

Use of a Rating Scale in Paediatric Videofluoroscopy

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Why rate videofluoroscopy studies?

- give clinicians a structured approach to observation
- standardise reporting technique, improve communication
- to demonstrate change in repeated assessments
- establish inter- and intra-rater reliability
- establish outcome measures
- provide information/data resource for audit and research

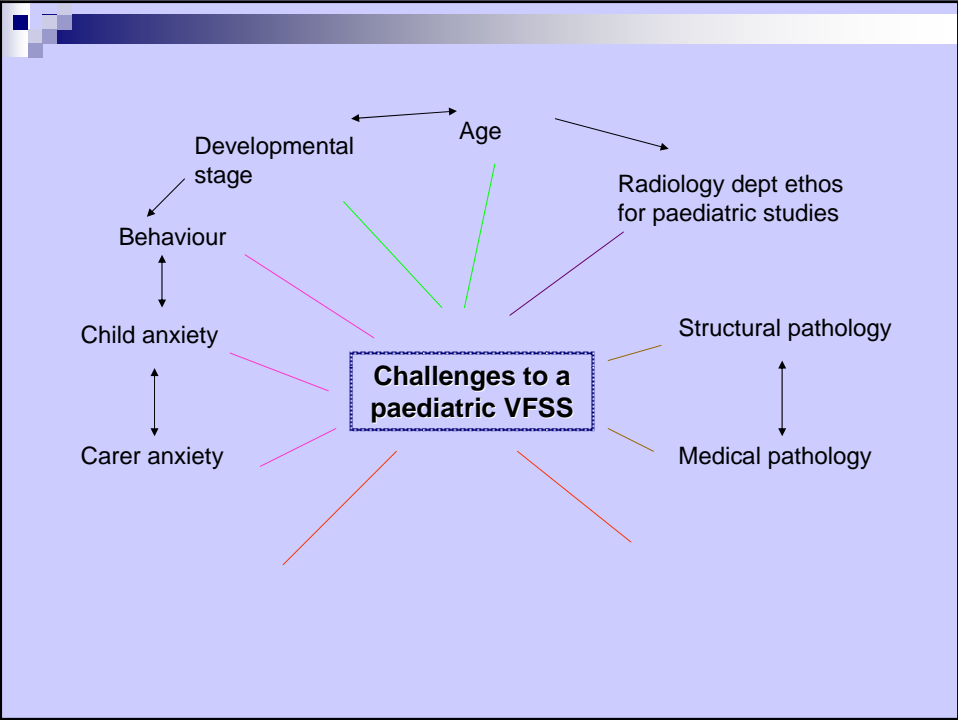
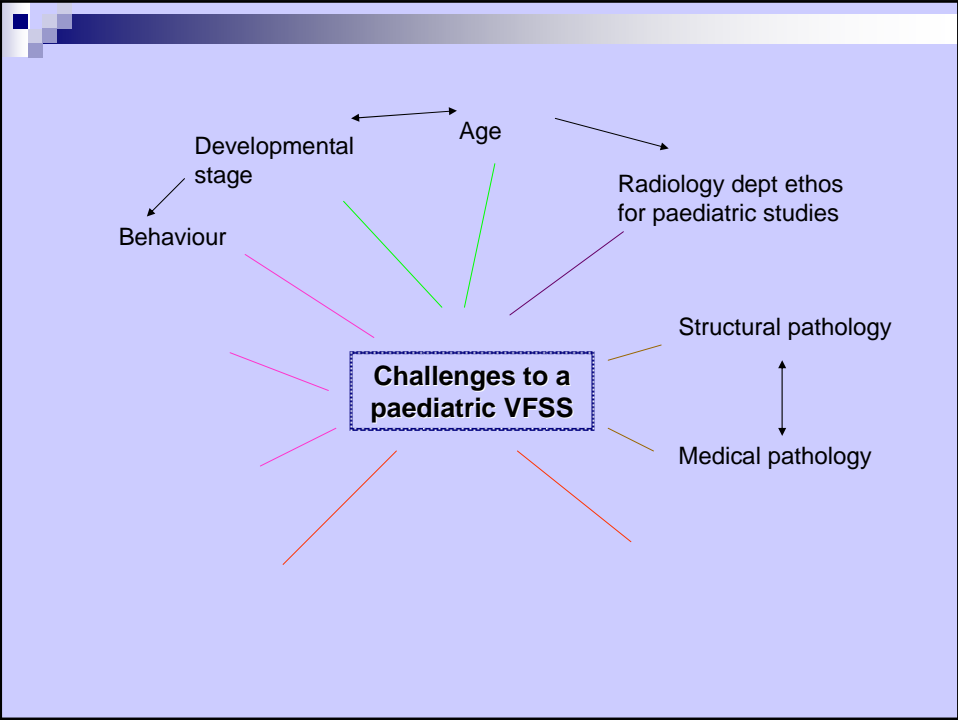
Literature Review of VFSS Rating Scales

- All adult studies
- Wide range of inter-rater reliability:
57-90%
- Wilcox et al (1996)
- Scott et al (1998)
- Kuhlemeier et al (1998)
- McCullough et al (2001)
- Stoeckli et al (2003)

- aspiration/penetration scales more reliable

Dysphagia Outcome Severity Scale

- DOSS - O'Neil et al (1999)
 - 4 judges : 135 vfss reports
 - 7 point rating scale
 - Severity of dysphagia
 - Functional level
 - Inter-rater reliability was 90%



Method – First phase

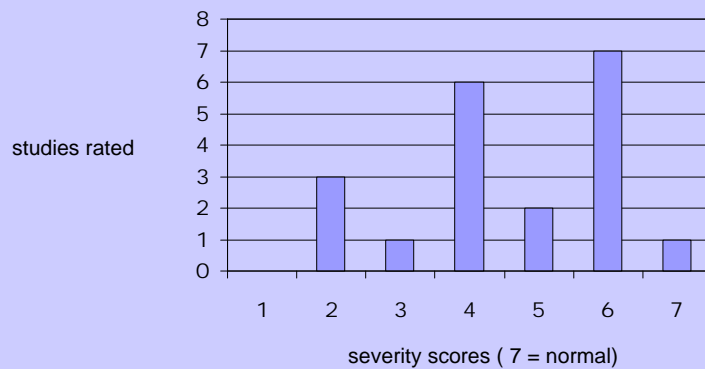
- 4 SLTs
- Training through consensus rating and discussion
- 20 videofluoroscopy studies selected
- Identification of items observed and allocation of a severity score

7	<input type="checkbox"/>	A Normal swallow
6	<input type="checkbox"/>	B Mild Oral / Pharyngeal delay
	<input type="checkbox"/>	C Retention / Trace epiglottic undercoating spontaneously clears
5	<input type="checkbox"/>	D Aspiration of thin fluids - Coughs to clear completely
	<input type="checkbox"/>	E Airway Penetration Midway to Cords / Clears spontaneously
	<input type="checkbox"/>	F Retention in pharynx - clears spontaneously
	<input type="checkbox"/>	G Mild oral dysphagia / oral retention that clears
4	<input type="checkbox"/>	H Retention in pharynx, cleared with cue
	<input type="checkbox"/>	I Retention in oral cavity, cleared with cue
	<input type="checkbox"/>	J Aspiration with one consistency with weak / no reflexive cough (NRC)
	<input type="checkbox"/>	K Penetration to the level of the vc with cough - two consistencies
3	<input type="checkbox"/>	L Penetration to the level of the vc without cough on one consistency
	<input type="checkbox"/>	M Moderate retention in the pharynx, cleared with cue
	<input type="checkbox"/>	N Moderate retention in the oral cavity cleared cue
	<input type="checkbox"/>	O Penetration to the level of the vc, NRC
	<input type="checkbox"/>	P Aspiration on 2 consistencies with weak / NRC
2	<input type="checkbox"/>	Q Aspiration 1 consistency weak / NRC plus penetration to vc 1 consistency N
	<input type="checkbox"/>	R Severe retention in pharynx, unable to clear or requires multiple cues
	<input type="checkbox"/>	S Severe oral stage bolus loss / retention, unable to clear
	<input type="checkbox"/>	T Aspiration with 2 or more consistencies, NRC, weak volitional cough
	<input type="checkbox"/>	U Aspiration one or more consistencies, no cough & penetration to cords, one / one + no cough
1	<input type="checkbox"/>	V Severe retention in the pharynx, unable to clear
	<input type="checkbox"/>	W Severe oral stage bolus loss / retention unable to clear
	<input type="checkbox"/>	X Silent aspiration with two or more consistencies, non volitional cough
	<input type="checkbox"/>	Y Unable to achieve swallow

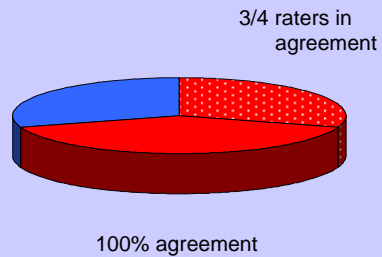
Patient Group

- Age range: 1 month - 15 years
- Range of diagnoses:
 - Respiratory
 - Gastro-enterology
 - Cranio-facial
 - Cleft
 - ENT
 - Neurological
 - Others

Distribution of Severity Scores



Inter-Rater Reliability



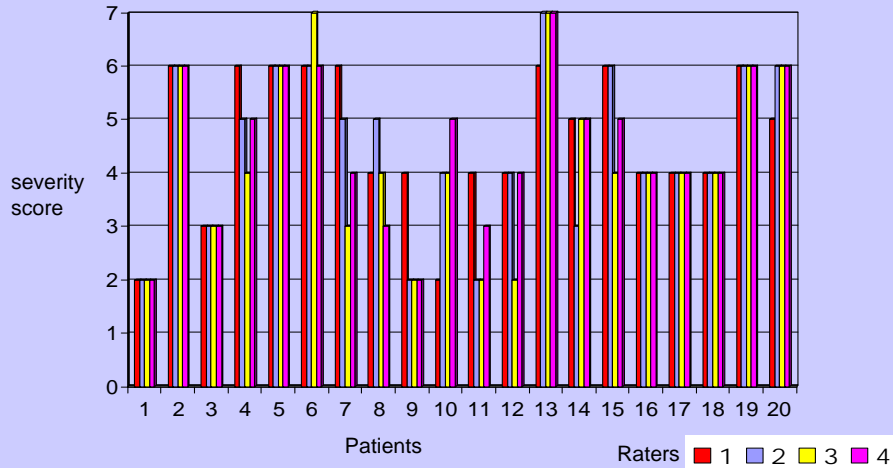
IRR = .863

- No difference among raters based on age
- No difference for specific raters
- Qualitative review highlighted rater inconsistency for some test items e.g.
 - Residue in pharynx cleared with cue
 - severe residue in pharynx requires multiple cues

Pharyngeal Residue



Inter-rater reliability



Dysphagia Outcome Severity Scale (O'Neil et al 1999) Original Scale Items

Level	Severity Scale	Observations
7	Normal	<input type="checkbox"/> A Normal swallow
6	Within Functional Limits	<input type="checkbox"/> B Mild Oral / Pharyngeal delay <input type="checkbox"/> C Retention / Trace epiglottic undercoating spontaneously clears
5	Mild Dysphagia	<input type="checkbox"/> D Aspiration of thin fluids - Coughs to clear completely <input type="checkbox"/> E Airway penetration midway to cords / To the cords but clears spontaneously <input type="checkbox"/> F Retention in pharynx, clears spontaneously <input type="checkbox"/> G Mild oral dysphagia / oral retention that clears
4	Mild-Moderate Dysphagia	<input type="checkbox"/> H Retention in pharynx, cleared with cue <input type="checkbox"/> I Retention in oral cavity, cleared with cue <input type="checkbox"/> J Aspiration with one consistency with weak / no reflexive cough OR <input type="checkbox"/> K Penetration to the level of the vc with cough - two consistencies OR <input type="checkbox"/> L Penetration to the level of the vc without cough on one consistency
3	Moderate Dysphagia	<input type="checkbox"/> M Moderate retention in the pharynx, cleared with cue <input type="checkbox"/> N Moderate retention in the oral cavity cleared with cue <input type="checkbox"/> O Penetration to the level of the vocal cords, no reflexive cough, 2 or more consistencies OR <input type="checkbox"/> P Aspiration with 2 consistencies with weak / no reflexive cough OR <input type="checkbox"/> Q Aspiration with 1 consistency weak / no reflexive cough and penetration to vocal folds with additional consistency - no cough
2	Moderately Severe Dysphagia	<input type="checkbox"/> R Severe retention in pharynx, unable to clear or requires multiple cues <input type="checkbox"/> S Severe oral stage bolus loss / retention, unable to clear <input type="checkbox"/> T Aspiration with 2 or more consistencies, NRC, weak volitional cough OR <input type="checkbox"/> U Aspiration with one or more consistencies, no cough and penetration to cords, one or more consistencies - no cough
1	Severe Dysphagia	<input type="checkbox"/> V Severe retention in the pharynx, unable to clear <input type="checkbox"/> W Severe oral stage bolus loss / retention unable to clear <input type="checkbox"/> X Silent aspiration with two or more consistencies, non functional volitional cough <input type="checkbox"/> Y Unable to achieve swallow

One or more characteristic required within a category in order to allocate severity level.

Highlighted items = poor rater agreement

Primary Question

- Can the DOSS be used reliably to evaluate paediatric videofluoroscopy studies?

Conclusions from 1st Study

- Adult DOSS scale not a discriminatory tool in paediatrics

Adjustments required:

- Modification of items where prevalence of clear disagreement
- Addition of some paediatric specific items

Phase Two

- Modify DOSS in the areas described – add paediatric specific items
- Repeat this project with the modified scale – inter-rater reliability
- Additional intra-rater reliability

Client Name / #:	GOS #:	Date:	Initial Assessment: <input type="checkbox"/>	Fatigue Assessment: <input type="checkbox"/>
Consistencies Taken:				
Cough Response - if not viewed on tape but observed in clinic: Present: consistencies				
Absent consistencies				
Delayed responsesecs..... consistencies				
Level	Observations			
7	<ul style="list-style-type: none"> • Normal Swallow • Minimal residue over the tongue / sulci, clears spontaneously on subsequent swallows 			
6	<ul style="list-style-type: none"> • Mild oral stage inco-ordination • Functional but mildly disorganised sucking pattern • Anterior spillage on one or more consistencies • Minimal residue in the valleculae and / or pyriform fossa and / or posterior pharyngeal wall, residue does not accumulate on subsequent swallows (one or more consistencies) • Epiglottic undercoating which clears spontaneously – one or more consistencies 			
5	<ul style="list-style-type: none"> • Retention in oral stage i.e. over the tongue/ sulci / hard palate which clears spontaneously on subsequent swallows (one or more consistencies) • Swallow triggered as bolus overflows from the valleculae to the pyriform fossa (one or more consistencies) • Residue observed to fill the valleculae and /or pyriform fossa clears after multiple swallows nb: no further increase / accumulation of material as the study continues (one consistency) • Penetration on one consistency – coughs to clear completely 			
4	<ul style="list-style-type: none"> • Key consistency* - dysfunctional sucking pattern with minimal / inadequate volumes extracted from teat • Residue filling the valleculae and pyriform fossa clears after multiple swallows nb no further increase / accumulation of material as the study continues (two or more consistencies) • Swallow triggered when pyriform fossa filled (one or more consistencies) • Penetration with two or more consistencies - cough response present • Aspiration with one consistency with cough response 			
3	<ul style="list-style-type: none"> • Residue filling the valleculae and pyriform fossa +/- residue coating on the posterior pharyngeal wall, volume seen to accumulate on subsequent swallows (one or more consistencies) • Penetration with two or more consistencies (or patient's key consistency), no cough response evident • Aspiration with one consistency - no cough, +/- penetration with one consistency – no cough. 			
2	<ul style="list-style-type: none"> • Severe oral stage bolus retention unable to clear one consistency • Aspiration with two or more consistencies (or patient's key consistency), delayed or ineffective cough response on one or more of these consistencies • Silent aspiration with two or more consistencies (or patient's key consistency), no cough response evident 			
1	<ul style="list-style-type: none"> • Severe oral stage bolus retention unable to clear two or more consistencies or patient's key consistency • Severe retention in the pharynx unable to clear one or more consistencies • Unable to achieve swallow one or more consistencies 			
<small>* Key Consistency: Where one consistency is taken routinely by patient e.g. children 4 months and under who rely on liquid consistencies only</small>				

Study into the applicability of the DOSS scale to paediatric patients

- Phase Two – 3 ‘judges’(SLT’s) – 30 children
- Adaptation of tool for paediatric use
 - changes to severity level descriptors
 - addition of specific paediatric items
 - sucking patterns
 - key consistencies
- (Phase Three – Field testing of adapted tool)

Conclusions from inter & intra –rater field reliability study (n = 30), 3 ‘judges’

- Inter class co-efficient was 0.95 (confidence interval 0.91-0.97)
- Intra rater reliability – very good 0.94,0.96,1
- This data supports conclusion that results from different judges are likely to be more reproducible and consistent.
- We feel it provides us with a better data set for further work
- Next aim – multicentre field evaluation



thanks