



ADAPTATION OF THE PENETRATION-ASPIRATION SCALE TO OPEN PARTIAL HORIZONTAL LARINGECTOMY: RELIABILITY ANALYSIS

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LARYNGEAL CANCER

PREVALENCE

2-5%

of all diagnosed cancers
worldwide

NEW CASES/year

Europe 52,000

U.S. 13,150

5-years SURVIVAL



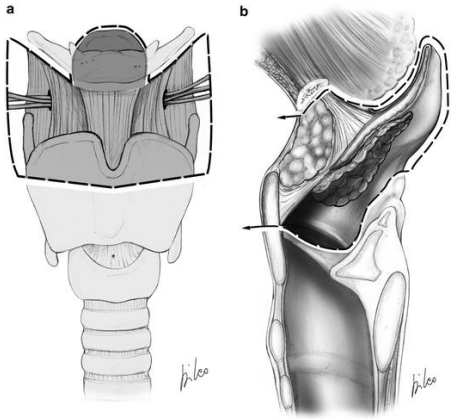
≈ 60-65%

Ferlay et al, 2001
Curado et al, 2007
SEER, 2008-2014

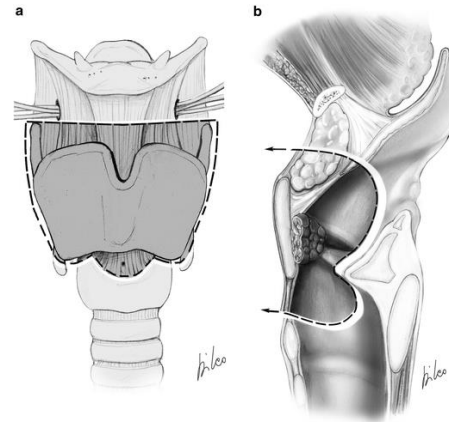
OPEN PARTIAL HORIZONTAL LARYNGECTOMIES

SUPRAGLOTTIC LARYNGECTOMY

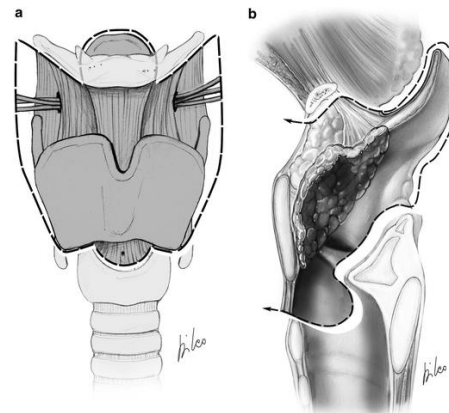
TYPE I



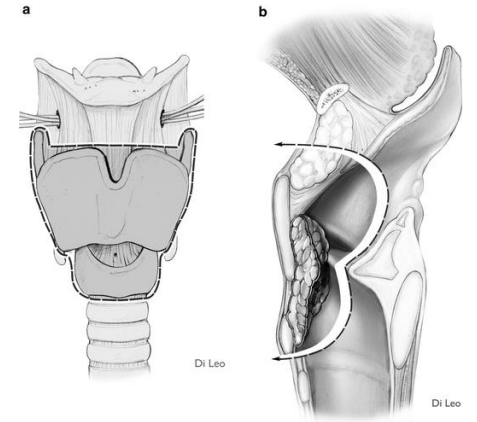
TYPE IIa



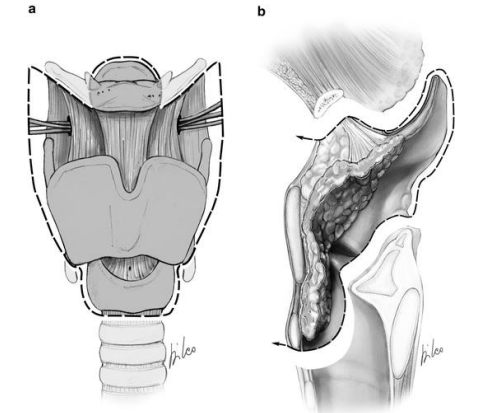
TYPE IIb



TYPE IIIa



TYPE IIIb



DYSPHAGIA AFTER OPHL

1st postoperative month Aspiration in 30-100% of patients

6-12 months postoperative Unrestricted oral nutrition in the majority of the patients

However Chronic aspiration in 12-67% of patients

Lips et al, 2015
Schindler et al, 2016

ASSESSING PENETRATION AND ASPIRATION IN OPHL HOW?

