Supplementary Online Content

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eTable. Major Diagnostic Advances in Cerebral Palsy Best-Available Evidence

eFigure. PRISMA Diagram of Study Flow

This supplementary material has been provided by the authors to give readers additional information about their work.

eTable. Major Diagnostic Advances in Cerebral Palsy Best-Available Evidence

Tool	Citation	Type of Evidence	Number Studies	Number Patients	Population	Age at Exam	Accuracy of Detecting Risk for Cerebral Palsy	QUADAS Quality
MOTOR DYSFUNCTION TOOLS								
AIMS *Norm-referenced gross motor assessment*	Heineman 2008	Systematic review	2 *AIMS*	Unable to calculate from review	Newborn high risk for CP & other diagnoses	3-18 months	*Cerebral Palsy* Authors conclude moderate predictive validity but no values reported	14/14
	Spittle 2008	Systematic review	2 *AIMS*	205	Preterm newborn high risk for CP	4, 6 & 8 months	*Cerebral Palsy* No data available in review *Abnormal Motor* Sensitivity = 77-86% Specificity = 81-93%	14/14
GMs *Quality of movement assessment*	Bosanquet 2013	Systematic review with meta-analysis	6 *GMs*	1358	Newborn high risk for CP	3-5 months CA	*Cerebral Palsy* Sensitivity = 98% Specificity = 91% A trajectory of longitudinal assessments are more predictive GMs with MRI provided more accurate prognostic information than the individual tools	14/14
	Burger	Systemati	17 *GMs*	1820	Newborn	3-5	*Cerebral*	14/14

	2009	c review			high risk for CP	months CA	*Palsy* Sensitivity = 92% Specificity = 82%	
	Darsaklis 2011	Systematic review	39 *GMs*	Unable to calculate from review	Newborn high risk for CP & other diagnoses	3-5 months CA	*Cerebral Palsy* Sensitivity = 100% Specificity = 100% *Developmental Delay* Sensitivity = 38-63% Specificity = 54%	14/14
Tool	**Citation**	**Type of Evidence**	**Number Studies**	**Number Patients**	**Population**	**Age at Exam**	**Accuracy of Detecting Risk for Cerebral Palsy**	**QUADAS Quality**
GMs continued	Heineman 2008	Systematic review	7 *GMs*	Unable to calculate from review	Newborn high risk for CP & other diagnoses	3-18 months	*Cerebral Palsy* Authors conclude good predictive validity but no values reported	14/14
	Spittle 2008	Systematic review	5 *GMs*	344	Preterm, term & IUGR newborn high risk for CP	3-5 months CA	*Cerebral Palsy* Sensitivity = 83-100% Specificity = 57-96%	14/14
DAYC *Parent-reported scored checklist of motor skills*	Maitre 2013	Retro-spective chart audit	1 *DAYC*	606	Preterm, and HIE newborn high risk for CP	6, 12, 24 months CA	*Cerebral Palsy* Predictive C-index = 89% *Falling DAYC scores 6-12 months* Probability for CP = low for score decreases within 1 SD of	N/A

							the mean i.e. 15 points Probability for CP = high (35%), as the score decreases (>1SD) i.e. 20 points Probability for CP = very high (83%), as the score decreases (>2SD) i.e. 30 points	
MAI *Standardized motor assessment, also assessing tone and reflexes*	Heineman 2008	Systematic review	7 *MAI*	Unable to calculate from review	Newborn high risk for CP & other diagnoses	3-18 months	*Cerebral Palsy* Authors conclude moderate predictive validity but no values reported	14/14
	Spittle 2008	Systematic review	5 *MAI*	856	Preterm, term newborn high risk for CP & social risk	4 & 8 months	*Cerebral Palsy* Sensitivity = 73-96% Specificity = 62-78% *Abnormal Motor* Sensitivity = 63-85% Specificity = 53-93%	14/14

