









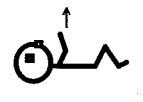

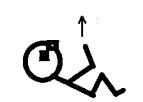
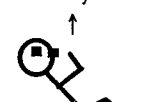
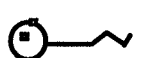
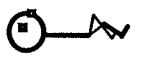






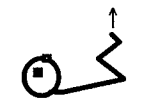



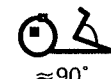

















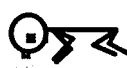



Posture and tone

<p>POSTURE Infant supine. Look mainly at position of 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 posture: a) opisthotonus b) marked leg extension, strong arm flexion</p> 
<p>ARM RECOIL Take both hands, quickly extend arms parallel to the body, Count to three. Release. Repeat 3 times.</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; snap back forcefully</p>
<p>ARM TRACTION Hold wrist and pull arm upwards. Note flexion at elbow and resistance while shoulder lifts off table. <i>Test each side separately.</i></p>	<p>arms remain straight; no resistance felt</p>  <p>R L</p>	<p>arms flex slightly or some resistance felt</p>  <p>R L</p>	<p>arms flex well till shoulder lifts, then straighten</p>  <p>R L</p>	<p>arms flex at approx 100° & maintained as shoulder lifts</p>  <p>R L</p>	<p>flexion of arms <100°; maintained when body lifts up</p>  <p>R L</p>
<p>LEG RECOIL Take both ankles in one hand, flex hips + knees. Quickly extend. Release. Repeat 3 times.</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; snap back forcefully</p>
<p>LEG TRACTION Grasp ankle and slowly pull leg upwards. Note flexion at knees and resistance as buttocks lift. <i>Test each side separately.</i></p>	<p>legs straight - no resistance felt</p>  <p>R L</p>	<p>legs flex slightly or some resistance felt</p>  <p>R L</p>	<p>legs flex well till bottom lifts up</p>  <p>R L</p>	<p>knee flexes remains flexed when bottom up</p>  <p>R L</p>	<p>flexion stays when back+bottom up</p>  <p>R L</p>
<p>POPLITEAL ANGLE Fix knee on abdomen, extend leg by gentle pressure with index finger behind the ankle. Note angle at knee. <i>Test each side separately.</i></p>	 <p>180°</p> <p>R L</p>	 <p>≈150°</p> <p>R L</p>	 <p>≈110°</p> <p>R L</p>	 <p>≈90°</p> <p>R L</p>	 <p><90°</p> <p>R L</p>
<p>HEAD CONTROL (1) (extensor tone) Infant sitting upright. 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 drops forward or back</p> 	<p>raises head: remains vertical; it may wobble</p> 	
<p>HEAD CONTROL (2) (flexor tone) Infant sitting upright. Encircle chest with both hands holding shoulders. Let head drop backward.</p>	<p>no attempt to raise head</p> 	<p>infant tries: effort better felt than seen</p> 	<p>raises head but drops forward or back</p> 	<p>raises head: remains vertical; it may wobble</p> 	<p>head upright or extended; cannot be passively flexed</p>
<p>HEAD LAG Pull infant towards sitting posture by traction on both wrists & support head slightly. Also note arm flexion.</p>	<p>head drops & stays back</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 in ventral suspension. Observe back, flexion of limbs, and relation of head to trunk. If it looks different, DRAW.</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</p> 

Movements

SPONTANEOUS MOVEMENT (quantity) Watch infant lying supine.	no movement	sporadic and short isolated movements	frequent isolated movements	frequent generalized movements	continuous exaggerated movements		
SPONTANEOUS MOVEMENT (quality) Watch infant lying supine.	only stretches	stretches and random abrupt movements; some smooth movements	fluent movements but monotonous	fluent alternating movements of arms + legs; good variability	<ul style="list-style-type: none"> cramped, synchronized; mouthing jerky or other abnormal movements 		
HEAD RAISING PRONE Infant in prone, head in 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 only after Moro reflex	tremor occasionally when awake	frequent tremors when awake	continuous tremors		
STARTLE	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 conjugated 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 abnormal pupils 		
AUDITORY ORIENTATION Infant awake. Wrap infant. Hold rattle 10 to 15 cm from ear.	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 (jerkily, abruptly) & eyes towards noise every time		
VISUAL ORIENTATION Wrap infant, wake up with rattle if needed or rock gently. Note if baby can see and follow red ball (B) or target (T).	does not follow or focus on stimuli B T	stills, focuses, follows briefly to the side but loses stimuli B T	follows horizontally and vertically; no head turn B T	follows horizontally and vertically; turns head B T	follows in a circle B T		
ALERTNESS <i>Tested as response to visual stimuli (B or T).</i>	will not respond to stimuli	when awake, looks only briefly	when awake, looks at stimuli but loses them	keeps interest in stimuli	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 Ease to quiet infant.	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:

