



Safety, Comfort and Adverse Effects - The FEES Registry

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Introduction

- 1988 Susan Langmore: „*Fiberoptic endoscopic examination of swallowing safety: a new procedure*“ *Dysphagia* 1988;2:216-219
- 2001 „*Endoscopic Evaluation and Treatment of Swallowing Disorders*“ by Susan Langmore is published by Thieme
- 2008 Guidelines „*Neurogenic Dysphagia*“ of the German Neurological society refer to VFSS and FEES as most important instrumental methods to investigate the swallow.
- 2010 OPS Code 1-613: to document that an endoscopic swallowing examination has been performed
- 2012 Guideline „Management of stroke-related dysphagia“ of the German Neurological Society and German Stroke Society states that „in the acute stage of the illness FEES is more useful and easier accessible than VFSS“.
- 2014 FEES curriculum of the German Neurological Society and German Stroke society is published
- 2015 FEES service is required on certified stroke units in Germany.
- 2017 ESPEN guidelines „Clinical nutrition in Neurology“
- 2017 FEES educational program of the ESSD is published
- 2019 Next generation FEES workshops start in Germany (FEES Experte Workshops)

Dziewas et al. *BMC Medical Education* (2016) 16:70
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BMC Medical Education

DEBATE

Open Access



Flexible endoscopic evaluation of swallowing (FEES) for neurogenic dysphagia: training curriculum of the German Society of Neurology and the German stroke society

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Dysphagia
DOI 10.1007/s00455-017-9828-9



EDITORIAL

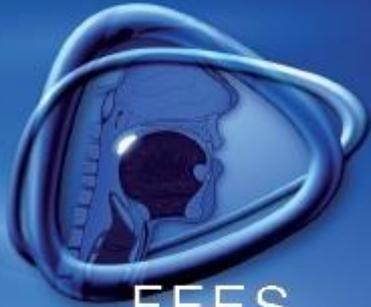
European Society for Swallowing Disorders FEES Accreditation Program for Neurogenic and Geriatric Oropharyngeal Dysphagia

R. Dziewas¹ · L. Baijens^{2,3} · A. Schindler⁴ · E. Verin⁵ · E. Michou⁶ ·
P. Clave⁷ · The European Society for Swallowing Disorders

FEES courses

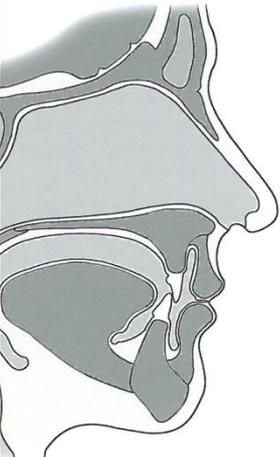
FEES Seminar
Neurogene Dysphagien
mit Prof. Susan Langmore, USA
Inklusive FEES hands-on Technik

14.09.2015 – 16.09.2015



FEES
AG ZALEST

FLEXIBLE
ENDOSCOPIC
EVALUATION
OF SWALLOWING



**Kurs zum Erwerb des
FEES-Zertifikats**

9. bis 11. Dezember 2015

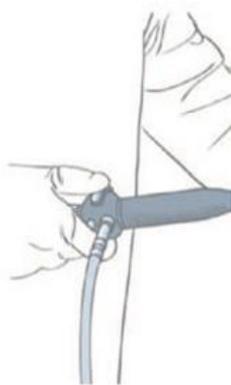
St. Johannes
Krankenhaus gGmbH

FEES Zertifikat

nach Ausb

**88. Kongress
der Deutschen Gesellschaft
für Neurologie
mit Fortbildungsakademie**

23. – 26. September 2015
Düsseldorf



Vorprogramm

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**Mensch
im Blick
Gehirn
im Fokus**



Today's situation



Looking back...

