

Hammersmith Neonatal Neurological Examination

Ricci D et al Early Hum Devel 2008

Term and preterms at term age

Page 1

Patient Name
DOB

GA

ID

Date

POSTURE	arms & legs extended or very slightly flexed	legs slightly flexed	leg well-flexed but not adducted	leg well flexed & adducted near to abdomen	abnormal posture: opisthotonus a) arms flexed, b) legs extended
	arms do not flex	arms flex slowly not always; not completely	arms flex slowly; more complete	arms flex quickly and completely	arms difficult to extend; snap back forcefully
	arms remain straight; no resistance	arms flex slightly or some resistance felt	arms flex well till shoulder lifts, then straighten	arms flex to approx. 100° & maintained as shoulder lifts	flexion of arms <100°; maintained when body lifts up
LEG RECOIL	No flexion	incomplete or variable flexion	complete but slow flexion	complete fast flexion	legs difficult to extend; snap back forcefully
	legs straight - no resistance	legs flex slightly or some resistance felt	legs flex well till bottom lifts up	knee flexes & remains flexed when bottom up	flexion stays when back & bottom up
	legs straight - no resistance	legs flex slightly or some resistance felt	legs flex well till bottom lifts up	knee flexes & remains flexed when bottom up	flexion stays when back & bottom up
POPLITEAL ANGLE	180°	= 150°	= 110°	= 90°	< 90°
	no attempt to raise head	infant tries: effort better felt than seen	raises head but drops forward or back	raises head: remains vertical	
	no attempt to raise head	infant tries: effort better felt than seen	raises head but drops forward or back	raises head: remains vertical; it may wobble	head upright or extended; cannot be passively flexed
HEAD LAG	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
	back curved, head & limbs hang straight	back curved, head ↓, limbs slightly flexed	back slightly curved, limbs flexed	back straight, head in line, limbs flexed	back straight, limbs above body
	back curved, head & limbs hang straight	back curved, head ↓, limbs slightly flexed	back slightly curved, limbs flexed	back straight, head in line, limbs flexed	back straight, limbs above body

1	.5	2	.5	3	.5	4	.5	5	
3	0	9	6	60	9	12	0	1	25-27w
1	0	6	2	61	16	12	1	1	28-29w
2	0	4	2	65	17	8	0	2	30-31w
0	0	0	2	81	4	9	0	4	32-34w
0	0	0	0	6	3	90	1	0	Full term

3	1	9	9	44	9	23	2	0	25-27w
1	1	3	4	42	15	33	0	1	28-29w
1	0	8	3	42	10	36	0	0	30-31w
0	0	2	2	54	15	25	0	2	32-34w
0	0	5	2	22	3	67	1	0	Full term

3	0	17	5	51	10	14	0	0	25-27w
7	1	14	7	45	8	18	0	0	28-29w
7	2	15	4	51	7	14	0	0	30-31w
6	2	25	0	59	4	4	0	0	32-34w
0	0	1	0	22	8	69	0	0	Full term

3	0	14	4	18	5	52	0	4	25-27w
0	0	5	2	24	5	62	0	2	28-29w
0	0	10	2	34	2	50	0	2	30-31w
0	0	9	0	38	2	49	0	2	32-34w
0	0	3	1	4	1	91	0	0	Full term

3	1	17	6	35	6	27	1	4	25-27w
1	1	17	2	36	6	35	1	1	28-29w
2	0	21	8	38	5	25	0	1	30-31w
0	4	29	10	43	2	10	0	2	32-34w
0	0	0	1	12	12	72	0	3	Full term

3	0	22	8	46	6	14	0	0	25-27w
5	1	16	5	48	7	17	1	0	28-29w
2	0	15	10	53	5	15	0	0	30-31w
2	0	26	4	49	4	13	0	2	32-34w
0	0	5	5	19	20	51	0	0	Full term

3	0	17	4	46	9	21	0	0	25-27w
0	0	13	5	46	12	24	0	0	28-29w
3	0	14	2	48	13	20	0	0	30-31w
4	0	15	4	55	4	18	0	0	32-34w
0	0	0	6	26	12	56	0	0	Full term