LIMB TONE:

MOTILITY:

REFLEXES:

ORIENTATION AND ALERTNESS:

IRRITABILITY:

CONSOLABILITY:

LIST DEVIANT SIGNS:

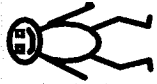






















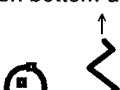

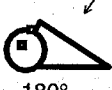












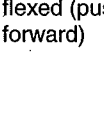










HAMMERSMITH SHORT NEONATAL NEUROLOGICAL EXAMINATION

NAME: _____ CODE: _____ No. OF EXAM: _____

D.O.B.: _____ D.O.E.: _____ AGE: _____ G.A.: _____ SEX: _____ BW: _____

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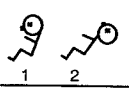

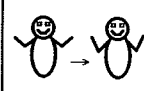
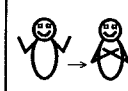

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POSTURE Baby lying on back. Look mainly at position of the legs, but also note arms. You may change drawing.	arms & legs extended 	legs slightly flexed 	legs well flexed but not adducted 	legs well flexed & adducted near belly 	arms very flexed, legs very extended 		
ARM RECOIL Quickly extend (straighten) both arms; put next to body. Count to two. Let go. Repeat 3 times.	arm does not flex 	arm flexes slowly, not always, not completely 	arm flexes slowly, more completely 	arm flexes and remains flexed 	arm difficult to extend; snap back forcefully 		
ARM TRACTION Hold wrist and pull upward. Note flexion at arm, and resistance while shoulder lifts off table.	arm remains straight - no resistance 	arm flexes slightly or some resistance felt 	arm flexes well till shoulder lifts, then straightens 	arm flexes and remains flexed as shoulder lifts 	arm remains flexed when body lifts up 		
LEG RECOIL Take both ankles, bend hips+knee. Quickly extend when infant not pushing. Let go. Repeat X 3	No flexion 	incomplete flexion, not every time 	complete slow flexion 	complete fast flexion 	legs difficult to extend; snap back forcefully 		
LEG TRACTION Hold ankle, pull leg upwards. Look at flexion & resistance as bottom pulled up.	leg straight - no resistance 	leg flexes slightly or some resistance felt 	leg flexes well till bottom lifts up 	knee flexes - remains flexed when bottom up 	flexion stays when back+bottom up 		
POPLITEAL ANGLE Fix knee on abdomen (belly), try to extend knee with first finger. Note distance (angle) between upper and lower limb.	 180°	 ≈150°	 ≈110°	 ≈90°	 <90°		
HEAD CONTROL (1) Baby sitting upright. Encircle chest with both hands holding shoulders. Let head drop forward.	no attempt to raise head 	infant tries: effort better felt than seen 	raises head but drops forward or back 	raises head: remains vertical, wobbles 			
HEAD CONTROL (2) Baby sitting upright. Encircle chest with both hands holding shoulders. Let head drop backward.	no attempt to raise head 	infant tries: effort better felt than seen 	raises head but drops forward or back 	raises head: remains vertical, wobbles 	head upright or extended; cannot be passively flexed (pushed forward) 		
HEAD LAG Pull baby to sit by the wrists & support head slightly.	head drops & stays back 	tries to lift head but it drops back 	able to lift head slightly 	lifts head in line with body 	head in front of body 		
VENTRAL SUSPENSION Hold baby horizontal under the belly. Look at posture of back, arms, legs, and head. If it looks different, DRAW!	back curved, head & limbs hang straight 	back curved, head ↓, limb slightly flexed 	back slightly curved, limbs flexed 	back straight, head in line with body, limbs flexed 	back straight, head above body 		