Übersichten

Nervenarzt 2013 · 84:705–708
DOI 10.1007/s00115-013-3791-y
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FEES auf der Stroke-Unit

Empfehlungen zur Umsetzung
im klinischen Alltag

Leserbriefe

Nervenarzt 2014 · 85:481–484
DOI 10.1007/s00115-014-4055-1
Online publiziert: 23. März 2014
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Zur fiberendoskopischen Evaluation des Schluckens auf der „stroke unit“

- Main concern:
- FEES is invasive and causes harm
 - Bleeding in the nose, pharynx larynx, in particular in the context of anticoagulation
 - Laryngospasm, vasovagal syncope
 - Critical aspiration necessitating emergency intervention, even tracheostomy

Side Effects

Facts from the literature

- In general very low risk of complications
- In >2800 examinations
 - <0.5% self-limited epistaxis
 - 0.1% vasovagal syncope
 - 0.07% self-limited laryngospasm (only ALS patients)
- In 300 acute stroke patients
 - 6% of self-limited epistaxis
 - Clinically insignificant changes of heart rate and blood pressure
 - No laryngospasm, no vasovagal syncope
 - Even within 24 h of thrombolysis no increased risk of complications

Table 3. Rate of Epistaxis During FEES

Patients	Epistaxis
All	18/300 (6.00%)
Ischemic stroke	16/265 (6.04%)
Thrombolysis	
No	11/168 (6.55%)
Yes	5/97 (5.15%)
Within 24 hours	2/43 (4.26%)
Secondary prevention	
Anticoagulant drugs	8/111 (7.21%)
Antiplatelet drugs	8/154 (5.19%)
Hemorrhage	2/35 (5.71%)

Side Effects

Facts from the literature

Side effects and complications	Reference (first author)				Our data
	Langmore, 1995	Aviv, 2000	Cohen, 2003	Warnecke, 2009	
Method	FEES	FEESST	FEESST	FEES	FEES
Sample of patients	6,000	500	349	300	2,820
Discomfort					
No discomfort		54 (10.8%)	44 (12.6%)	50 (16.7%)	697 (24.7%)
Discomfort	–	446 (89.2%)	305 (87.4%)	115 (38.3%)	2,123 (75.3%)
Mild discomfort		353 (70.6%)	169 (48.4%)	88 (29.3%)	
Moderate discomfort		77 (15.4%)	110 (31.5%)	22 (7.3%)	
Severe discomfort		16 (3.2%)	26 (7.5%)	5 (1.7%)	
Gagging		–	–	–	745 (26.4%)
Vomiting	–	–	–	–	57 (2.0%)
Epistaxis	20 (0.33%)	3 (0.6%)	3 (0.9%)	18 (6.0%)	
Anterior epistaxis					3 (0.1%)
Posterior epistaxis					1 (0.04%)
Laceration of the mucosa	0	0	–	–	0
Vasovagal episodes	4 (0.07%)	0	–	0	3 (0.1%)
Adverse reactions to topical anaesthetic	0	0	–	0	–
Adverse reaction to methylene blue	0	0	0	0	0
Laryngospasm	2 (0.03%)	0	0	0	2 (0.07%)

FEES-Registry

Keeping a promise

Dziewas et al. *Neurological Research and Practice* (2019) 1:16
<https://doi.org/10.1186/s42466-019-0021-5>

Neurological Research
and Practice

RESEARCH ARTICLE

Open Access

Safety and clinical impact of FEES – results of the FEES-registry



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FEES-Registry

Design and Endpoints

- Prospective multicentre observational trial at 23 sites in Germany and Switzerland from 9/2014 to 5/2017.
- Recording of
 - Epidemiological and clinical data
 - Qualification and experience of the examiner
 - Side-effects
 - Cardiorespiratory parameter
 - Severity of dysphagia
 - Impact of FEES on dysphagia management

FEES-Registry

Patient Characteristics

General characteristics (N=2401)	
Age	69.8 (14.6)
Female gender	1013 (42.2)
Barthel	35 (35.4)
RASS	-0.1 (0.81)
Anticoagulation	451 (18.8)
Anti-platelets	796 (33.2)
Antithrombotic drugs	1005 (41.9)
Specific characteristics	
Complex patients	1089 (45.4)
Respiratory problems	279 (11.6)
Tracheal cannula	447 (18.6)
Agitation	161 (6.7)
Disorientation	496 (20.7)
Fluctuating vigilance	390 (16.2)

