Risks & Safety of Endoscopy

Excellent Safety Record

› Many thousands of exams done by thousands of SLPs over past decades

› Warnecke (2009) FEES 1 day post acute stroke is safe!

› No known serious complications
–Langmore (2000); Aviv (2000)

Informed Consent

› Written? No! Oral is sufficient

› Same as ENT does for their routine laryngeal exams

› Important Note: Inform patient this is not an exam to look for cancer.

Difficult Patients

› Agitated
› Tense / Anxious
› Hyperactive gag
› Small nasal passage

Possible Adverse Reactions

› Discomfort
› Gagging
› Nose bleed
› Allergic reaction: hypersensitivity to topical anesthesia or decongestant
› Laryngospasm
› Vasovagal response

Laryngospasm

› Exaggerated LAR: Strong protective response to sudden (unexpected) stimulus perceived as adversive → VF spasm (airway closes tight)

› Most common stimuli = GER, irritants, aspiration, drowning, general anesthesia

› Prevention: don't purposely & forcefully touch the larynx

› Treatment: calm the patient, blow air into mouth, Heimlich maneuver

Vasovagal (VV) Response (Fainting)

› Sympathetic branches within vagus nerve
  – Emotions (extrinsic cause)
  – Nerve endings in nares (intrinsic cause – rare)

› Nervous patient

› Predisposed patient - history of fainting

Stages of VV response:

› First Stage = increased heart rate, increased blood pressure, sweating, blood flows to extremities,

› Second Stage = HR and BP drop, bradycardia, oxygen deprivation to brain → syncope
  – Pt with bradycardia at risk for cardiac damage

Preventing a Vasovagal Response

› Calm, reassuring examiner

› Get a good history → fainter?

› Acute cardiac condition? Ask MD/RN there to monitor BP & HR

› Remove scope at first sign; position head below heart

Treatment of Vasovagal Response

› Lay patient supine

› Take pulse at carotid

› Get medical assistance

What about topical anesthesia?

› Does it make the patient more comfortable?

› Does it impair swallowing?

› To be discussed in Risks/Safety – last lecture

Collaborative Research: BU Medical Center & Wake Forest Medical Center

Three studies…

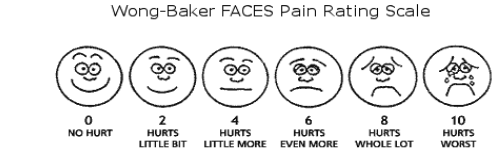
1. Lester (2013)
2. Fife (2015)
3. O'Dea (2015)

All 3 compared exams with and without topical anesthesia

All 3 looked for change in PAS score
All 3 had subjects rate pain level for each exam

Wong-Baker FACES Pain Scale scores

› collected at scope insertion, during examination, and after scope removal



From Wong D.L., Hockenberry-Eaton M., Wilson D., Winkelstein M.L., Schwartz P.: Wong's Essentials of Pediatric Nursing, ed. 6, St. Louis, 2001, p. 1301. Copyrighted by Mosby, Inc. Reprinted by permission.

Study #1*: Lester (2013) Design

› 20 healthy young adults – RCT

› Tested effect of **1ml** of 4% lidocaine
  – dose typically used by ENT physicians

*Lester S, Langmore SE, Lintzenich CR, et al. The effects of topical anesthetic on swallowing during nasoendoscopy. *The Laryngoscope.* 2013;123(7):1704-1708.

Study #1: Lester (2013) Results

› PAS above 1 (2+) in more swallows with lidocaine than without lidocaine (p=0.002)
  – It did affect the swallow

› Pain Rating: significantly greater without anesthesia (p=006)

Study #2*: Fife (2015) Design

› 25 patients with dysphagia

› Tested effect of **0.5ml** 4% lidocaine

*Fife TA, Butler SG, Langmore SE, et al. Use of topical nasal anesthesia during flexible endoscopic evaluation of swallowing in dysphagic patients. *Ann Otol Rhinol Laryngol.* 2015;124(3):206-211.