3	0	3	5	57	11	21	0	0	25-27w
1	2	6	4	50	13	24	0	0	28-29w
1	0	2	2	63	11	21	0	0	30-31w
0	0	4	2	77	2	15	0	0	32-34w
0	0	0	4	29	15	52	0	0	Full term

3	3	27	13	36	3	15	0	0	25-27w
3	3	18	7	40	14	15	0	0	28-29w
7	3	16	5	46	7	16	0	0	30-31w
4	0	21	4	56	0	15	0	0	32-34w
0	0	9	4	44	12	31	0	0	Full term

0	0	21	11	38	11	15	4	0	25-27w
3	0	25	8	44	8	10	0	2	28-29w
3	0	22	8	47	5	14	1	0	30-31w
2	0	17	2	56	2	19	0	2	32-34w
0	0	4	5	47	16	28	0	0	Full term

Tone pattern items

FLEXOR TONE (compare arm and leg traction)	arm flexion < leg flexion	arm flexion = leg flexion	arm flexion > leg flexion; difference ≤1 column	arm flexion > leg flexion; difference > 1 column n
FLEXOR TONE (resting posture)		arms and legs generally flexed	strong arm flexion with strong leg extension <i>intermittent</i>	strong arm flexion with strong leg extension <i>continuous</i>
LEG TONE (leg traction and popliteal angle)	leg traction > popliteal angle	leg traction = popliteal angle	leg traction < popliteal angle; difference ≤1 column	leg traction < popliteal angle; difference > 1 column n
HEAD CONTROL (sitting)	neck extension < neck flexion	neck extension = Neck flexion	neck extension > neck flexion; difference < 1 column	neck extension > neck flexion; difference > 1 column n
NECK AND AXIAL TONE (horizontal)	ventral suspension < head lag	ventral suspension = head lag	ventral suspension > head lag; difference ≤1 column	ventral suspension > head lag; difference > 1 column n

1	.5	2	.5	3	.5	4	.5	5	
0	0	45	0	27	<1	27	0	1	25-27w
0	0	40	<1	40	0	20	<1	0	28-29w
0	0	34	<1	47	<1	18	0	1	30-31w
0	0	38	<1	36	<1	24	<1	2	32-34w
0	0	25	3	53	0	18	0	<1	Full term


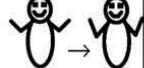
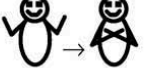


0	0	0	0	99	<1	0	0	1	25-27w
0	0	0	0	96	<1	3	0	1	28-29w
0	0	0	0	96	<1	2	0	2	30-31w
0	0	0	0	94	<1	2	0	4	32-34w
0	0	0	0	99	0	<1	0	<1	Full term

0	0	43	<1	34	0	21	<1	1	25-27w
0	0	41	0	39	<1	19	0	1	28-29w
0	0	38	0	36	<1	22	<1	4	30-31w
0	0	19	<1	50	<1	29	<1	2	32-34w
0	0	4	0	57	0	35	0	1	Full term

0	0	25	0	64	0	9	0	2	25-27w
0	0	17	0	70	0	13	0	0	28-29w
0	0	18	0	76	0	6	0	0	30-31w
0	0	23	0	64	0	13	0	0	32-34w
0	0	3	0	94	0	3	0	<1	Full term

0	0	20	0	39	0	35	0	6	25-27w
0	0	31	0	42	0	26	0	1	28-29w
0	0	24	0	49	0	26	0	1	30-31w
0	0	17	0	51	0	28	0	4	32-34w
0	0	24	0	58	0	18	0	<1	Full term

Reflex items

TENDON REFLEX	absent	felt, not seen	seen	'exaggerated'	clonus
SUCK/GAG	no gag / no suck	weak irregular suck only: no stripping	weak regular suck some stripping	strong suck: (a) irregular (b) regular good stripping	no suck but strong clenching
PALMAR GRASP	no response R L	short, weak flexion of fingers R L	strong flexion of fingers R L	strong finger flexion, shoulder ↑ R L	very strong grasp; infant can be lifted off couch R L
PLANTAR GRASP	no response R L	partial plantar flexion of toes R L	toes curve around the examiner's finger R L		
PLACING	no response R L	dorsi-flexion of ankle only R L	full placing response with flexion of hip, knee & placing sole on surface R L		
MORO REFLEX	no response or opening of hands only	full abduction at shoulder and extension of the arms; no adduction 	full abduction but only delayed or partial adduction 	partial abduction at shoulder and extension of arms followed by smooth adduction 	<ul style="list-style-type: none"> • no abduction or adduction; • only forward extension of arms from the shoulders • marked adduction only  or 

