Conclusion

In this study, four patients with thin anterior glottic webs were managed with balloon dilation with or without division of scar band with good result. This method can be considered in patients with thin anterior glottic webs as a minimally invasive treatment that addresses scarring without inducing trauma leading to re-stenosis. This could be considered particularly in patients with RRP, who are expected to require additional procedures in the future

Number of procedures



Time in days between procedures



## References

1. Flissey JM, Borzotto D, Piluch S, Corbha A. Surgical management of acquired anterior glottic web: a systematic review. The Journal of Laryngology & Otology. 2019;133(10):867-874.
2. Wimaiz T. Surgical treatment of glottic web using butterfly mucosal flap technique: Experience on 12 patients. Laryngoscope. 2019 Jun;129(6):1423-1427.
3. Carrà F, Mariani C, Quattri D, Giola E, Chichewa N, Paredesi R. Single and double mucosal incisional CO2 laser "sliding" technique in the management of laryngeal glottic web: anatomical and functional results. Eur Arch Otorhinolaryngol. 2019 Dec;276(12):3405-3412.
4. Lahav Y, Weisman M, Halperin D, Cohen O, Shapiro-Gallie H, Shofel-Havakuk H. Subglottic Mucosal Flap: Endoscopic Single-Stage Reconstruction for Anterior Glottic Stenosis. Laryngoscope. 2022 Mar;132(3):612-618.
5. Kuo IC, Rutter M. Surgical Management of Anterior Glottic Webs. Front Pediatr. 2020 Oct 19;8:555040.