Study #2: Fife (2015) Results

› PAS scores were higher with anesthesia, but not statistically significant (p=0.065)
  – 3.5 vs. 3.1 on 10ml milk

› Significantly less pain/discomfort with anesthesia (p=0.01)

› We were uneasy with the results…….

Study #3*: O'Dea (2015) Design

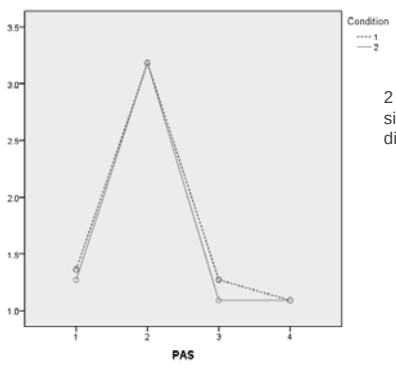
› 17 patients with dysphagia

› Tested effect of **0.2ml** of 4% lidocaine
  – Control condition = 0.2ml Neosynephrine (nasal decongestant)
  – Experimental condition = 0.2ml Neosynephrine Plus 0.2ml 4% lidocaine

› 2 FEES performed
  – 1st exam with 0.2ml Neosynepherine
  – 2nd exam added 0.2ml lidocaine

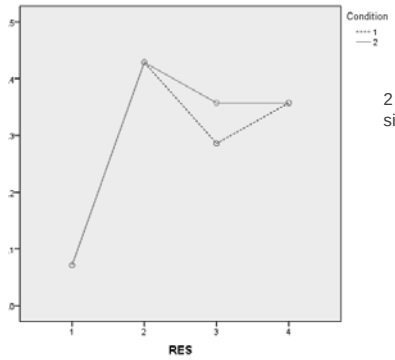
*O'Dea MB, Langmore SE, Krisciunas GP, et al. Effect of Lidocaine on Swallowing During FEES in Patients With Dysphagia. *Ann Otol Rhinol Laryngol.* 2015;124(7): 537-544.

Study #3: Results (PAS Scores)



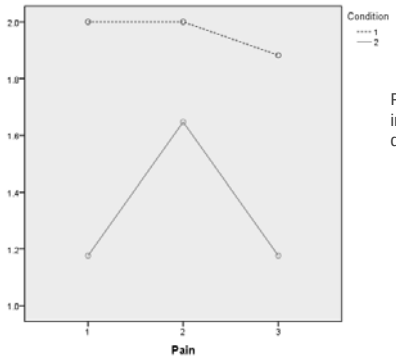
2 conditions not significantly different

Study #3: Results (Residue Scores)



2 conditions not significantly different

Study #3: Results (Pain Scores)



Pain scores on insertion were signif different

Study #3: Conclusion

› 0.2ml of 4% lidocaine does NOT worsen PAS or residue scores in patients with dysphagia

› …but it DOES increase comfort of a FEES exam (specifically during scope insertion)

Topical Anesthesia

› Lidocaine HCl - safest anesthesia
› 2% Gel (cotton tipped applicator)
› 4% Spray (atomizer with disposable tips)

– Amide family (not related to Novacaine, Cetacaine)
– PDR: max dose = 10ml/100lbs body weight
  › Giving 0.2ml or even 1ml is WAY below normal adult limits

– Allergic reaction rare: restricted to nasal mucosa swelling, erythema (Eyre & Nally, Lancet, 1971)

Nasal Decongestant is Useful

› Afrin (oxymetazoline) or
› Neosynephrine (phenylephrine)

Clean the Scope with High Level Disinfection

› Follow same procedures as ENT currently does for laryngeal exams
› Not sterilization – but high level disinfection
› Follow Infection Control Procedure at your institution

Scope Reprocessing

Scope Transport

Using Endoscopy in Treatment of Dysphagia

FEES is a Patient & Family Friendly Tool

› Used anywhere convenient for clinician and patient

› Family and/or significant care takers involved

› Unlimited time

› Can repeat endoscopy as often as needed

Endoscopy Can Be Used Throughout Management of the Patient

› During the evaluation
  – To trial interventions & evaluate the effects (same as MBS)

› Re-evaluations
  – To monitor change: can do more often than MBS
  – To modify the treatment plan
  – To modify diet

› As a treatment tool

Endoscopy as a Treatment Tool

› Image can be viewed afterwards in education/teaching mode

› Or online in a biofeedback mode

› Biofeedback is the most effective way to learn a motor skill
  – Manor (2013)*: Group of PD patients who had biofeedback for 6 sessions reduced residue significantly more than control group without biofeedback.

*Manor, Y., et al., *Video-assisted swallowing therapy for patients with Parkinson's disease.* Parkinsonism Relat Disord, 2013. **19**(2): p. 207-11.

Endoscopy as a Biofeedback Tool

Used to:

› Raise awareness about residue, spillage, aspiration – as it occurs

› Teach maneuvers or exercises

› Judge the effect of the maneuver, exercise, or other intervention on the swallow

Swallow Therapy: Compensatory & Rehabilitative Interventions

› Compensatory Interventions: changes the effect of the swallow by altering the bolus itself, or the way it is swallowed

› Rehabilitative Interventions: improves the swallow itself by improving the force, speed, and/or timing of structural movements that are involved in the swallow

Examples of Compensatory Techniques

› Modify bolus volume, consistency, viscosity

› Change method of food/liquid delivery

› Modify sequence of food/liquid delivery

› Change rate of food/liquid delivery

› Alter behavior (e.g. dry/clearing swallows, postural changes)

› Endoscopy can be used to try ALL of these possibilities… even over 1 long session

FEES with Demented or Neurodegenerative Patients: Focus on Compensatory Techniques

› Ideal for patient with supportive family

› Purpose: how to help patient eat comfortably, efficiently (more), and safely so doesn't cough – comfort and quality of life is paramount!

› Use food that patients wants to eat

› Compensatory techniques are tried; posture, altering food, liquid,

VIDEOS

Compen ALS FTD. Ramona 2 min)

OPTIONAL:

Compen PSP FTD 4 yrs post.mov

› Patient with ALS; has developed FTD, with poor insight and judgment; she is physically able to eat independently at time of the exam

› Patient with PSP and FTD; wife and caretaker feeding patient; goal = to find his most successful liquid/food consistencies and strategies so he can continue eating orally; patient unable to eat independently

Rehabilitative Techniques

› Swallow maneuvers
  – Supraglottic Swallow
  – Effortful Swallow
  – Mendelsohn maneuver swallow

› Non-swallow Exercises (to increase strength of muscle groups)

› Endoscopy can be used to ***teach*** some of these, and to ***assess*** the effect of all of them.

Treatment for 4 Problems

1. Oral stage problems
2. Initiation of the swallow (including leakage during oral stage)
3. Bolus propulsion
4. Valving: Laryngeal closure, VP valving, UES opening

Oral Stage Problems

› Mastication & feeding problems: address these problems from clinical observations

Problems Initiating the Swallow: Mistiming bolus flow with swallow initiation

1. Problem in oral preparatory phase (not containing the bolus)
2. Problem at the initiation of the swallow
   a. Mistiming tongue propulsion with laryngeal movements
   b. Delayed, slow initiation of the swallow.....

› **All of the above → Bolus Spills into HP prior to the swallow onset**

› **and many of the problems can be treated similarly**

VIDEO

Postures Chin Tuck VA

› Compensatory Techniques to reduce spillage

› Chin tuck, thick liquids = common interventions

Movie = PTs at our VA hospital working on chin tuck

Rehabilitative Techniques for Improving the Initiation of the Swallow -

› thermal stim, electrical stimulation, pharyngeal stimulation, brain stimulation, intense taste

– Rationale for "Delayed Initiation" – **facilitate a brisker swallow**

My first intervention for all problems with spillage: teach a "Controlled Swallow"

Goal:

to Prevent Spillage during Oral Prep –

and/or to facilitate a more coordinated Initiation of the swallow

Controlled Swallow

› Step 1: practice containing bolus in the mouth
  – Start with ice water
  – If needed, try with pureed, then move to liquid

› Step 2: "Swallow as the Bolus leaves the mouth"
  – Should not see bolus before whiteout!
  – Emphasize a coordinated, controlled swallow: "swallow it altogether"!