FEES-Registry

Patient Characteristics

Main Diagnosis	
Stroke	1465 (61.0)
Parkinson's Disease	157 (6.5)
CIP	135 (5.6)
MND	75 (3.1)
Dementia	64 (2.7)
Malignoma	48 (2.0)
Movement Disorders (other)	41 (1.7)
Encephalopathy	37 (1.5)
TBI	36 (1.5)
Meningitis/Encephalitis	36 (1.5)
Myasthenia gravis	35 (1.5)
Immune-mediated neuropathy	34 (1.4)
Psychogenic dysphagia	34 (1.4)
Seizure	33 (1.4)
Myopathy	29 (1.2)
Cervical spine surgery	20 (0.8)
Multiple Sclerosis	18 (0.7)
Pneumonia	13 (0.5)
Esophageal diseases	12 (0.5)
Other/Missing	79 (3.3)

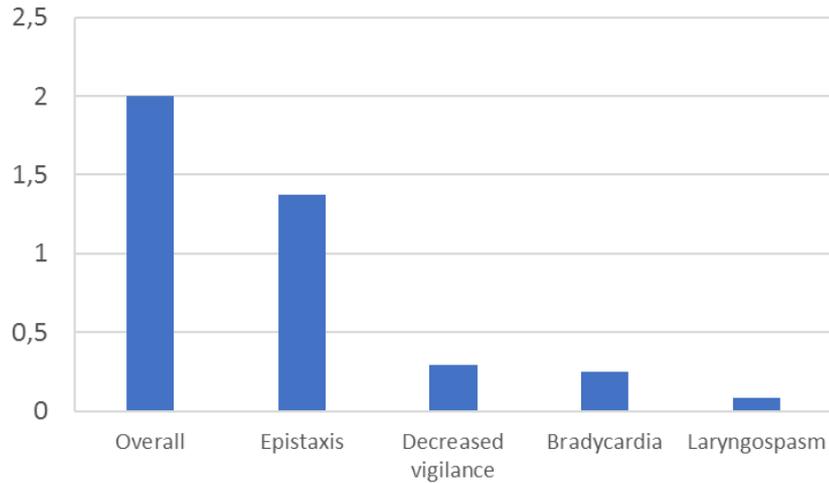
FEES-Registry

Environment & Expertise

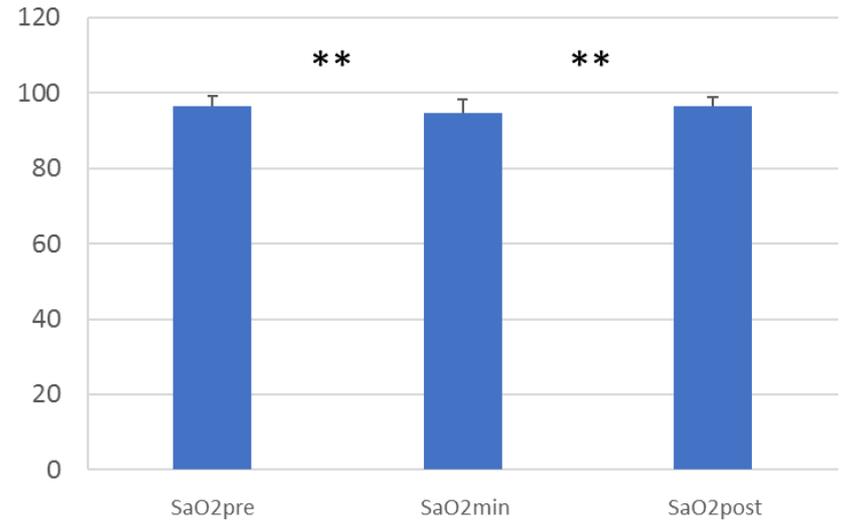
Setting	
Outpatient service	216 (9.0)
Acute care facility	1692 (70.5)
Rehabilitation facility	493 (20.5)
Examiner's profession	
Physician involved	1404 (58.5)
SLT involved	2282 (95.0)
SLT alone	985 (41.0)
Examiner's experience	
<30 FEES	420 (17.7)
30-200 FEES	609 (25.6)
201-500	389 (16.4)
>500	960 (40.4)
Examination time (min)	9.8 (5.9)