MOVEMENTS

						STATE	ASYMM
SPONTANEOUS MOVEMENT Watch baby while (s)he is lying on back.	no movement	few stretches, no other movement	jerky movement, stretches, but also some smooth movement	smooth movements of arms + legs	fits, cramped or other abnormal movements: DESCRIBE!!		
ABNORMAL HAND OR TOE POSTURES	hands open	hands fisted or thumbs adduct intermittently but open	hands fist or thumb adducts, or finger & thumb oppose	big toe up (extended) or all toes flex			
TREMOR	no tremor	tremor only when crying or after Moro reflex	some tremor when awake	frequent tremors	continuous tremors		
STARTLE Similar movements to Moro reflex but not doing Moro test	no startle	startle to sudden noise or bang on table	2 or 3 spontaneous startles	3 - 5 spontaneous startles	more than 6 spontaneous startles		

REFLEXES = test both sides

SUCK & GAG Watch on breast; if no suck is seen, put little finger into mouth with pulp of finger upwards.	no gag / no suck	weak suck only: (a) irregular (b) regular No stripping	infant sucks well on the breast	strong suck: (a) irregular (b) regular Good stripping	no suck but strong clenching		
PALMAR GRASP Stroke inside of hand. DO NOT TOUCH BACK OF HAND!!	no reaction	short, weak flexion of fingers	strong flexion of fingers	strong finger flexion, shoulder ↑	strong finger flexion, whole body ↑		
PLANTAR GRASP Press on sole below toes.	no response	toes flex (bend) slightly	toes curve around finger				
MORO REFLEX Put baby in position shown in drawing 1 below. Bring head forward and suddenly let it fall back slightly. 	no response	full abduction of the arms, extension at the elbow, no adduction 	full abduction, little or delayed adduction 	arms do not fully abduct but good adduction 	• adduction only • extension at the elbow only 		
PLACING Hold infant upright. Stroke front of the baby's lower leg on edge of table.	nothing happens	baby flexes ankle	baby flexes hip, knee, and ankle & steps on table				

ORIENTATION AND BEHAVIOUR

EYES	does not open eyes	normal eye movement, eyes move together	abnormal eye movements: DESCRIBE!!				
AUDITORY ORIENTATION Must not be asleep. Wrap infant. Hold rattle 10-15 cm (4-6 inches) from ear.	no reaction	brightens (wakes up)	turns eyes and sometimes turns head a bit also	turns eyes and head fully to side of noise	turns head and eyes strongly to noise; <i>does not tire</i>		
VISUAL ALERTNESS Wrap infant, wake up with rattle if needed or rock baby a bit. Look if baby can see and follow red ball (R) or a target (T).	does not follow or focus on red ball or target R T	stills, focuses, follows very briefly to side and up but loses it quickly R T	follows with eyes to the side and up, may turn head R T	follows with eyes to the side and up; turns head always R T	follows in a circle R T		
ALERTNESS Tested as response to red ball (R) or target (T). How long infant interested.	will not respond to red ball R T	when awake, looks only briefly R T	when awake, looks at red ball but loses it R T	keeps interest in red ball R T	does not tire R T		
PEAK OF EXCITEMENT Circle "H" if high-pitch cry	quiet all the time H	awakes briefly, does not cry H	awakes briefly, cries sometimes H	cries always when handled H	cries always H		
CONSOLABILITY How easy is it to make baby quiet?	never awake or crying	awake but never cries, consoling not needed	becomes quiet when talked to	needs picking up to console	cannot be consoled		

COMMENT:

EXAMINER:

HAMMERSMITH INFANT NEUROLOGICAL EXAMINATION

Name:

Date of birth:

Gestational age:

Date of examination:

SUMMARY OF EXAMINATION

No of asymmetries in section 1:

Neurological items score:

Behavioural score:

COMMENTS:

Cranial nerves functions

Posture

Movements

Tone



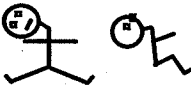






Reflexes and reactions

Behaviour

SECTION 1 : NEUROLOGICAL ITEMS

Assessment of cranial nerve function

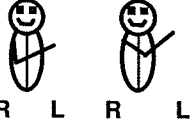

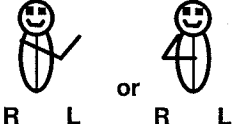

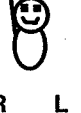

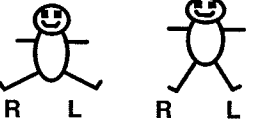
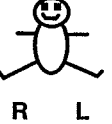
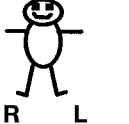




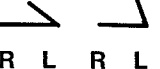

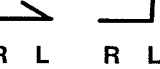







	column 1 (score 2)	c. 2 (sc. 1.5)	column 3 (score 1)	column 4 (score 0)	A	comment
Facial appearance (at rest and when crying or stimulated)	smiles or reacts to stimuli by closing eyes and grimacing		closes eyes but not tightly; poor facial expression	expressionless; does not react to stimuli		
Eye appearance	normal conjugated eye movements		intermittent deviation of eyes or abnormal movements	continuous deviation of eyes or abnormal movements		
Auditory response test the response to rattle or bell	reacts to stimuli on both sides		doubtful reaction to stimuli or asymmetrical	does not react to stimuli		
Visual response test the ability to follow a red ball or moving object	follows the object for a complete arc		follows the object for an incomplete arc, or asymmetry	does not follow the object		
Sucking/swallowing watch the infant suck on breast or bottle	good suck and swallowing		poor suck and/or swallowing	no sucking reflex, no swallowing		

	column 1 (score 2)	c 2 (sc.1.5)	column 3 (score 1)	column 4 (score 0)	A
Head in sitting	 straight; in midline		 slightly to side <i>or</i> backward <i>or</i> forward	 markedly to side <i>or</i> backward <i>or</i> forward	
Trunk in sitting	 straight		 slightly curved or bent to side	 very rounded rocking back bent sideways	
Arms at rest	in neutral position: central, straight <i>or</i> slightly bent		slight internal rotation <i>or</i> external rotation	marked internal rotation <i>or</i> external rotation <i>or</i> dystonic posture hemiplegic posture	
Hands	hands open		intermittent adducted thumb <i>or</i> fisting	persistent adducted thumb <i>or</i> fisting	
Legs in sitting	able to sit with straight back, and legs straight <i>or</i> slightly bent (long sitting)		sit with straight back but knees bent at 15-20 °	unable to sit straight unless knees markedly bent (no long sitting)	
in supine and in standing	 legs in neutral position: straight <i>or</i> slightly bent	slight internal rotation <i>or</i> external rotation	 internal rotation <i>or</i> external rotation at hips	 marked internal rotation <i>or</i> external rotation <i>or</i> fixed extension <i>or</i> flexion <i>or</i> contractures at hips and knees	
Feet in supine and in standing	central; in neutral position toes straight midway between flexion and extension		slight internal rotation <i>or</i> external rotation intermittent tendency to stand on tiptoes; <i>or</i> toes up <i>or</i> curling under	marked internal rotation <i>or</i> external rotation at the ankle persistent tendency to stand on tiptoes <i>or</i> toes up <i>or</i> curling under	




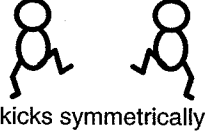


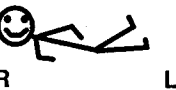
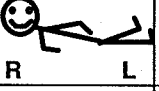
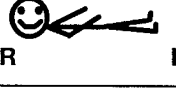

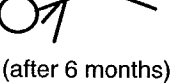
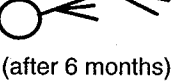
Movements

Quantity watch infant lying in the supine	normal		excessive <i>or</i> sluggish	minimal <i>or</i> none	
Quality	free, alternating, smooth		jerky, slight tremor	<ul style="list-style-type: none"> • cramped & synchronous • extensor spasms • athetoid • ataxic • very tremulous • myoclonic spasm • dystonic 	