Use endoscopy to teach this in biofeedback mode

VIDEOS:

Controlled Swallow CVA Daniels.Tx

Controlled Swal NPC Part 2 GOOD CONTROL

Videos: working on Controlled Swallow (+ SSGS)

› RH CVA – aspirates on liquids occasionally but with risky pattern at initiation – (Susan's first use of this technique with this patient)

› NPC patient –doing it correctly after working on it during a session

Problem: Incomplete Bolus Clearance

› Reduced force of BOT retraction, pharyngeal shortening/ constriction; hyolaryngeal excursion

→ Residue after the swallow
→ Aspiration after the swallow, as next swallow begins

Incomplete Bolus Clearance

› Compensatory Techniques
  – Liquid wash
  – Double swallows
  – Postural changes –

› Rehabilitation Techniques
  – Exercises for muscles used in swallowing
  – Swallow exercises to be performed while swallowing

VIDEOS

Postures.BOS FEES 48sec

Postures SCricoidLary RbtBeru 2min

Videos: Postural Techniques to Aid Bolus Clearance

› 1) Patient with Base of skull vagal schwanoma, surgery sacrificed cranial nerves 9-12 on her right side;
  – She could only take small sips; needed liquid wash for all food

› 2) Supracricoid laryngectomy; TVCs removed, 1 arytenoid removed
  – Note reconstruction
  – Posture changes = head turn and tilt: he employed these for a month but he was able eat a regular diet within a few months

Rehab: Exercises to Improve Bolus Clearance

<u>CAN teach these exercises WITH endoscope in place for biofeedback</u>

› Mendelsohn Maneuver swallow
› Effortful swallow
› EPG / Pharyngeal Squeeze (not during swallowing)
› Tongue pull back (use gauze to hold tongue with thumb and finger; try to retract tongue while resisting with fingers)
  – Self administered; not during swallowing

VIDEOS:

1. Mendelsohn Maneuver 32sec

2. Mend maneuver OlyRep. biofeedback

Videos: Teaching Mendelsohn Maneuver with endoscopy as biofeedback

› 1) Patient seen after practicing the Mendelsohn Maneuver for 6 weeks; previously had residue in vallecula; he demonstrates the Mendelsohn Maneuver

› 2) Olympus rep learning the MM at DRS *(watch audio – too loud at first! Turn it down)*

Exercises for Base of Tongue/Pharyngeal Constrictors

› (Masako maneuver –: cannot see on FEES)

› Tongue pull back – exercise done without swallowing;

Hold tongue with gauze (finger and thumb in mouth); pull back with tongue retraction muscles; try to touch the posterior pharyngeal wall; use fingers to provide some resistance

NEED ENDOSCOPY AS BIOFEEDBACK

TONGUE PULL BACK AND EPG VIDEOS

Tongue Pull back. normal. Mark

EPG: Effortful pitch glide up Normal Joe

SLP demonstrating the Tongue Pull back

SLP demonstrating the Effortful Pitch Glide (EPG)

(Sing “eee” - Start low and glide up in pitch until very high and hold it – tight!”)

VIDEO

Tongue pull back EPG 1.49 sec

Patient learning Tongue Pull Back and Effortful Pitch Glide – Endoscopy as biofeedback

Patent learning the tongue pull back - and effortful pitch glide

Incomplete Laryngeal Valving

Reduced Laryngeal Valving During Swallow

Two Causes

1. **Reduced hyolaryngeal excursion** causes incomplete….
   – Arytenoid tilt forward
   – Epiglottal retroflexion

2. **Reduced glottic closure** causes incomplete
   – Arytenoid medialization & VC adduction

Treatment for reduced Laryngeal Valving

› Remember to first ask: “When did the aspiration occur?”

– **Before** the swallow? If so, work on **timing** the initiation of the swallow.

