Table 3: Canadian Stroke Best Practice Recommendations Swallow Screening and Assessment Tools

Author/ Name of test	Components of test Details of validation study	Results of original validation study
Daniels et al. 1997 [1] **"Any Two"**	Items included: 6 clinical features-dysphonia, dysarthria, abnormal volitional cough (includes water-swallowing test), abnormal gag reflex, cough after swallow and voice change after swallow were assessed. Scoring: Presence of any 2 of the items distinguished patients with/without dysphagia Sample: 59 acute stroke survivors were studied within 5 days of hospital admission.	Diagnostic standard: VMBS exam Prevalence of dysphagia: 74.6% The sensitivities and specificities of individual items ranged from 31%-76.9% and 61%-88%, respectively. Overall: Sensitivity: 92% Specificity: 67%
Trapl et al. 2007 [4] **The Gugging Swallowing Screen (GUSS)**	Preliminary Assessment (vigilance, throat clearing, saliva swallow) Direct swallow (semisolid, liquid, solid swallow trials) Scoring: Total scores ranged from 0 (worst) - 20 (no dysphagia). A cut-off score of 14 was selected Sample: 50 first-ever acute stroke patients with suspected dysphagia	Diagnostic standard: fiberoptic endoscopic evaluation using the Penetration Aspiration Scale to interpret the results. Prevalence of dysphagia: 73% First group of 19 patients using the GUSS to identify subjects at risk of aspiration: Sensitivity: 100%, Specificity: 50% Second group of 30 patients Sensitivity: 100% Specificity: 69% Interrater reliability: Kappa=0.835
Martino et al. 2009 [5] **The Toronto Bedside Swallowing Screening Test (TOR-BSST)**	Items included: presence of dysphonia before/after water swallowing test, impaired pharyngeal sensation and abnormal tongue movement. Scoring: pass=4/4 items; fail ≥1/4 items Sample: 311 stroke patients (103 acute, 208 rehabilitation)	Diagnostic standard: VMBS exam. Prevalence of dysphagia: 39% Sensitivity: 96% Specificity: 64% Interrater reliability (based on observations from 50 subjects) ICC =0.92 (95% CI: 0.85-0.96)
Edmiaston et al. 2009	Items included: Glasgow Coma Scale score <13, presence of facial, tongue or palatal asymmetry/weakness. If no to all 3 items, then proceed	Diagnostic standard: Mann Assessment of Swallowing Ability (MASA),

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USA [6] **Acute Stroke Dysphagia Screen**	to 3 oz water swallowing test. Scoring: If there is evidence of change in voice quality, cough or change in vocal quality 1 minute after water swallowing test = fail. Sample: 300 acute stroke patients screened by nurses within 8 to 32 hours following admission.	performed by a SPL. Prevalence of dysphagia: 29% Sensitivity (Dysphagia): 91% Specificity: 74% Sensitivity (aspiration risk): 95% Specificity: 68% Interrater reliability: Kappa=94%
Turner-Lawrence et al. 2009 [7] **Emergency Physician Dysphagia Screen**	The two-tiered bedside tool was developed by SLPs. Tier 1 items included: voice quality, swallowing complaints, facial asymmetry, and aphasia. Tier 2 items included a water swallow test, with evaluation for swallowing difficulty, voice quality compromise, and pulse oximetry desaturation (≥ 2%). Patients failing tier 1 did not move forward to tier 2. Scoring: Patients who passed both tiers were considered to be low-risk. Sample: a convenience sample of 84 stroke patients (ischemic/hemorrhagic) screened by 45 ER MDs.	Diagnostic standard: formal assessment conducted by an SLP Prevalence of dysphagia: 57% Sensitivity: 96% Specificity: 56% Interrater reliability: Kappa=0.90
Antonios et al. 2010 [8] **Modified Mann Assessment of Swallowing Ability (MMASA)**	12 of the 24 MASA items were retained including: alertness, co-operation, respiration, expressive dysphasia, auditory comprehension, dysarthria, saliva, tongue movement, tongue strength, gag, volitional cough and palate movement. Scoring: Maximum score is 100 (no dysphagia). A cut-off score of 94 was used to identify patients at risk of dysphagia Sample: 150 consecutive patients with acute ischemic stroke were assessed by 2 neurologists shortly after admission to hospital.	Diagnostic standard: MASA conducted by SLP Prevalence of dysphagia: 36.2% Sensitivity: 87% & 93% Specificity: 86% & 84% Interrater reliability: Kappa=0.76
Schrock et al. 2011[9] **MetroHealth Dysphagia Screen**	5 Items included: Alert and able to sit upright for 10 minutes, weak, wet or abnormal voice, drooling, slurred speech and weak, or inaudible cough. Scoring: ≥1 items answered yes=failed screen Sample: 283 patients admitted to the Emergency department with acute	Diagnostic standard: VMBS Prevalence of dysphagia at 30 days: 32% Sensitivity: 95% Specificity: 55%

Author/ Name of test	Components of test Details of validation study	Results of original validation study
	stroke and screened for the presence of dysphagia by nurses	Interrater reliability: Kappa=0.69

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