1	.5	2	.5	3	.5	4	.5	5	
0	0	9	0	55	7	13	3	13	25-27w
0	0	12	0	50	7	22	4	5	28-29w
0	0	24	1	52	1	13	0	9	30-31w
0	0	18	0	57	0	17	4	4	32-34w
<1	0	21	0	78	0	<1	0	<1	Full term

0	0	1	0	3	3	93	0	0	25-27w
0	0	3	0	7	0	90	0	0	28-29w
0	0	0	0	6	2	92	0	0	30-31w
0	0	4	0	10	0	86	0	0	32-34w
0	0	1	0	5	0	92	0	2	Full term

0	0	5	0	47	7	30	1	10	25-27w
0	0	3	1	40	8	43	1	4	28-29w
0	0	1	0	51	3	35	0	10	30-31w
0	0	7	0	53	3	30	0	7	32-34w
<1	0	6	0	84	0	9	0	<1	Full term

0	0	4	1	95	0	0	0	0	25-27w
0	1	5	2	92	0	0	0	0	28-29w
0	0	2	1	97	0	0	0	0	30-31w
0	0	2	2	96	0	0	0	0	32-34w
<1	0	2	0	98	0	0	0	0	Full term

5	2	12	3	78	0	0	0	0	25-27w
0	2	12	6	80	0	0	0	0	28-29w
1	0	8	8	83	0	0	0	0	30-31w
0	0	4	0	96	0	0	0	0	32-34w
1	0	18	0	81	0	0	0	0	Full term

0	0	13	1	61	4	20	0	1	25-27w
0	0	12	1	64	6	15	1	1	28-29w
0	0	12	1	51	3	28	0	5	30-31w
0	0	23	0	46	2	27	0	2	32-34w
0	0	1	0	20	0	79	0	0	Full term

Movements

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SPONTANEOUS MOVEMENT (quantity)	no movement	sporadic and short isolated movements	frequent isolated movements	frequent generalized movements	continuous exaggerated movements
	only stretches	stretches and random abrupt movements	fluent movements but monotonous	fluent alternating movements of arms + legs;	cramped synchronous
		Some smooth movements		good variability	jerky or other abnormal movement
SPONTANEOUS MOVEMENT (quality)					
HEAD RAISING	no movement	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

1	.5	2	.5	3	.5	4	.5	5	
0	0	15	3	28	3	51	0	0	25-27w
0	0	17	3	26	11	43	0	0	28-29w
0	0	13	0	31	8	48	0	0	30-31w
0	0	20	0	27	0	51	0	2	32-34w
<1	0	3	0	5	0	92	0	<1	Full term

0	0	16	4	42	11	23	1	3	25-27w
0	0	22	5	35	1	23	2	2	28-29w
0	0	20	6	34	2	36	0	2	30-31w
0	0	21	0	15	0	60	0	4	32-34w
2	0	5	0	<1	0	93	0	<1	Full term

0	0	36	6	34	6	14	1	3	25-27w
1	1	35	4	34	9	14	1	1	28-29w
1	1	40	5	28	1	21	1	2	30-31w
0	0	40	0	30	4	22	2	2	32-34w
<1	0	10	0	50	0	40	0	<1	Full term

Abnormal signs

ABN. 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 trem or or trem or only when crying	tremor only after Moro or 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

1	.5	2	.5	3	.5	4	.5	5	
0	0	57	4	37	0	2	0	0	25-27w
0	0	64	6	28	0	2	0	0	28-29w
0	0	67	1	30	1	1	0	0	30-31w
0	0	75	2	21	0	2	0	0	32-34w
0	0	85	0	12	0	3	0	<1	Full term

0	0	43	1	29	8	16	0	3	25-27w
0	0	43	0	27	9	19	2	0	28-29w
0	0	54	0	24	3	19	0	0	30-31w
0	0	62	0	30	0	4	0	4	32-34w
0	0	88	0	12	0	<1	0	<1	Full term

22	0	40	7	20	1	10	0	0	25-27w
23	1	35	7	30	2	2	0	0	28-29w
37	1	32	1	25	1	3	0	0	30-31w
50	0	35	0	9	0	6	0	0	32-34w
<1	0	94	0	6	0	<1	0	<1	Full term

Behavioural signs, vision, hearing

EYE APPEARANCE	does not open eyes		full conjugated eye mov	transient nystagmus	persistent nystagmus
				strabismus	strabismus
				roving eye movemens	roving eye movements
				sunsetting sign	dow nward deviation

1	.5	2	.5	3	.5	4	.5	5	
6	0	0	0	74	4	16	0	0	25-27w
2	0	0	0	80	2	15	1	0	28-29w
5	0	0	0	80	2	13	0	0	30-31w
4	0	0	0	87	2	7	0	0	32-34w
7	0	0	0	92	0	1	0	<1	Full term

AUDITORY ORIENTATION	no reaction	auditory startle; Brightens and stills;	shifting of eyes, head might turn towards source	prolonged head turn to stimulus;	turns head and eyes towards noise every time;
		no true orientati - on		search with eyes;	jerky abrupt
				smooth	

5	1	28	0	57	1	8	0	0	25-27w
2	0	23	10	50	6	9	0	0	28-29w
5	1	27	7	51	1	8	0	0	30-31w
3	0	14	0	73	3	7	0	0	32-34w
<1	0	30	0	50	0	20	0	<1	Full term

VISUAL ORIENTATION	does not follow or focus on stimuli	stills, focuses follows briefly to the side but loses stimuli	follows horizontal -ly and vertically;	follows horizon -tally and vertically;	follows in a circle
			no head turn	turns head	

6	0	7	2	25	3	26	9	22	25-27w
0	0	7	1	33	7	21	15	16	28-29w
1	0	9	0	27	5	25	10	23	30-31w
0	0	10	0	42	10	38	0	0	32-34w
<1	0	7	0	41	0	51	0	1	Full term

ALERTNESS	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)

6	0	22	1	48	3	20	0	0	25-27w
1	0	17	4	60	3	14	1	0	28-29w
0	0	21	1	43	2	33	0	0	30-31w
0	0	7	3	54	0	36	0	0	32-34w
1	0	2	0	48	0	49	0	<1	Full term

IRRITABILITY	quiet all the time, not irritable to any stimuli	awakes, cries some -times when handled	cries often when handled	cries always when handled	cries even when not handled

12	1	52	0	31	0	3	0	1	25-27w
16	2	47	2	27	1	5	0	0	28-29w
27	0	47	1	22	0	2	0	1	30-31w
23	0	49	0	23	0	5	0	0	32-34w
<1	0	93	0	5	0	2	0	<1	Full term

CONSOLABILITY	not crying consoling not needed	cries briefly; consol -ing not needed	cries; becomes quiet when talked to	cries; needs picking up to console	cries cannot be consoled

10	0	29	0	29	3	29	0	0	25-27w
17	1	19	2	29	7	22	1	2	28-29w
27	0	18	0	28	2	22	1	2	30-31w
23	0	9	0	32	2	28	0	6	32-34w
1	0	41	0	45	0	12	0	<1	Full term

CRY	no cry at all	whimpe -ring cry only	cries to stimuli but normal pitch		high pitched cry; often continuous

11	0	11	0	78	0	0	0	0	25-27w
16	0	5	2	77	0	0	0	0	28-29w
26	1	3	1	69	0	0	0	0	30-31w
23	0	6	2	69	0	0	0	0	32-34w
<1	0	7	0	92	0	0	0	1	Full z

Reference

Ricci D, Romeo DMM, Haataja L et al Neurological examination of preterm infants at term equivalent age. Early Human Development 2008;84;751–761