– **After** the swallow? If so, work on reduced **pharyngeal clearance**

– **During the swallow? If so, work on laryngeal valving.**

Compensatory Techniques for Laryngeal Valving

› Chin tuck
– Might work b/c reduces spillage

› Thick liquids
– Might help b/c they move slower

› Head turn if unilateral VF immobility
– Helps close off airway / glottis

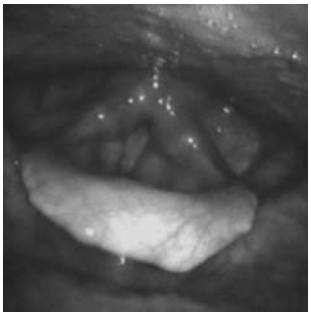
Exercises for Laryngeal Valving

› Where is the problem? What movement is incomplete / reduced?

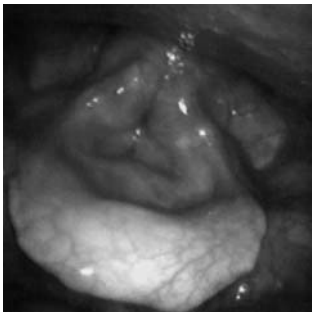
› **Reduced TVC adduction?** If yes, work on TVC adduction.

Work on Tight Breath Hold (NOT light)

LIGHT BREATH HOLD



TIGHT BREATH HOLD



Exercises for Laryngeal Valving

What is the problem?

› Is it **reduced arytenoid and/or epiglottis movement?** If so work on **hyoid and laryngeal elevation.**

– Shaker – no biofeedback
– Effortful pitch glide – visual feedback on FEES
– Mendelsohn – visual feedback on FEES
– Supraglottic swallow (see next slide)

SuperSupraglottic Swallow (SSGS) Maneuver

› A superstar maneuver!

› Helps prevent aspiration before, during, or after the swallow!!

– Good for *spillage* into airway *before the swallow* begins: closes off airway early at level of VCs (use it if controlled swallow doesn’t prevent spillage)

– Compensates for incomplete laryngeal valving (arytenoid and epiglottic movement) *during the swallow* with complete, prolonged glottic closure at level of vocal folds – seals off the airway

– Also good for ejecting bolus out of airway/laryngeal vestibule *after the swallow* if residue remains

How to Teach the Super Supraglottic Swallow

› Teach tight breath hold – use biofeedback

› Teach / monitor tight breath hold while initiating the swallow – endoscopy/biofeedback
  – Caution: if breath hold is light, closure may be temporary, and TVCs re-open with swallow.
  – ***Only with tight breath hold, do the TVCs maintain contact throughout the swallow***
  – ***So tell the patient to keep the breath held tight during the swallow***

› Cough out / strong exhale as the airway opens – release the swallow with a cough

1. SSGS.CVA BrainStem thin thick liq 2.17 min

2. SSGS.HNC BOT Norma show 3.00 to the end of movie

3. Controlled Swal SGS Oral Ca Sx + RT

4. Controlled Swal Hold BreathNPC Part 1 work on it 1/21sec

Videos: Teaching the SSGS

1 Brainstem CVA patient – could not master Controlled Swallow so SSGS used as compensation to close off the airway early

2 HNC – Base of tongue, post RT patient had reduced laryngeal valving during swallow and residue after the swallow; needed to compensate by closing off vocal folds early and maintain it throughout - needed to use it with liquids to wash food

3 Oral Cancer patient- post surgery to tongue and RT – difficulty holding and controlling liquid propulsion at initiation of swallow. Taught Controlled Swallow *plus* early breath hold (SGS) in case of spillage

4 NPC patient demonstrating SSGS he said he 'learned' – but he hadn't learn it!!

Implementing FEES into your practice

Landmark Achievements

› 1991 – ASHA Policy Statement on Instrumental Diagnostic Procedures for Swallowing, including FEES: "Performing FEES is within the scope of practice of SLP's"

› 2003 – FEES gets permanent CPT code (92612)
  – It can be billed!
  – Distinct from the ENT laryngoscopy procedure

Implementation of FEES: Preliminary considerations: Gain support from key players at your institution

Necessary Levels of Support for FEES

› National level: ASHA support exists and documents are available

› State level: yes (by default), but check whether there are specific requirements regarding any training
  – Don't call the Licensure Board and ask if SLP can do FEES!!

