Preliminary Results of a Multi-Site Rater Reliability Study and Literature Review of the Dynamic Imaging Grade of Swallowing Toxicity (DIGEST™)

Schelling, B., Barbon, C., & Hutcheson, K.
1 Department of Head & Neck Surgery, Section of Speech Pathology & Audiology
2 Division of Radiation Oncology

THE UNIVERSITY OF TEXAS
MD Anderson Cancer Center
Making Cancer History®

Background

- Dysphagia, or difficulty swallowing, is a common toxicity for head and neck cancer (HNC) patients; reliable measures are required to characterize and grade swallowing impairment.
- The Dynamic Imaging Grade of Swallowing Toxicity (DIGEST) is a clinician-rated method used to grade safety and efficiency of the pharyngeal stage of the swallow [1]. (Fig. 1).

Figure 1. DIGEST method for grading dysphagia
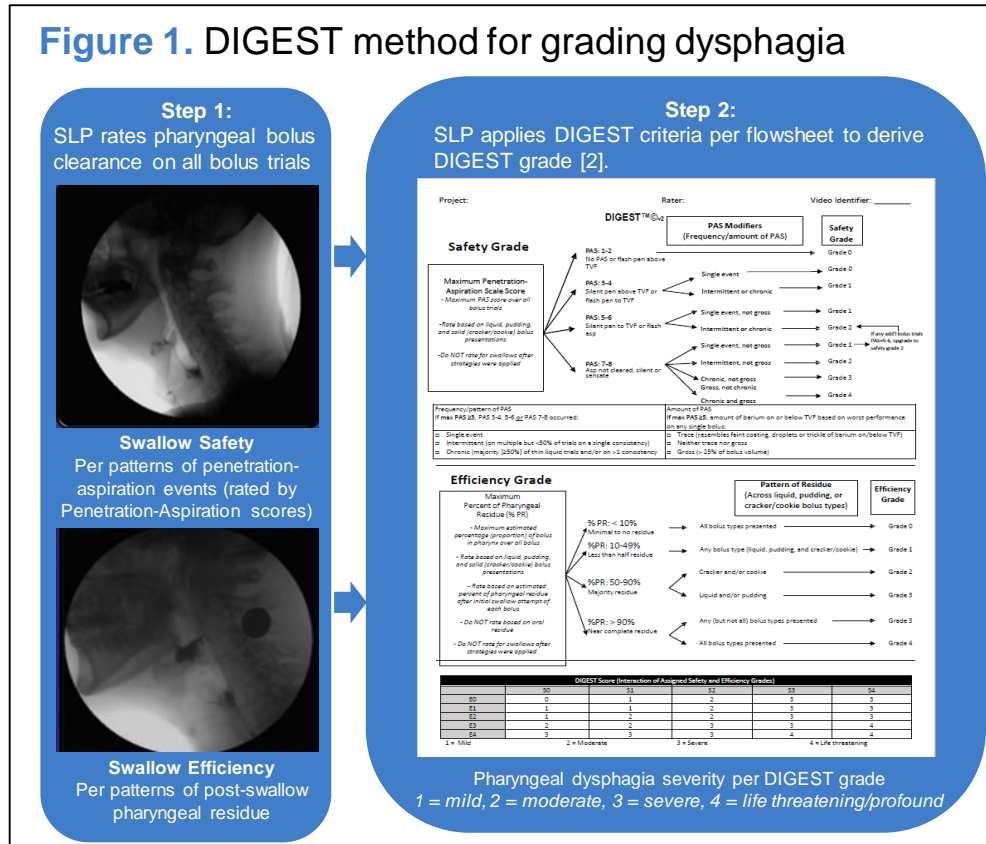
- Variance of inter- and intra-rater reliability is a topic relevant to all clinical measures of dysphagia severity. As the dissemination and implementation of DIGEST increases (Fig. 2), it is critical to understand reliability and facilitators of accurate implementation among clinician users.