CLINICAL ASSESSMENT

Pearson and Leipzig scale

Leipzig, 1980

Pearson, 1981

Schindler et al, 2016

INSTRUMENTAL ASSESSMENT

Penetration-Aspiration scale (PAS)

Rosenbek et al, 1996

4-point or 5-point ordinal scales

Zacharek et al, 2001

Webster et al, 2010

ASSESSING PENETRATION AND ASPIRATION IN OPHL HOW?

CLINICAL ASSESSMENT

Pearson and Leipzig scale

Leipzig, 1980

Pearson, 1981

Silent aspiration

INSTRUMENTAL ASSESSMENT

Penetration-Aspiration scale (PAS)

Rosenbek et al, 1996

Altered anatomy

4-point or 5-point ordinal scales

Zacharek et al, 2001

Webster et al, 2010

Not validated

Schindler et al, 2016

AIM

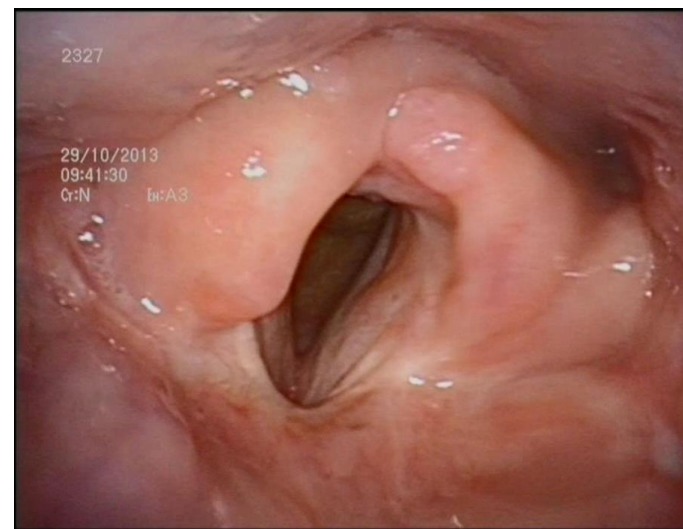
1. To **adapt** the PAS to the anatomy of the OPHLs
2. To test the **reliability** of the OPHL-PAS