› *Institutional level: You need support from medical and administrative staff!!*

"Selling" FEES

› MDs: Sell the tool / procedure – it will help patients
  – Welcome the MD involvement
  – Demonstrate benefits to patient

› Sell it to administration
  – A cost saving procedure for inpatients
  – A money making procedure for outpatients

Promote FEES: Compare it to MBS

› Comparing the benefits and differences of each procedure is a good way to objectively sell the utility of FEES

› Endoscopy and Fluoroscopy have unique findings
  – They are both valuable exams
  – They both complement each other
  – Not having one can actually be detrimental

Findings Unique to Fluoroscopy

› Only fluoroscopy can visualize…
  – The bolus during the height of the swallow
  – The oral phase
  – Completeness of tongue retraction
  – UES opening
  – Hyoid & laryngeal elevation
  – Extent of aspiration
  – Anatomical abnormalities beneath the surface mucosa (osteophytes, esophageal narrowing, Zenker's diverticula, etc)

Findings Unique to Endoscopy

› Only endoscopy can visualize…
  – Secretions (location, amount, viscosity, patient reaction)
  – Direct assessment of sensation
  – Surface anatomy / mucosal abnormalities (edema, erythema)
  – Configuration of the hypopharynx and effect on bolus flow
  – Airway protection
  – VC mobility
  – Arytenoid movement
  – Path of bolus
  – Location of bolus residue within the HP with specificity

After you have verbal support from key players at your institution……..

Basic Steps in Implementing FEES

Written Policies that may be Needed at your Institution

› Hospital/Institution-approved FEES Policy
  – Approved by Board that oversees all procedures done by SLPs that are not 'routine' or that 'need advanced training', etc.

› Authorization to Administer Medications
  – defines personnel who can administer medications to patients, including allied health professionals. Usually brought before a Pharmacy Committee

› Procedure for High Level Disinfection Utilizing Ortho-Phthalaldehyde solution (Cidex OPA)'.
  – Often needs approval by Infection Control

FEES Policy

- Describe your model: anticipate roles for all health professionals
  - SLP to perform FEES independently?
  - SLP and ENT (or other MD) perform FEES together?
  - Other professionals involved?
- Include…
  - Purpose of exam
  - Indications for FEES
  - Contraindications & possible complications
  - Set up needed
  - Procedure / steps
  - Availability of medical back-up in case of airway emergency

FEES Policy – include Training/Competency of Staff at your institution

- No formal requirements from ASHA
  - Look at ASHA published guidelines for competency and skills for FEES
- Remember, there is NO national "certification" in FEES. Your state requirements may call it 'certification'.
- You need to develop competencies for your staff - institution specific
  - Similar to MBS?

Medicare FEE Schedule Rates for 2017 (vary by geographic location)

Procedure	Charge
Clinical swallowing evaluation	$87.21
MBS	$88.29
FEES	$190.57
FEES (interpret/report only)	$39.12
Laryngeal sensory test	$146.78
Laryngeal sensory test (interpret/report only)	$34.09
FEESST	$210.31
FEESST (interpret/report only)	$42.71
Diagnostic Laryngoscopy - 31575 (MD only)	$113.77
MBS (fluoroscopy) Code for SLP (92611) MBS – MD/radiologist code (31575)	$88.29 $91.16

Should we Establish Accrediation for FEES?

Should we establish FEES accreditation?

- European model – Neurologic Society; Stroke Society; ESSD – all embrace this model

Dysphagia
DOI 10.1007/s00455-017-9828-9

EDITORIAL

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

R. Dziewas[1] · L. Baijens[2,3] · A. Schindler[4] · E. Verin[5] · E. Michou[6] · P. Clave[7] · The European Society for Swallowing Disorders

Received: 24 July 2017 / Accepted: 27 July 2017

FEES Accreditation?

- Who should develop and enforce it?
- DRS?
- ASHA?
- BCSS-S?
- No one?

Thank you! Questions?