FEES-Registry Results

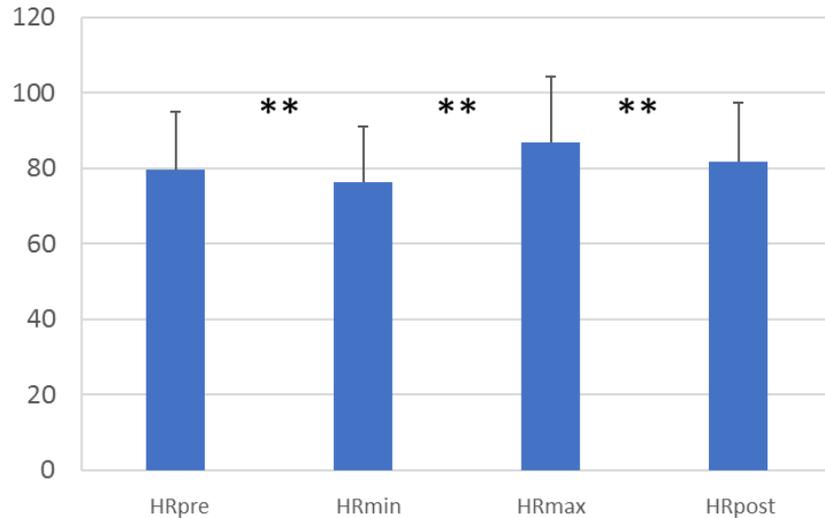
Complications (%)



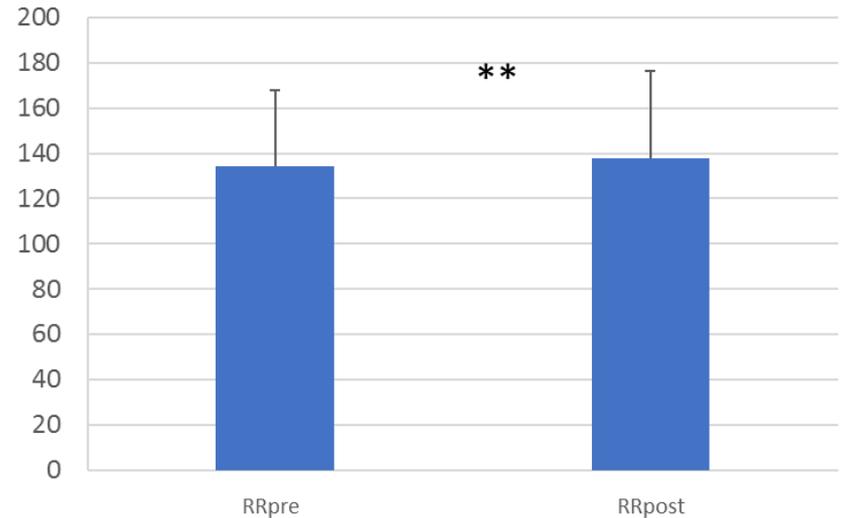
SaO2 (%)



HR (B/min)



RRsys (mmHg)



Placing Nasogastric Tubes Changes in BP & HR

SHORT REPORT

Placing nasogastric tubes in stroke patients with dysphagia: efficiency and tolerability of the reflex placement

R Dziewas, M Schilling, C Konrad, F Stögbauer and P Lüdemann

J Neural Neurosurg Psychiatry 2003;74:1429–1431

Table 1 Characteristics of stroke patients

	Conventional placement (n = 88)	Reflex placement (n = 16)
Age (years)	68.9 (1.5)	67.9 (14.4)
Lesion location		
Left MCA	40	9
Right MCA	24	3
Left MCA & ACA	4	0
Right MCA & ACA	1	0
Left ICH	2	1
Right ICH	3	0
Brainstem	14	3
NIH Stroke Scale (points)	13.7 (6.2)	14.5 (5.8)

Numbers are expressed as mean (SD).

ACA, anterior cerebral artery; ICH, intracerebral hemorrhage; MCA, middle cerebral artery; NIH, National Institute of Health

Table 2 Number of trials, vegetative and oxygen saturation changes during conventional and reflex placement of nasogastric tubes

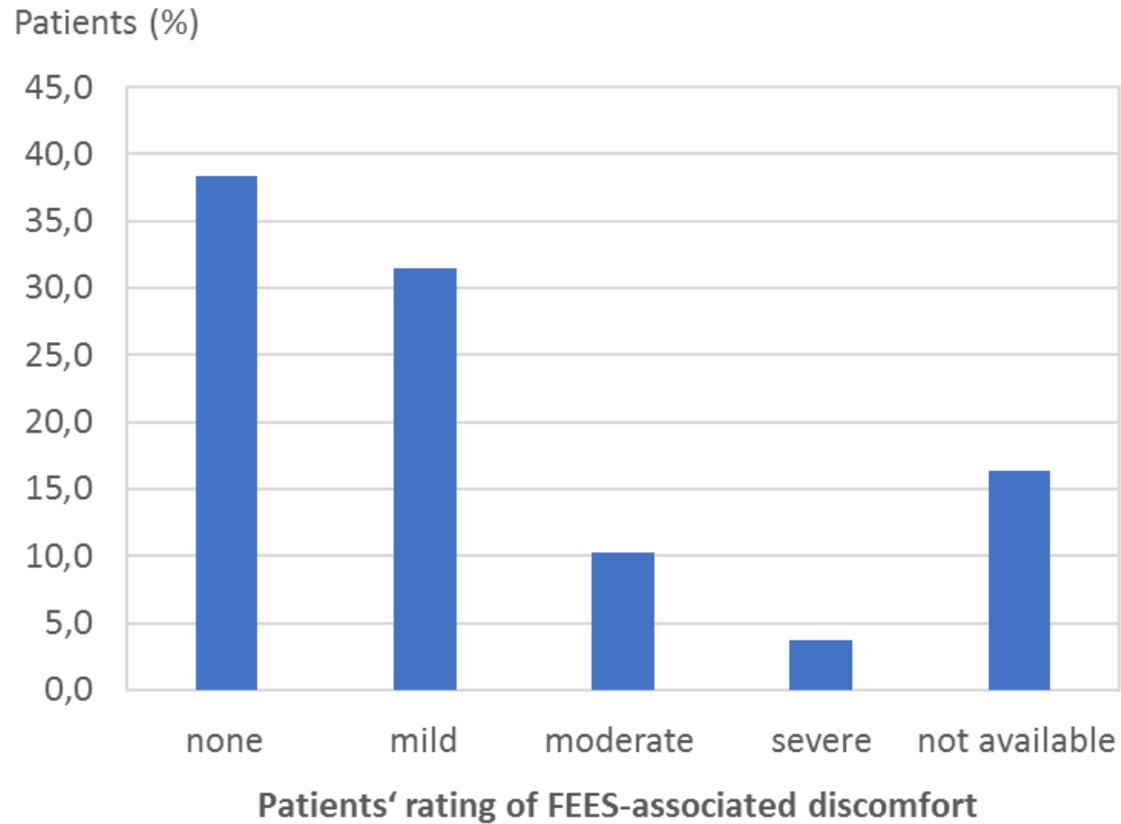
	Conventional placement	Reflex placement	p value
Number of trials	2.2 (0.8)	1.3 (0.5)	<0.01
Baseline BP _{sys} (mm Hg)	141 (17)	145 (28)	NS
NGT BP _{sys} (mm Hg)	176 (16)*	156 (28)*	<0.01
Baseline HR (beats/min)	85 (13)	82 (15)	NS
NGT HR (beats/min)	108 (16)*	94 (16)*	<0.01
Baseline SaO ₂ (%)	97 (1)	97 (1)	NS
NGT SaO ₂ (%)	96 (2)	97 (1)	NS

Numbers are expressed as mean (standard deviation).

NS, not significant; BP_{sys}, systolic blood pressure; NGT BP_{sys}, systolic blood pressure during placement of a nasogastric tube; HR, heart rate; SaO₂, oxygen saturation.

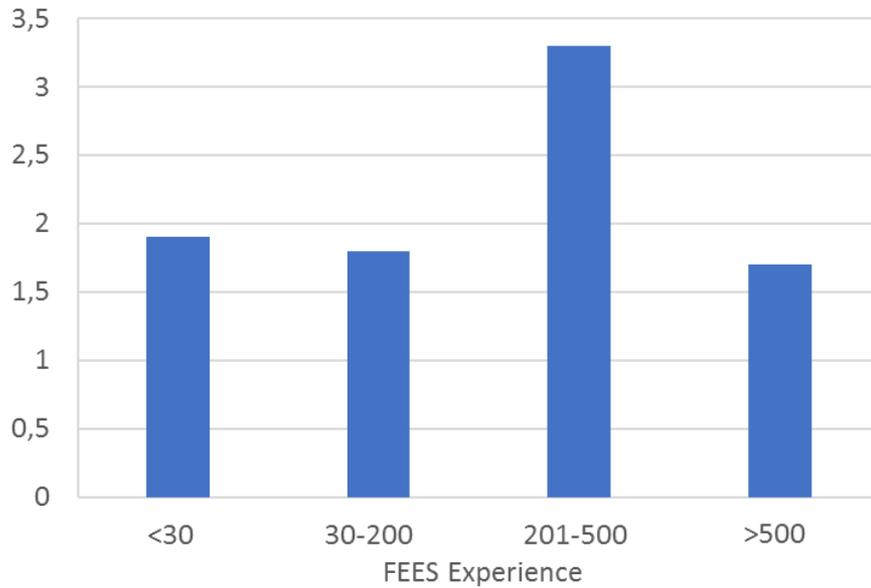
*p<0.01 for the comparison of baseline and intervention parameters.

FEES-Registry Results

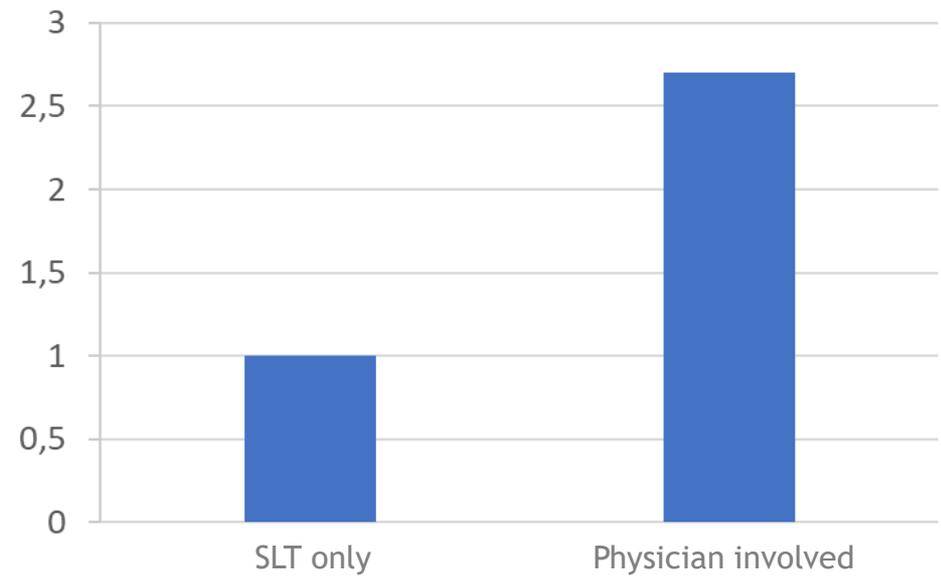


FEES-Registry Complications

Complications (%)



Complications (%)