ADAPTATION OF THE PAS TO OPHLs

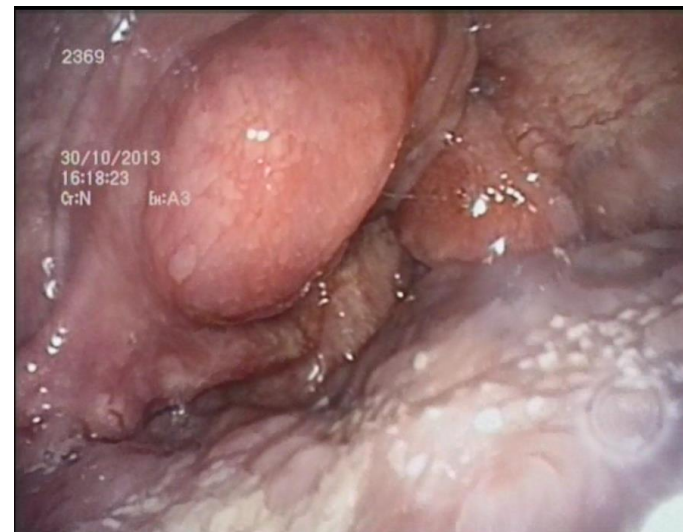
ENTRY OF THE LARYNGEAL VESTIBULE



Normal Anatomy



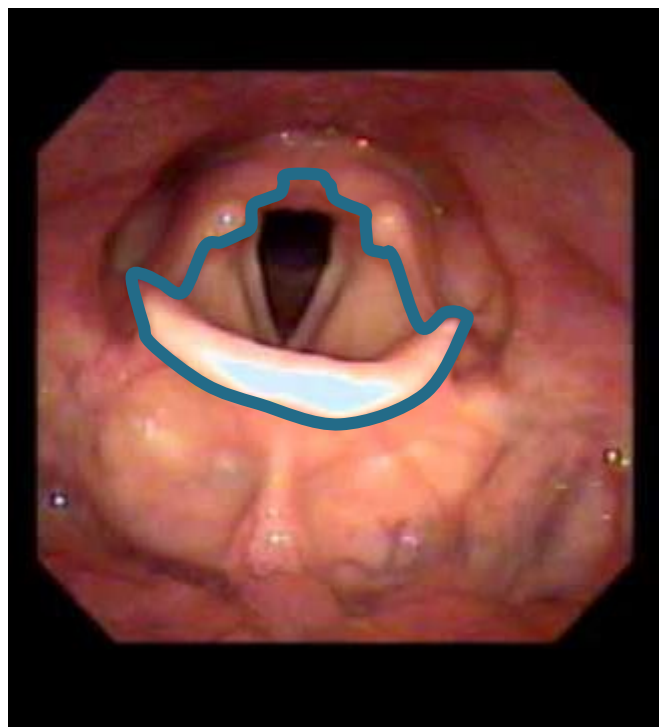
Type I
Scar of the pexy



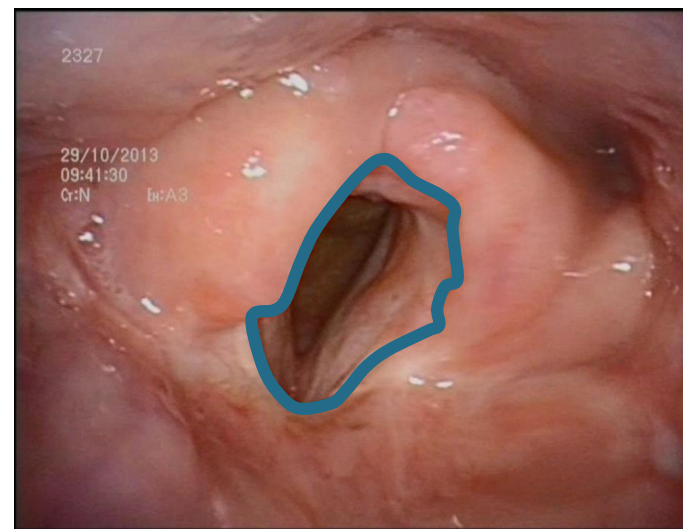
Type IIb – IIIb
Line of contact
between the arytenoid(s)
and the BOT in phonation

ADAPTATION OF THE PAS TO OPHLs

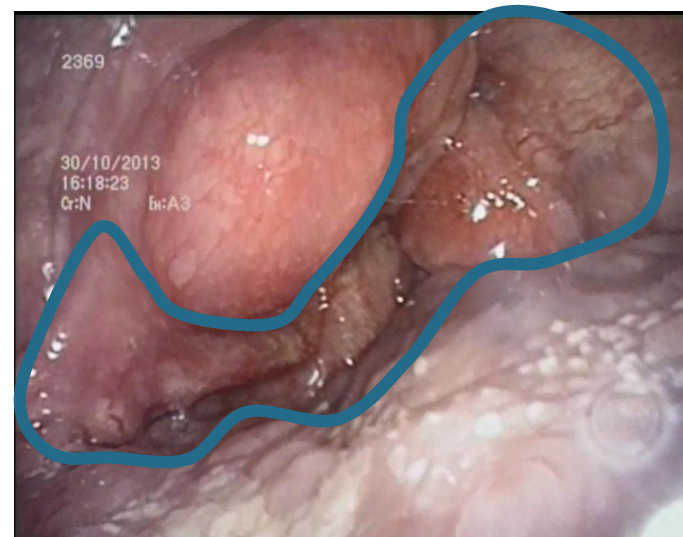
ENTRY OF THE LARYNGEAL VESTIBULE



Normal Anatomy



Type I
Scar of the pexy



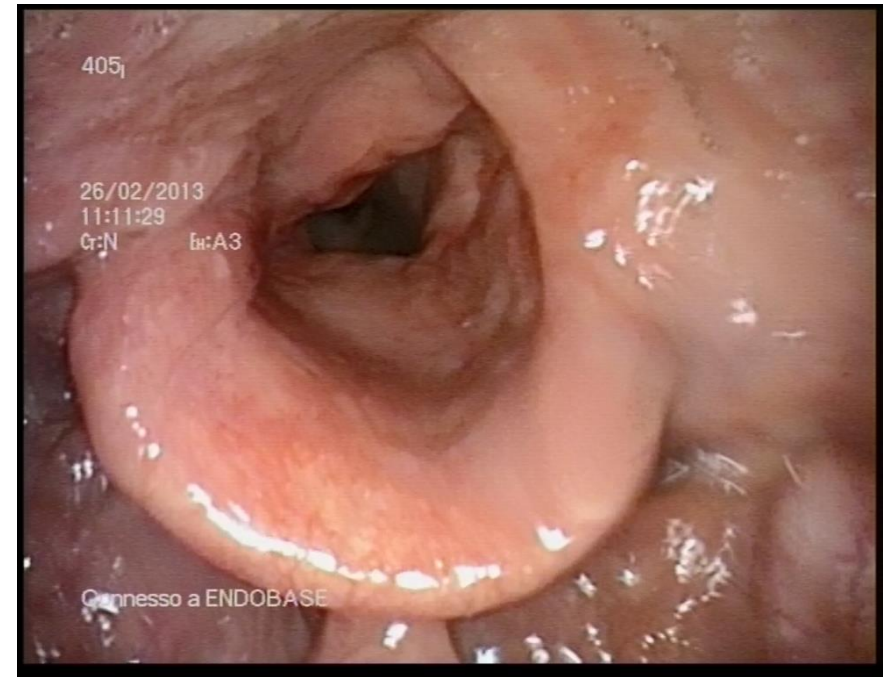
Type IIb – IIIb
Line of contact
between the arytenoid(s)
and the BOT in phonation