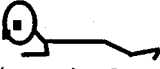
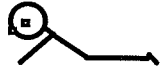


Tone

	column 1 (score 2)	c. 2 (sc.1.5)	column 3 (score 1)	column 4 (score 0)	A
Scarf sign Take the infant's hand and pull the arm across the chest until there is resistance. Note the position of the elbow.	Range: 				
Passive shoulder elevation Lift arm next to the infant's head. Note resistance at shoulder and elbow.	resistance, but overcome 		no resistance 	resistance, not overcome 	
Pronation/supination Steady upper arm while pronating and supinating forearm. Note resistance.	full pronation and supination, no resistance,		full pronation and supination but resistance to be overcome	full pronation and supination not possible, marked resistance	
Adductors With the infant's legs extended, open them as far as possible. The angle formed by the legs is noted.	Range: 150°-80° 	150°-160° 	>170° 	<80° 	
Popliteal angle Legs are flexed at the hip simultaneously on to the side of the abdomen, then extended at the knee until there is resistance. Note angle between lower and upper leg.	Range: 150°-110° 	150°-160° 	~90° or >170° 	<80° 	
Ankle dorsiflexion With knee extended, dorsiflex ankle. Note the angle between foot and leg.	Range: 30°-85° 	20°-30° 	<20° or 90° 	>90° 	
Pulled to sit Pull infant to sit by wrists.					
Ventral suspension Hold infant in ventral suspension; note position of back, limbs, and head.					

Reflexes and reactions

Tendon Reflexes	easily elicitable biceps knee ankle	mildly brisk bic knee ank	brisk biceps knee ankle	clonus or absent biceps knee ankle	
Arm protection Pull the infant by one arm from the supine position and note the reaction of the opposite side.					
Vertical suspension Hold infant under axilla. Make sure legs do not touch any surface.					
Lateral tilting (describe side up). Infant held vertically, tilt quickly to horizontal. Note spine, limbs, and head.					
Forward parachute Infant held vertically and suddenly tilted forward. Note reaction of the arms.	 (after 6 months)		 (after 6 months)		

SECTION 2: MOTOR MILESTONES

Head control	unable to maintain head upright (normal < 3 mo)	wobbles (normal at 4 mo)	all the time maintained upright (normal at 5 mo)			
Sitting	cannot sit	sits with support at hips  (normal at 4 mo)	props  (normal at 6 mo)	stable sit  (normal at 7-8 mo)	pivots (rotates)  (normal at 9 mo)	Observed: Reported (age):
Voluntary grasp	no grasp	uses whole hand	index finger and thumb but immature grasp	pincer grasp		Observed: Reported (age):
Ability to kick (in supine)	no kicking	kicks horizontally legs do not lift	upward (vertically)  (normal at 3 mo)	touches leg  (normal at 4-5 mo)	touches toes  (normal at 5-6 mo)	Observed: Reported (age):
Rolling	no rolling	rolling to side (normal at 4 mo)	prone to supine (normal at mo)	supine to prone (normal at mo)		Observed: Reported (age):
Crawling	does not lift head	on elbow  (normal at 3 mo)	on outstretched hand  (normal at 4 mo)	crawling flat on abdomen  (normal at 8 mo)	crawling on hands and knees  (normal at 10 mo)	Observed: Reported (age):
Standing	does not support weight	supports weight (normal at 4 mo)	stands with support (normal at 7 mo)	stands unaided (normal at 12 mo)		Observed: Reported (age):
Walking		bouncing (normal at 6 mo)	cruising (walks holding on) (normal at 12 mo)	walking independently (normal at 15 mo)		Observed: Reported (age):

SECTION 3: BEHAVIOUR

	1	2	3	4	5	6	Comment
State of consciousness	unrousable	drowsy	sleepy but wakes easily	awake but no interest	loses interest	maintains interest	
Emotional state	irritable, not consolable	irritable, mother can console	irritable when approached	neither happy or unhappy	happy, smiling		
Social orientation	avoiding, withdrawn	hesitant	accepts approach	friendly			

Score for behaviour: