

HAMMERSMITH NEONATAL NEUROLOGICAL EXAMINATION

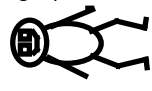

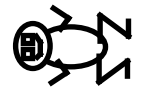

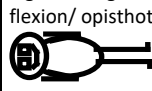
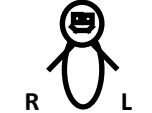
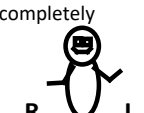


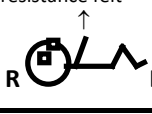
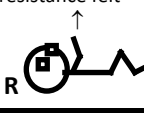
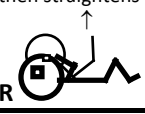
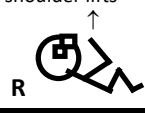

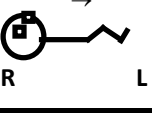



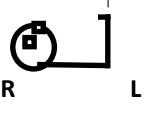
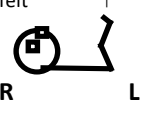

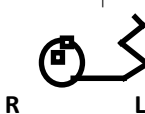

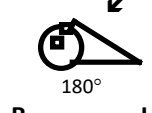
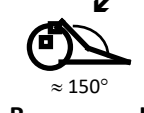


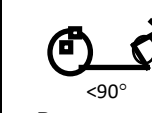









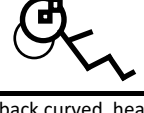
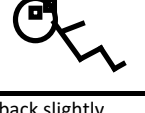
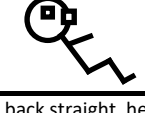
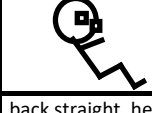




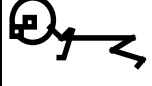
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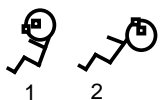

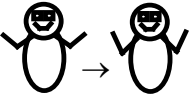
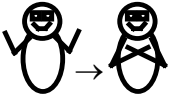

SEX: _____ BW: _____ HC: _____ No. of EXAM: _____

<p>POSTURE Infant lying supine. Look mainly at the position of the legs but also note arms. <i>Score predominant posture.</i></p>	<p>arms & legs extended or very slightly flexed</p> 	<p>legs slightly flexed</p> 	<p>legs well-flexed but not adducted</p> 	<p>legs well flexed & adducted near abdomen</p> 	<p>abnormal postures: marked extension of legs / strong arm flexion/ opisthotonus</p> 		
<p>ARM RECOIL Take both wrists, quickly extend arms parallel to the body, count to 3. Release. <i>Repeat x3. Note response on each side.</i></p>	<p>arms do not flex</p> 	<p>arms flex slowly, not always & not completely</p> 	<p>arms flex slowly, more completely</p> 	<p>arms flex quickly and completely</p> 	<p>arms difficult to extend and may snap back forcefully</p>		
<p>ARM TRACTION Hold wrist and pull arm upwards. Note flexion at elbow and resistance while shoulder lifts off the bed. <i>Test each side separately.</i></p>	<p>arm remains straight - no resistance felt</p> 	<p>arm flexes slightly or some resistance felt</p> 	<p>arm flexes well till shoulder lifts, then straightens</p> 	<p>arm flexes at ~100° and maintained as shoulder lifts</p> 	<p>arms flexed (<100°) & maintained when body lifts up ↑</p> 		
<p>LEG RECOIL Hold both ankles in one hand, flex hips and knees. Quickly extend fully and release. <i>Repeat x3. Note response on each side.</i></p>	<p>No flexion</p> 	<p>Incomplete or variable flexion</p> 	<p>complete but slow flexion</p> 	<p>complete fast flexion</p> 	<p>legs difficult to extend; may snap back forcefully</p>		
<p>LEG TRACTION Hold ankle, slowly pull leg upwards. Look at flexion at knees and resistance as the bottom lifts. <i>Test each side separately.</i></p>	<p>leg straight - no resistance felt</p> 	<p>leg flexes slightly / some resistance felt</p> 	<p>leg flexes well till bottom lifts up</p> 	<p>knee remains flexed when bottom up</p> 	<p>flexion stays when back+bottom up</p> 		
<p>POPLITEAL ANGLE Fix knee on stomach, extend leg at knee by gentle pressure from first finger at ankle. Note angle behind knee. <i>Test sides separately.</i></p>	 <p>180°</p>	 <p>≈ 150°</p>	 <p>≈ 110°</p>	 <p>≈ 90°</p>	 <p>< 90°</p>		
<p>HEAD CONTROL (1) (extensor tone) Hold infant upright in sitting. Encircle chest with both hands holding shoulders. Let head drop forward.</p>	<p>no attempt to raise head</p> 	<p>infant tries: effort better felt than seen</p> 	<p>raises head but head drops forward or back</p> 	<p>raises head; head remains vertical, wobbles</p> 			
<p>HEAD CONTROL (2) (flexor tone) Hold infant upright in sitting. Encircle chest with both hands holding shoulders. Let head drop backwards.</p>	<p>no attempt to raise head</p> 	<p>infant tries: effort better felt than seen</p> 	<p>raises head but head drops forward or back</p> 	<p>raises head; head remains vertical, wobbles</p> 	<p>head upright or extended; cannot be passively flexed</p>		
<p>HEAD LAG Pull infant towards a sitting posture by the wrists and support the head slightly. (note arm flexion).</p>	<p>head drops back & stays</p> 	<p>tries to lift head but it drops back</p> 	<p>able to lift head slightly</p> 	<p>lifts head in line with body</p> 	<p>head in front of body</p> 		
<p>VENTRAL SUSPENSION Hold infant prone lifting horizontally under the abdomen. Look at curvature of back, flexion of limbs and relation of head to trunk</p>	<p>back curved, head & limbs hang straight</p> 	<p>back curved, head ↓, limbs slightly flexed</p> 	<p>back slightly curved, limbs flexed</p> 	<p>back straight, head in line, limbs flexed</p> 	<p>back straight, head above body, limbs flexed</p> 		

Tone patterns

FLEXOR TONE (1) (on traction: arm vs. leg) compare scores for arm traction with leg traction.		score for arm flexion less than score for leg flexion	score for arm flexion equal to score for leg flexion	score for arm flexion more than leg flexion but difference ≤ 1 column	score for arm flexion more than leg flexion and difference >1 column		
FLEXOR TONE (2) (arm vs leg) Posture in supine			arms and legs flexed	strong arm flexion with strong leg extension <i>intermittent</i>	strong arm flexion with strong leg extension <i>continuous</i>		
LEG EXTENSOR TONE Compare scores for leg traction and popliteal angle.		score for leg traction more than score for popliteal angle	score for leg traction equal to score for popliteal angle	score for leg traction less than score for popliteal angle; difference ≤ 1 column	score for leg traction less than score for popliteal angle; difference >1 column		
NECK EXTENSOR TONE (INFANT IN SITTING) Compare scores of head control 1 and 2.		score for head extension less than score for head flexion	score for head extension equal to score for head flexion	score for head extension more than head flexion; difference ≤ 1 column	score for head extension more than head flexion; difference >1 column		
NECK EXTENSOR TONE (INFANT HORIZONTAL) Compare scores for head lag and ventral suspension.		score for ventral suspension less than score for head lag	score for ventral suspension equal to score for head lag	score for ventral suspension more than head lag; difference ≤ 1 column	score for ventral suspension more than head lag; difference >1 column		

Reflexes

TENDON REFLEX (biceps, knee, ankle jerks) Wait till muscles relaxed and tap with finger or hammer.	absent	felt, not seen	seen	'exaggerated' (very brisk)	clonus		
SUCK / GAG Put little finger into mouth with pulp of finger upwards (<i>use gloves</i>)	no gag / no suck	weak irregular suck only: no stripping	weak suck only, but regular some stripping	strong suck: (a) irregular (b) regular good stripping	no suck but strong clenching		
PALMAR GRASP Put index finger into palm of hand and press gently. DO NOT TOUCH BACK OF HAND. Test sides separately.	no reaction R L	short, weak flexion of fingers R L	strong flexion of fingers R L	strong finger flexion even when shoulder lifts R L	strong finger flexion, so whole body can be lifted R L		
PLANTAR GRASP Press thumb on ball of foot just beneath toes <i>Test sides simultaneously.</i>	no response R L	toes flex slightly R L	toes curve around the examiner's thumb R L				
PLACING Hold infant upright. Wait for legs to straighten and relax. Stroke front of infant's lower leg against edge of the table. <i>Test each side separately.</i>	no response R L	dorsiflexion of ankle only R L	full response i.e. flexion of hip, knee, ankle & placing sole of foot on table R L				
MORO REFLEX (do last) Raise the infant to 45° (1) supporting head in midline. Bring head forward and let it fall back at least 10°. <i>Note if jerky.</i>  1 2	no response or opening only of hands	full abduction at shoulders and extension of arms, no adduction 	full abduction but delayed or partial adduction 	partial abduction at shoulders, extension of the arms followed by smooth adduction 	•minimal abduction or adduction •only forward extension of arms •marked adduction only 		

Movements

SPONTANEOUS MOVEMENTS (quantity) Watch infant lying supine.	no movement	sporadic and short isolated movements	frequent isolated movements	frequent generalised movements	continuous exaggerated movements		
SPONTANEOUS MOVEMENTS (quality) Watch infant lying supine.	only stretches	stretches and random abrupt movements; some smooth movements	fluent movements but monotonous	fluent alternating movements of arms and legs; good variability	<ul style="list-style-type: none"> •cramped synchronised •mouthing •jerky/other abnormal movements 		
HEAD RAISING PRONE Lie Infant on stomach with head in the midline.	no response	infant rolls head over, chin not raised	infant raises chin, rolls head over	infant brings head and chin up	infant brings head up and keeps it up		

Abnormal signs/patterns

ABNORMAL HAND OR TOE POSTURES		hands open, toes straight most of the time	intermittent fisting or thumb adduction	continuous fisting or thumb adduction; index finger flexion; thumb opposition	continuous big toe extension or flexion of all toes		
TREMOR		no tremor or tremor only when crying or after Moro	tremors occasionally when awake	frequent tremors when awake	continuous tremors		
STARTLE Similar movements to Moro but without doing Moro.	no startle even to sudden noise	no spontaneous startle but reacts to sudden noise	2 – 3 spontaneous startles	more than 3 spontaneous startles	continuous startles		

Orientation and behaviour

EYE APPEARANCES	does not open eyes		full conjugate eye movements	<i>transient</i> <ul style="list-style-type: none"> •nystagmus •strabismus •roving eye movements •sunset sign 	<i>persistent</i> <ul style="list-style-type: none"> •nystagmus •strabismus •roving eye movements •sunset sign 		
AUDITORY ORIENTATION Infant awake. <i>Wrap infant. Hold rattle 10-15 cms from ear. Do not shake infant.</i>	no reaction	auditory startle; brightens and stills; no true orientation	shifting of eyes; head might turn towards source	prolonged head turn to stimulus; search with eyes; smooth	turns head and eyes to noise every time but jerkily and abruptly		
VISUAL ORIENTATION Wrap infant, wake up with rattle if needed or rock gently.	does not follow or focus on target	stills, focuses, follows briefly to side but loses stimulus	follows horizontally and vertically but no head turn	follows horizontally and vertically and turns head	follows in a circle		
ALERTNESS Tested as response to visual stimulus.	does not respond to stimulus	when awake, looks only briefly	when awake looks at stimulus but loses it	keeps interest in stimulus	does not tire (hyper-reactive)		
IRRITABILITY In response to stimuli	quiet all the time, not irritable to any stimuli	awakes, cries sometimes when handled	cries often when handled	cries always when handled	cries even when not handled		
CONSOLABILITY	not crying consoling not needed	cries briefly; consoling not needed	cries; becomes quiet when talked to	cries; needs picking up to be consoled	cries; cannot be consoled		
CRY	no cry at all	whimpering cry only	cries to stimuli but normal pitch		high-pitched cry; often continuous		

SUMMARY OF EXAMINATION:

Head and trunk tone:

Motility:

Orientation and alertness:

Consolability:

Limb tone:

Reflexes:

Irritability:

List deviant signs:

Examiner's signature