

# A single case study: to describe the swallowing outcomes of patient X diagnosed with a deep interarytenoid groove (DIG) who underwent management with injection laryngoplasty and had longer-term follow-up.

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## Introduction

Benjamin and Inglis's classification of laryngeal clefts includes four types [Figure 1]. They describe a type 1 laryngeal cleft as a 'supraglottic interarytenoid cleft sparing the cricoid cartilage.' There is no clarity whether a type 1 cleft is only diagnosed if the gap is to the level of the vocal folds. Therefore, a gap that is described as deep but not to the level of the vocal folds may be described as a deep interarytenoid groove (DIG). A DIG may be associated with dysphagia. It can be managed conservatively or surgically with either sutures or injection laryngoplasty. The research base suggests favourable outcomes for the use of injection laryngoplasty on swallow outcomes (Al-Alawneh et al. (2021), Timashpolsky et al. (2021)). There are varied methodologies and outcome measures. The objective of this study is to use a comprehensive set of outcome measures to describe the swallowing outcomes of a single patient who underwent surgical management with injection laryngoplasty and had longer-term follow-up.

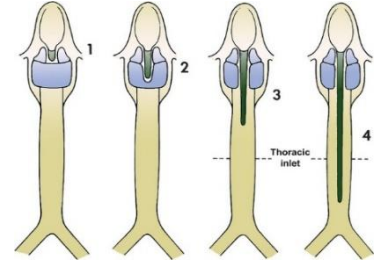
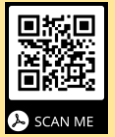


Figure 1: Benjamin and Inglis (1989): Classification of Laryngeal Clefts

## Methodology

- Patient X was selected by a Specialist ENT Speech and Language Therapist from a tertiary ENT dysphagia clinic. Patient X was known over a 23-month period.
- No co-morbidities, aged 2 years 4 months at initial assessment
- DIG diagnosis on microlaryngobronchoscopy
- Clinical dysphagia assessment pre and post-surgery
- Videofluoroscopy Swallow Study (VFSS) pre and post-surgery
- Pre and post-surgery measure of swallow outcomes:
  1. Clinical dysphagia assessment findings
  2. Rosenbek Penetration/Aspiration Scale (Rosenbek 1996)
  3. Required texture modification for fluids

8 point scale to describe penetration and aspiration



## Results

Renu-V injection (can last up to 9-12 months)



Swallow outcomes				
Clinical dysphagia assessment findings	No clinical signs of aspiration		No clinical signs of aspiration	
Swallow characteristics on VFSS on IDDSI level 1	<ul style="list-style-type: none"> <li>• Delayed swallow trigger</li> <li>• Reduced airway closure</li> <li>• Penetration, frequent, deep, material not ejected from laryngeal vestibule</li> <li>• Aspiration (silent)</li> </ul>		<ul style="list-style-type: none"> <li>• Delayed swallow trigger</li> <li>• Reduced airway closure</li> <li>• Penetration, <b>less frequent</b>, <b>more ejection</b> of material from laryngeal vestibule</li> <li>• Aspiration (silent)</li> </ul>	
Rosenbek penetration/aspiration scale score	IDDSI 0	4	IDDSI 0	7
	IDDSI 1	8	IDDSI 1	8
	IDDSI 2	3	IDDSI 2	2
Required texture modification for fluids	IDDSI 3		IDDSI 2	
			IDDSI 1	

## Discussion:

An improvement in swallow over-time was observed. The most significant change was observed on the 2<sup>nd</sup> VFSS post-surgery, 11 months post-surgery. The improvement on VFSS and therefore PAS resulted in reduced texture modification: IDDSI level 3 down to IDDSI level 1.

It is difficult to tell exactly what factors contributed to the improvement in swallow outcomes. It is possible that the injection filler had a positive impact on the swallow outcomes, suggesting that the injection may have had a therapeutic purpose. Growth may have also been a contributing factor.

Patient X was on the least restrictive diet at 11 months post-surgery. This was at a point in time when the filler material was expected to be fully absorbed. In light of this, there was no indication to proceed to permanent surgical repair (suture) of the DIG at that point in time.

Perhaps swallow function takes longer to improve post operatively. This indicates that true outcomes of surgical intervention may not be apparent immediately post-operatively.

Longer follow-up intervals should be considered to make clear the predictive value with regards to success of further temporary or permanent surgical options for a DIG. Consideration should be given to whether clinical improvement should be solely defined as the feasibility of the diet to be advanced to thinner consistencies. Consideration should be given to the temporary nature of the injection. A limitation of this study is that it is a single case study. Future research should include a larger sample size.

Future investigations should address short and long-term efficacy of injection laryngoplasty on swallow outcomes, respiratory outcomes and patient and care-giver related outcome measure. It is possible that the use of injection laryngoplasty in the management of DIGs can serve as both as diagnostic and therapeutic technique.

## References

Al-Alawneh M et al. (2021) Injection laryngoplasty for the treatment of type 1 laryngeal clefts; a single institution experience *AORL*, Benjamin B & Inglis A (1989) Minor congenital laryngeal clefts: diagnosis and classification *AORL*, Rosenbek et al. (1996) A penetration aspiration scale. *Dysphagia*, Timashaolsky A et al (2021) Management of type 1 laryngeal clefts; a systematic review and meta analysis *OHNS*, Westrate et al. (2021) Evolution of bulbar function in SMA Type 1 treated with Nusinersen. *DMCN*, Miller et al. (2019) Long-term swallowing outcomes following type 1 laryngeal cleft injection *IJPO*, Cohen et al. (2010) Injection laryngoplasty for type 1 laryngeal cleft in children.