Figure 2. Number of Publications using DIGEST method
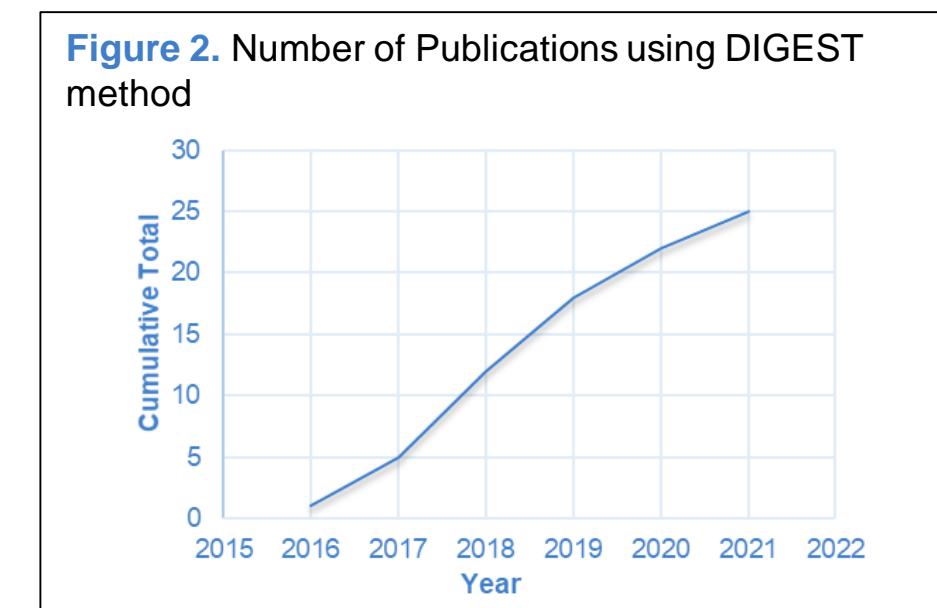
Aims

1. To review and summarize rater reliability using DIGEST in the published literature.
2. Explore rater reliability, patterns of use, and training needs among speech-language pathologists (SLPs) at multiple clinical sites.

Literature Review

- 25 articles were reviewed. A total of 8 studies reported reliability statistics and were summarized and interpreted according to Cohen's conventions.
- Inter-rater reliability in the current literature ranged from substantial to almost perfect (k = 0.67-1.0).
- Intra-rater reliability in the current literature fell almost perfect (k = 0.82-1.0) (Table 1).

Table 1. Results of the Literature Review

Author/doi	Year	Inter-rater reliability	Intra-rater reliability	Institution	Population	Rating type
Hutcheson 10.1002/cncr.30283	2017	DIGEST grade k = 0.67 / DIGEST-S k = 0.67 / DIGEST-E k = 0.81	k = 0.82-0.84	MDACC	100 HNC patients	blinded lab raters
Goepfert 10.1007/s00455-017-9843-x	2018	DIGEST grade k = 0.67	k = 0.82-0.84	MDACC	32 HNC patients	blinded lab raters
Hutcheson 10.1002/lary.26986	2018	DIGEST grade k = 0.67-0.81	k = 0.82-0.84	MDACC	109 HNC patients	blinded lab raters
Hutcheson 10.1002/lary.26845	2018	DIGEST grade k = 0.67-0.81	k = 0.82-0.84	MDACC	26 HNC patients	blinded lab raters
Lazarus 10.1002/hed.25455	2018	DIGEST grade k = 0.76 / DIGEST-S k = 1 / DIGEST-E k = 0.76	k = 1	Mount Sinai Beth Israel (NY)	10 HNC patients	clinician-rated
Plowman 10.1002/mus.26292	2018	DIGEST grade k = 1	NR	University of Florida	52 ALS patients	blinded lab raters
Kirsh 10.1002/lary.27610	2019	DIGEST grade k = 0.69	NR	Boston, MA	30 HNC patients	clinician-rated
Starmer* 10.1044/2021_JSLHR-21-00014	2021	DIGEST grade k = 0.83 / DIGEST-S k = 0.86 / DIGEST-E k = 0.74	k= 0.9-0.99	Stanford University	64 HNC patients	blinded lab raters

NR = value not reported; DIGEST = Dynamic Imaging Grade of Swallowing Toxicity; DIGEST-S = Safety; DIGEST-E = Efficiency
DIGEST-FEES adaptation*   ■ almost perfect (k = 0.81-1.0)   ■ substantial (k = 0.61-0.8)