Tool	Citation	Type of Evidence	Number Studies	Number Patients	Population	Age at Exam	Accuracy of Detecting Risk for Cerebral Palsy	QUADAS Quality
NSMDA *Standardized gross and fine motor assessment*	Spittle 2008	Systematic review	1 *NSMDA*	148	Low birth weight infants	1, 4, 8, 12 months	*Cerebral Palsy* No data available in review *Abnormal Motor at 1 month:* Sensitivity = 68% Specificity = 72% *Abnormal Motor at 4 months:* Sensitivity = 80% Specificity = 56% *Abnormal Motor at 8 months:* Sensitivity = 82% Specificity = 83%	14/14
PDMS-2 *Norm-referenced gross and fine motor assessment*	Heineman 2008	Systematic review	2 *PDMS-2*	Unable to calculate from review	Newborn high risk for CP & other diagnoses	3-18 months	*Cerebral Palsy* Authors conclude moderate predictive validity but no values reported	14/14
TIMP *Standardized motor assessment*	Heineman 2008	Systematic review	5 *TIMP*	Unable to calculate from	Newborn high risk for CP & other	3-18 months	*Cerebral Palsy* Authors conclude	14/14

				review	diagnoses		good predictive validity but no values reported	
	Spittle 2008	Systematic review	3 *TIMP*	192	Preterm newborn high risk for CP	32 weeks – 12 months	*Cerebral Palsy* No data available in review *Abnormal Motor* Sensitivity = 33-91% Specificity = 68-100% Note: Most sensitive at 4 months	14/14

Tool	Citation	Type of Evidence	Number Studies	Number Patients	Population	Age at Exam	Accuracy of Detecting Risk for Cerebral Palsy	QUADAS Quality
NEUROLOGICAL DYSFUNCTION TOOLS								
Amiel-Tison *Neurological examination*	Heineman 2008	Systematic review	6 *Amiel-Tison*	Unable to calculate from review	Newborn high risk for CP & other diagnoses	3-18 months	*Cerebral Palsy* Authors conclude good predictive validity but no values reported Note: The test's purpose is discriminative not predictive	14/14
HINE *Scored neurological examination*	Romeo 2015	Systematic review	10 *HINE*	3452 n=2621 preterm n=831 termborn	Preterm & HIE newborn high risk for CP	3-12 months CA	*Cerebral Palsy* *HINE ≤56 at 3 months*: Sensitivity = 90% Specificity = 90% *HINE ≤65 at 12 months:* Sensitivity = 90% Specificity = 90% Scores <40 = severe CP only A trajectory of longitudinal assessments are more predictive HINE with MRI provided more	14/14

							accurate prognostic information than the individual tools. Normal neonatal MRI or moderate white matter lesions = HINE scores (>73) and normal motor outcome. Severe basal ganglia lesions were associated with HINE scores (<40) and CP	
	Heinemann 2008	Systematic review	4 *HINE*	Unable to calculate from review	Newborn high risk for CP & other diagnoses	3-18 months	*Cerebral Palsy* Authors conclude good predictive validity but no values reported	14/14

Tool	Citation	Type of Evidence	Number Studies	Number Patients	Population	Age at Exam	Accuracy of Detecting Risk for Cerebral Palsy	QUADAS Quality
Infanib *Neurological examination*	Heineman 2008	Systematic review	3 *Infanib*	Unable to calculate from review	Newborn high risk for CP & other diagnoses	3-18 months	*Cerebral Palsy* Authors conclude moderate predictive validity but no values reported	14/14
Muscle Power *Neurological examination*	Heineman 2008	Systematic review	3 *Muscle Power*	Unable to calculate from review	Newborn high risk for CP & other diagnoses	3-18 months	*Cerebral Palsy* Authors conclude good predictive validity but no values reported Note: The test's purpose is discriminative not predictive	14/14
Touwen *Neurological examination*	Bosanquet 2013	Systematic review with meta-analysis	2 *Touwen*	142	Preterm newborn high risk for CP	5-12 months CA	*Cerebral Palsy* Sensitivity = 88% Specificity = 87%	14/14
	Heineman 2008	Systematic review	2 *Touwen*	Unable to calculate from review	Newborn high risk for CP & other diagnoses	3-18 months	*Cerebral Palsy* Authors conclude good predictive validity but no values reported	14/14
NEUROIMAGING TOOLS								
CUS	Bosanquet 2013	Systematic review with meta-analysis	10 *CUS*	2644	Preterm & HIE newborn high risk for CP	Preterm or term equivalent age	*Cerebral Palsy* Sensitivity = 88% Specificity =	14/14

							87%	

Tool	Citation	Type of Evidence	Number Studies	Number Patients	Population	Age at Exam	Accuracy of Detecting Risk for Cerebral Palsy	QUADAS Quality
CUS continued	Ment 2002	Clinical Practice Guideline	7 *CUS*	2045	Preterm <30 wks as newborn high risk for CP & other outcomes	7-14 days of age	*Cerebral Palsy* Grade 3 & 4 IVH, cystic PVL, and/or moderate-severe ventriculomegaly injuries were predictive of CP *CUS = established as predictive* *Recommendation:* Routine CUS screening should be performed on all infants of <30-weeks' GA once between 7-14 days of age. Plus repeated between 36-40 weeks'	14/14
CT	Ashwal 2004	Clinical Practice Guideline	9 *CT*	782	CP	7months-16yrs	*Cerebral Palsy* Sensitivity = 77% Yield varied by CP type (hemiplegic > ataxic > mixed > diplegic > quadriplegic > hypotonic > dyskinetic) *Recommendation:* Neuroimaging should be conducted using MRI, preferably to CT, because MRI is more accurate	14/14

Tool	Citation	Type of Evidence	Number Studies	Number Patients	Population	Age at Exam	Accuracy of Detecting Risk for Cerebral Palsy	QUADAS Quality
MRI	Ashwal 2004	Clinical Practice Guideline	10 *MRI*	644	CP	3months-41yrs	*Cerebral Palsy* Sensitivity = 89% *Recommendation:* *1.* Neuroimaging should be conducted using MRI, preferably to CT. Yield varied by CP type (mixed > quadriplegic > hemiplegic > diplegic > ataxic > dyskinetic > hypotonic) and was different to yields from CT *MRI = established as predictive* 2. Screen for intellectual disability, ophthalmologic and hearing impairments, speech and language disorders, and oral-motor dysfunction as these are common co-occurring impairments	14/14
	Bosanquet 2013	Systematic review with meta-analysis	3 *MRI*	702	Newborn high risk for CP	Term equivalent age	*Cerebral Palsy* Sensitivity = 86% Specificity = 89%	14/14

Tool	Citation	Type of Evidence	Number Studies	Number Patients	Population	Age at Exam	Accuracy of Detecting Risk for Cerebral Palsy	QUADAS Quality
MRI continued	Ment 2002	Clinical Practice Guideline	13 *MRI*	410	Encephal-opathy newborn high risk for CP & other outcomes	2-8 days	*Cerebral Palsy* Basal ganglia injury was predictive of CP (50-94%) *MRI = established as predictive* *DWI = probably predictive* *MRS = possibly predictive* *Recommendation*: MRI should be performed 2-8 days to assess the location and extent of injury DWI and MRS, when available, should also be performed to provide additional prognostic data	14/14

AIMS = Alberta Infant Motor Scale; Amiel-Tison = Amiel-Tison Neurological Examination; CA = Chronological Age; CP = Cerebral Palsy; CT = Computed Tomography; CUS = Cranial Ultrasound; DAYC = Developmental Assessment of Young Infants; DWI = Diffusion Weighted Imaging; GMs= Prechtl's General Movements Assessment; HIE = Hypoxic Ischaemic Encephalopathy; HINE = Hammersmith Infant Neurological Examination; Infanib = Infant Neurological International Battery; MAI = Movement Assessment of Infants; MRI = Magnetic Resonance Imaging; Muscle Power = Active and Passive Muscle Power; MRS = Magnetic Resonance Spectroscopy; NSMDA = Neuro Sensory Motor Development Assessment; PDMS-2 = Peabody Developmental Motor Scales; SD = standard deviation; TIMP = Test of Infant Motor Performance; Touwen = Touwen Infant Neurological Examination.

eFigure. PRISMA Diagram of Study Flow