ADAPTATION OF THE PAS TO OPHLs

NEOGLOTTIS



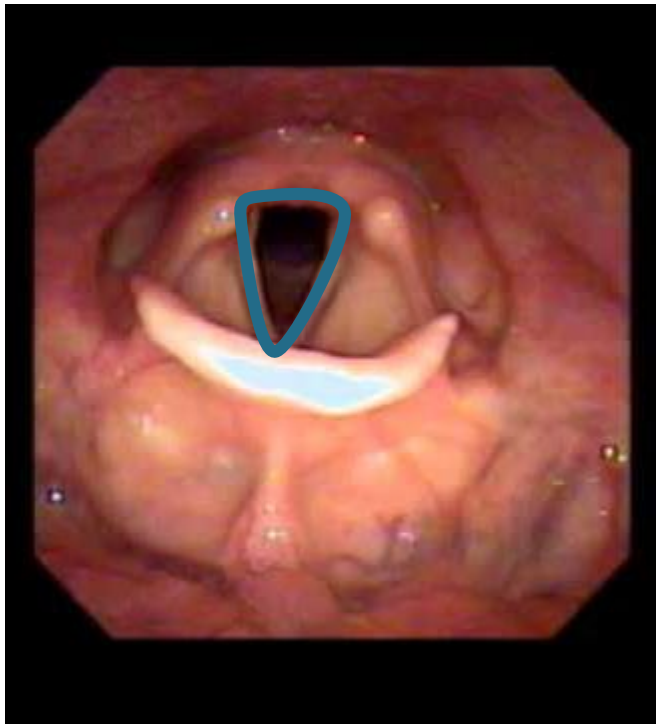
Normal Anatomy



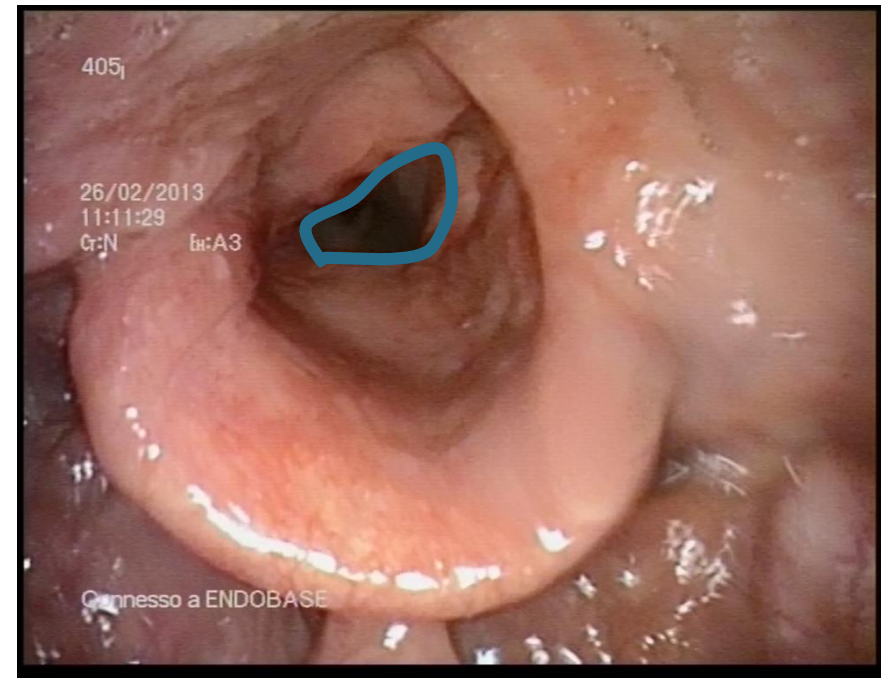
Type II – III
Scar of the pexy

ADAPTATION OF THE PAS TO OPHLs

NEOGLOTTIS

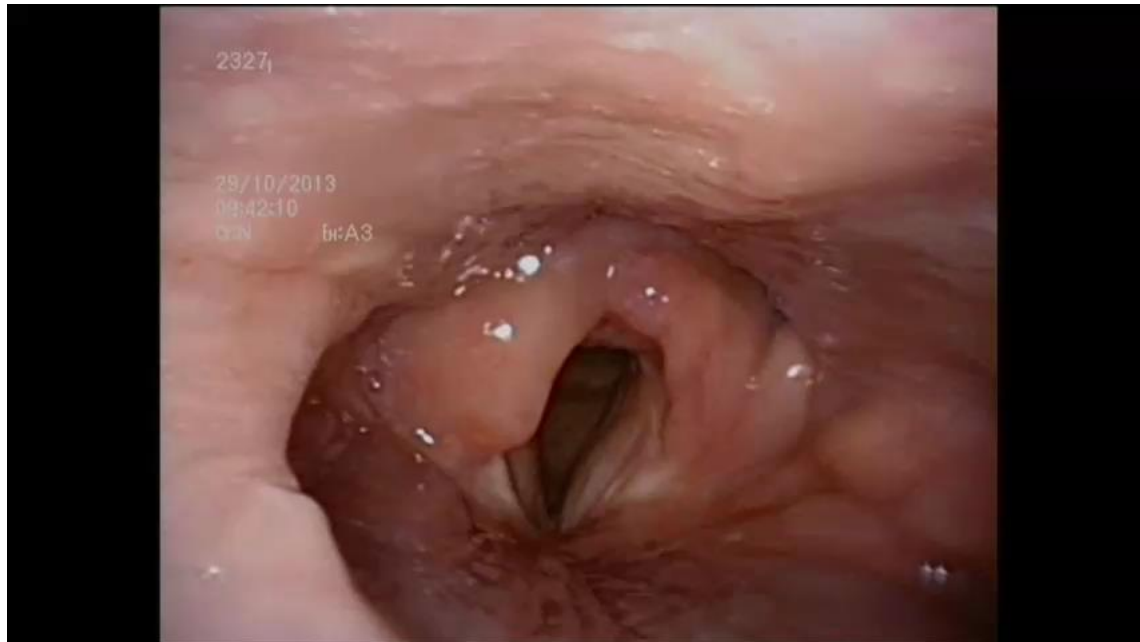


Normal Anatomy



Type II – III
Scar of the pexy

EXAMPLES



TYPE I



TYPE IIIa

POPULATION

Random Selection of FEES recordings



90 patients

Median Age 64 (40-85)

TYPE I 27

TYPE II 31 (2 IIb)

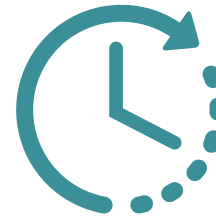
TYPE III 32 (5 IIIb)

+ RT 23/90

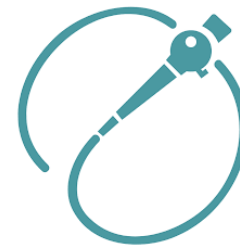


Turin

Vittorio Veneto



>6 months



Liquids

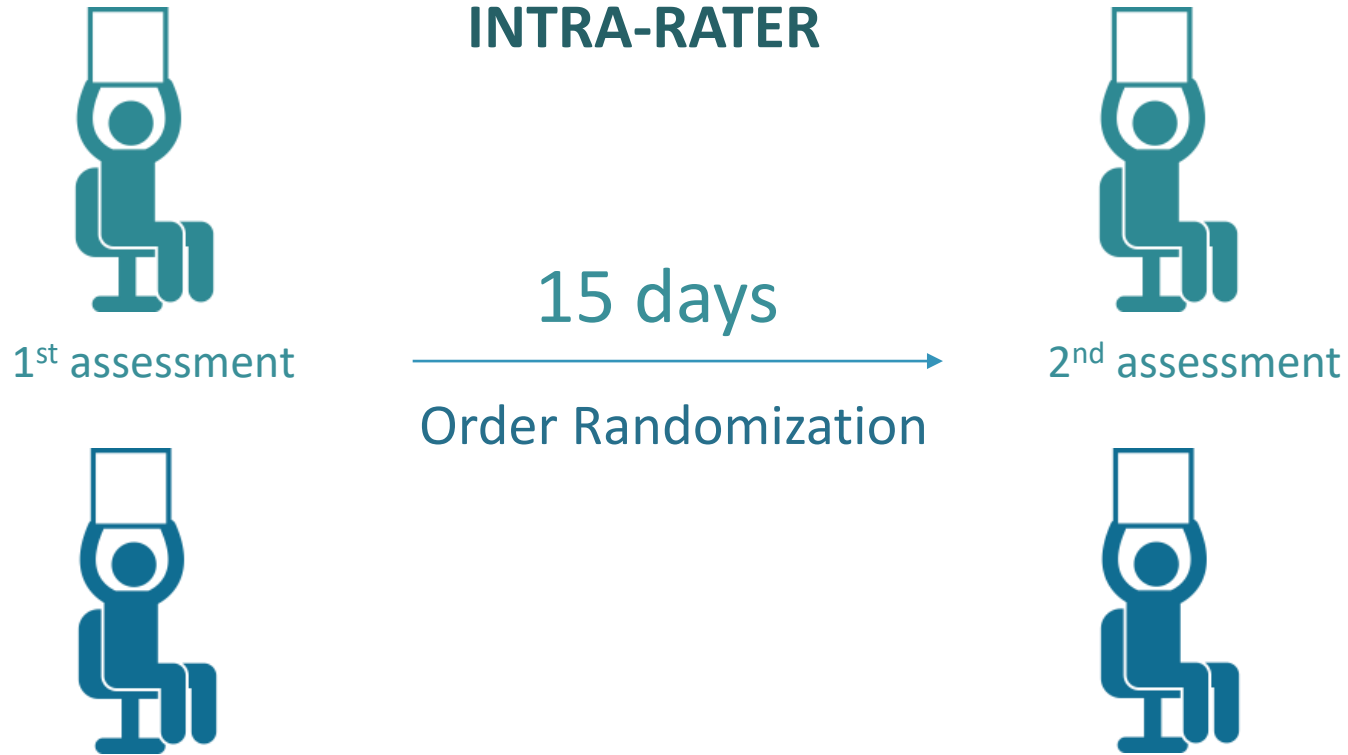
Semisolids x 3 trials

Solids

810 swallows

METHODS

INTER-RATER



1st assessment

Order Randomization

2nd assessment

Clinical experience >4 years
+ Training

ASSESSMENT SHEET

OPHL-PAS liquids
semisolids
solids

N° visualizations

Difficulty rating

Entry of the vestibule

0 10

Neoglottis

0 10

STATISTICS

AGREEMENT unweighted Cohen's Kappa

NUMBER OF VISUALIZATIONS Kruskal Wallis test + post-hoc

DIFFICULTY RATING U Mann-Whitney test

Significance $p < 0.05$

RESULTS

INTER-RATER AGREEMENT

Overall $k = 0.863$

Type I $k = 0.924$

Type II $k = 0.865$

Type III $k = 0.808$

7.2% Δ 1 score

		RATER 1								Scores Frequency
		1	2	3	4	5	6	7	8	
RATER 2	1	133	3	1						51.5%
	2	2	28	1						11.7%
	3	1	2	39	1	1				16.5%
	4			4	6	2	1			4.9%
	5			2		10		2		5.3%
	6					1	2	2		1.9%
	7							12	1	4.9%
	8								9	3.4%
Scores Frequency		51.1%	12.4%	17.7%	2.6%	5.3%	1.1%	6%	3.8%	

RESULTS

INTER-RATER AGREEMENT

Overall $k=0.863$

Type I $k= 0.924$

Type II $k= 0.865$

Type III $k= 0.808$

3% Δ 2 scores

		RATER 1								Scores Frequency
		1	2	3	4	5	6	7	8	
RATER 2	1	133	3	1						51.5%
	2	2	28	1						11.7%
	3	1	2	39	1	1				16.5%
	4			4	6	2	1			4.9%
	5			2		10		2		5.3%
	6					1	2	2		1.9%
	7							12	1	4.9%
	8								9	3.4%
Scores Frequency		51.1%	12.4%	17.7%	2.6%	5.3%	1.1%	6%	3.8%	

RESULTS

DIFFICULTY

N° OF VISUALIZATIONS $p=0.004$

	p
I vs II	0.265
I vs III	0.030
II vs III	0.281

VAS NEOGLOTTIS $p=0.010$

	Median	IQ range
II	1.4	3.3
III	2.45	4.5

LIMITS

- ✓ Only 7 patients with type IIb and IIIb
- ✓ Highly homogeneous surgical approach
- ✓ Frequency of scores among different PAS levels
- ✓ Low number of raters

CONCLUSIONS

The **OPHL-PAS** is a **reliable** scale
to assess lower airways' invasion
in patients with OPHL using **FEES**

Ordinality

Amount of inhaled food

Agreement on method



Validated scale for OPHL
Common language