FEES-Registry

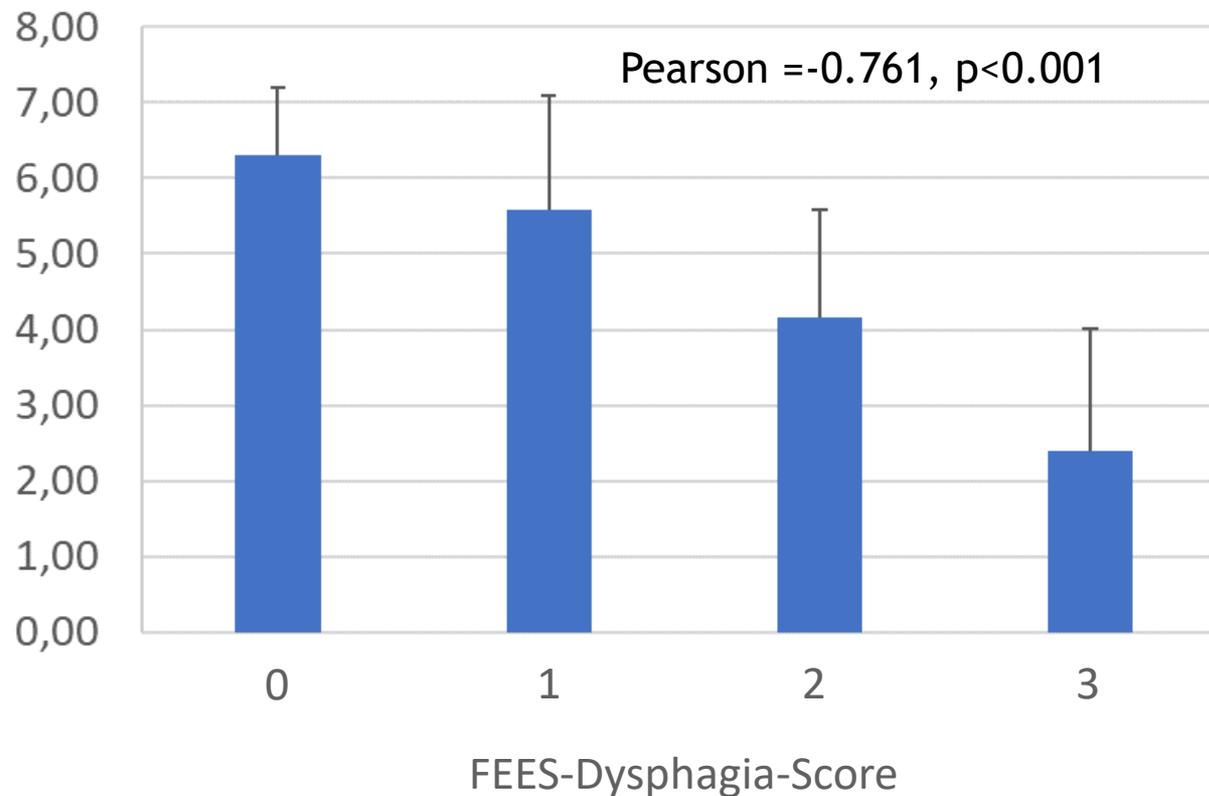
FOIS Scale

1	No oral intake
2	Tube dependent with minimal/inconsistent oral intake
3	Tube supplements with consistent oral intake
4	Total oral intake of a single consistency
5	Total oral intake of multiple consistencies requiring special preparation
6	Total oral intake with no special preparation, but must avoid specific foods or liquid items
7	Total oral intake with no restrictions

Crary MA et al. Initial psychometric assessment of a functional oral intake scale for dysphagia in stroke patients. Arch Phys Med Rehabil 2005;86:1516-1520.

FEES-Registry Results

FOIS (N=1712)