Methods: Multi-site Rater Study

- 35 SLP raters from 7 sites participated in a blinded longitudinal rating study.
- Raters were provided a standardized, triplicate lab-rated set of MBS image files (n=20) and a concealed folder for submission of DIGEST grades. Initial ratings (R1) were followed by a 2-4 week break before rating a re-keyed MBS set to establish intra-rater reliability (R2), then a 4-8 week wash-out before self-study of a written DIGEST training manual followed by a final rating (R3).
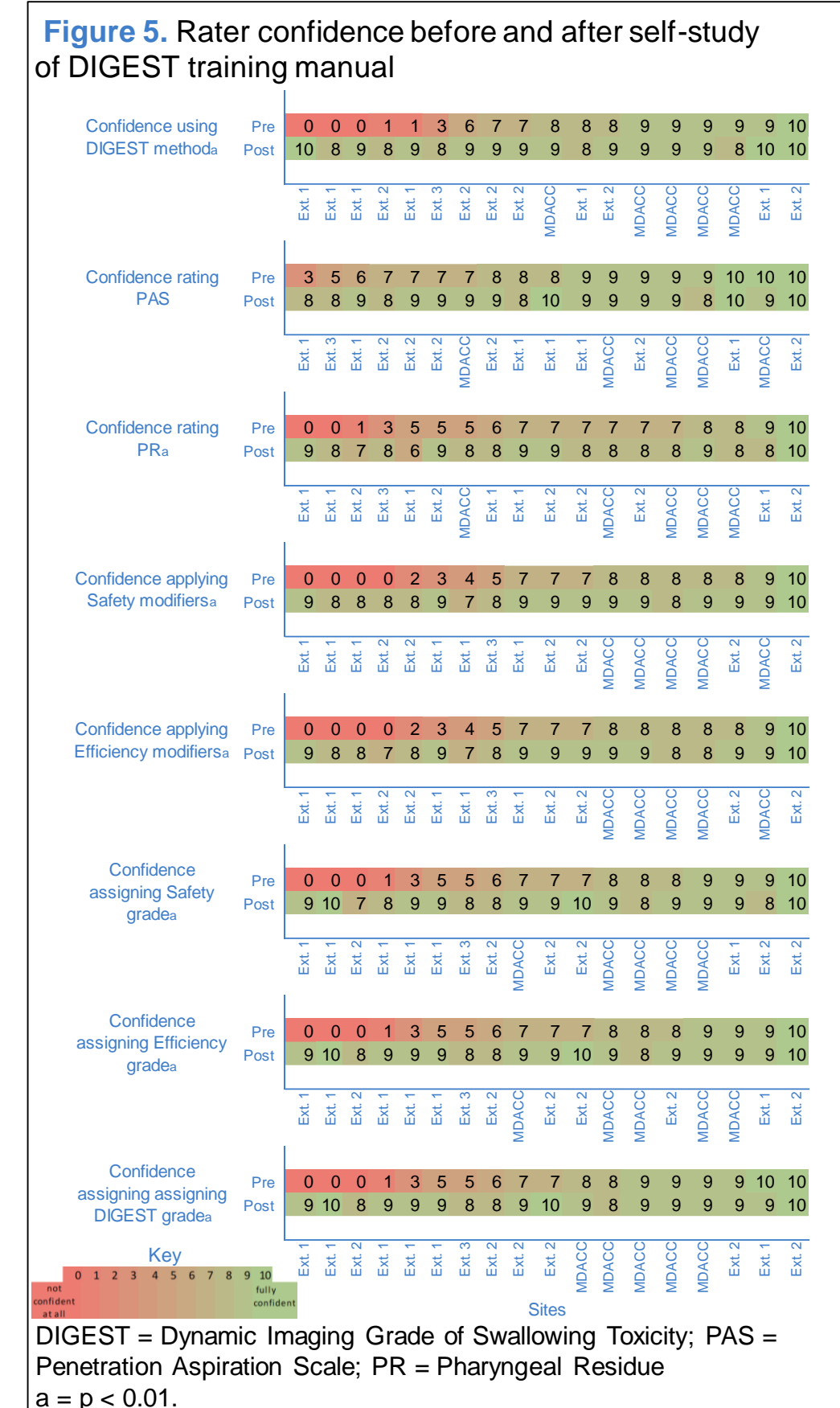- 18 raters completed a 27-item survey after the round 3 training condition. (Fig. 3).

Figure 3. Schema of Study Flow
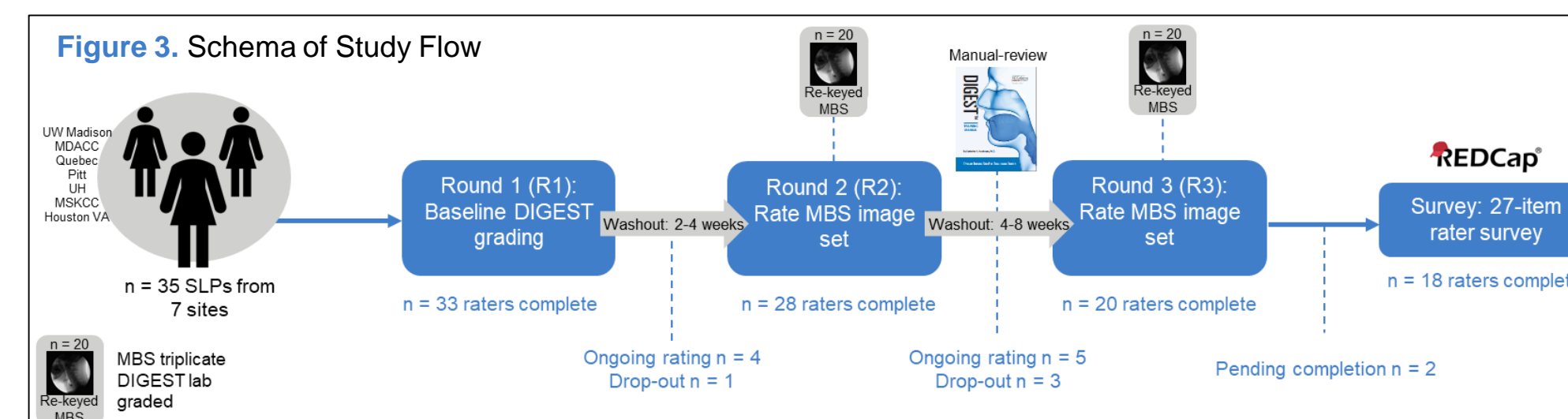
Results

- 94% (17/18) raters found the DIGEST manual helpful or very helpful in their grading of pharyngeal dysphagia. (Fig. 4).

Figure 4. Helpfulness of DIGEST Training Manual
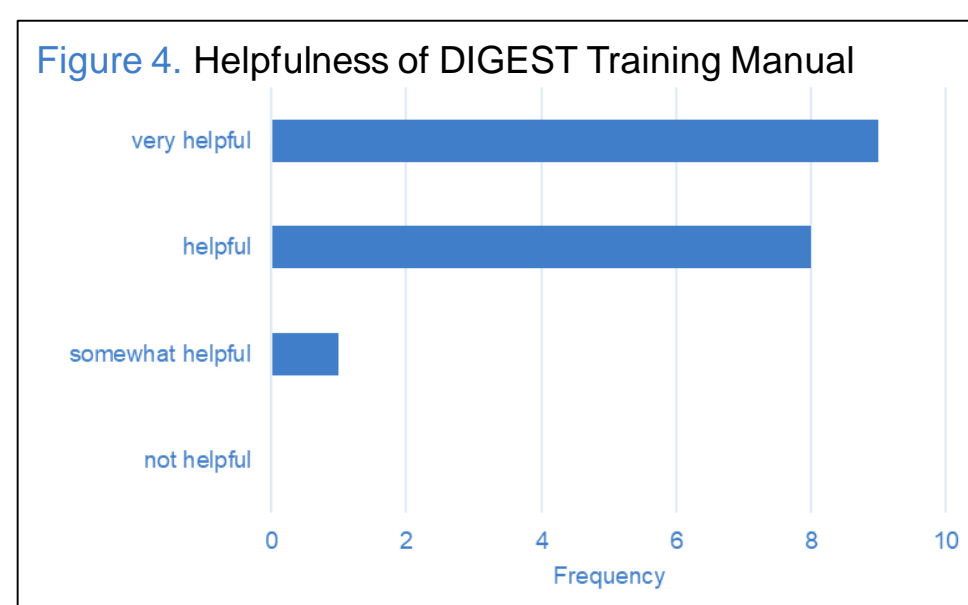
Results Cont.

- 33% (6/18) reported low overall confidence (score < 5) at baseline, after self-study of manual, all raters reported high confidence (score ≥ 8). (Fig. 5).

Figure 5. Rater confidence before and after self-study of DIGEST training manual

DIGEST = Dynamic Imaging Grade of Swallowing Toxicity; PAS = Penetration Aspiration Scale; PR = Pharyngeal Residue
a = p < 0.01.

Conclusions

- The need for a standardized and reliable dysphagia severity grading scale is evident as it will allow health professionals to obtain a clear representation of swallowing ability and reliably share this information with others.
- Increasing diagnostic confidence and establishing common nomenclature between clinicians should improve patient outcomes.
- Self-study of the DIGEST training manual improved rater confidence and may improve reliability.
- Early data show promise that provider training may be useful to aid in internal consistency and reliability of DIGEST implementation among SLP clinical users.

References

1. Hutcheson, K.A., et al., Dynamic Imaging Grade of Swallowing Toxicity (DIGEST): Scale development and validation. Cancer, 2017. 123(1): p. 62-70.