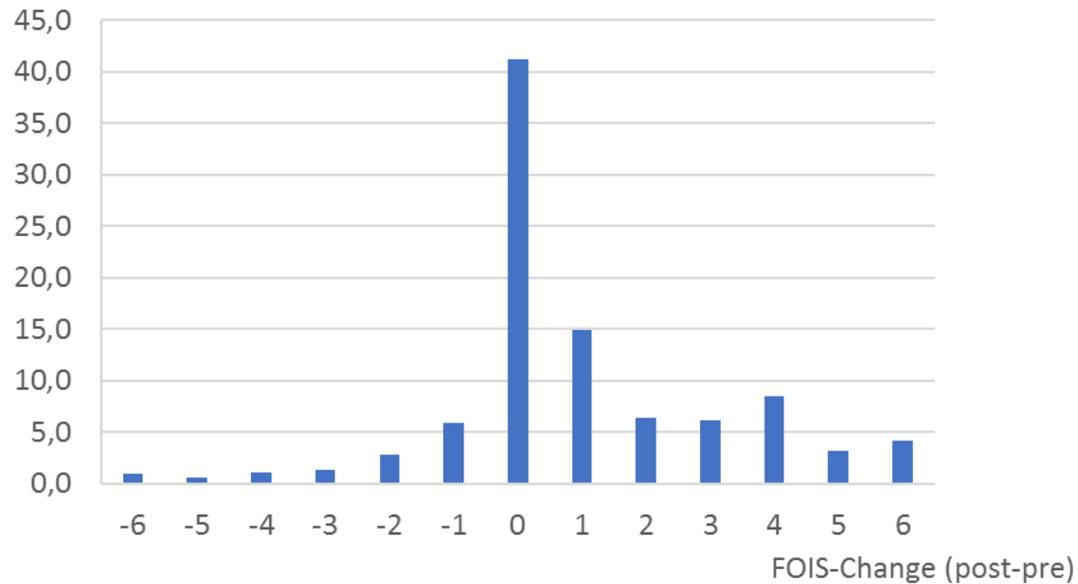
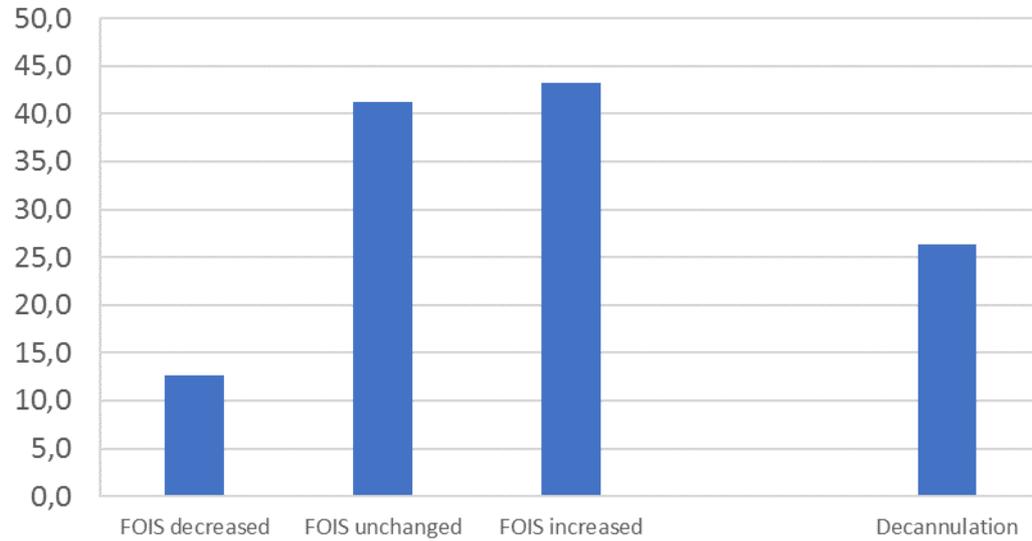


FEES-Dysphagia-Score

- **0 = no relevant dysphagia**
- **1 = mild dysphagia**
(premature spillage and/or residues, but no penetration/aspiration)
- **2 = moderate dysphagia**
(penetration/aspiration events with one consistency)
- **3 = severe dysphagia**
(penetration/aspiration events with two or more consistencies)

(Warnecke et al. 2010, 2016)

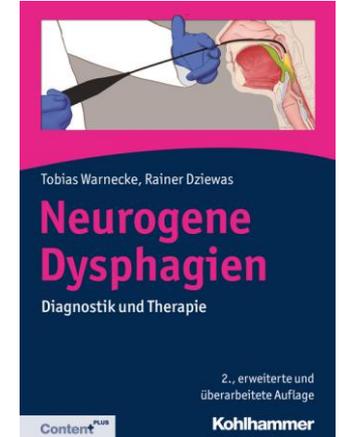
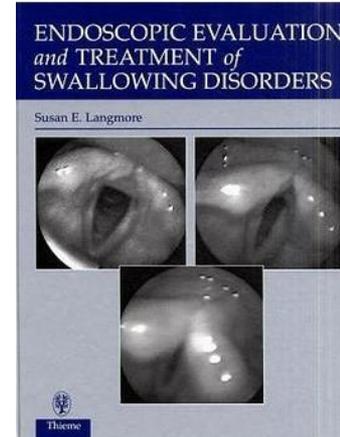
FEES-Registry Results



FEES-Registry Conclusions

- Side-effects similar to previously published studies.
- All complications were self-limited and resolved without sequelae
- No increased risk of complications if FEES was performed by less experienced clinicians.
- Cardiorespiratory alterations were not clinically relevant.
- FEES impacted on feeding strategy in >50% of patients.
- Decannulation after FEES in >25% of trach-patients.

Thank you!



Dysphagia (2017) 32:27–38
DOI 10.1007/s00455-016-9775-x



REVIEW

History of Fiberoptic Endoscopic Evaluation of Swallowing for Evaluation and Management of Pharyngeal Dysphagia: Changes over the Years

Susan E. Langmore^{1,2}

