HEALTH HOLDING

HAFER ALBATIN HEALTH CLUSTER
MATERNITY AND CHILDREN HOSPITAL

Department:	Neonatal Intensive Care Unit (NICU)		
Document:	Departmental Policy and Procedure		
Title:	Assessment of Gestational Age and Intrauterine Growth of the Newborn		
Applies To:	All NICU Staff		
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1. PURPOSE:

1.1 To evaluate for gestational age so as to be observed and treated appropriately.

2. DEFINITIONS:

2.1 **Infants with low birth weights for their gestational age**: These include small for gestational age (SGA) and fetal (intrauterine) growth restriction (IUGR). These two terms, although related since they may include many of the same infants, are not the same.

2.2 **Small for gestational age (SGA):** Infants with a birth weight below the 10th percentile for gestational age. They are constitutionally small infants with a normal birth weight below 10th percentile due to constitutional factors including maternal height, weight, ethnicity, and parity. These infants are not at increased risk for perinatal mortality or morbidity.

2.3 **Fetal (Intrauterine) Growth Restriction (IUGR):**

- 2.3.1 It is defined as an estimated fetal weight below the 10th percentile for gestational age. However, their fetal growth is less than normal for the population and growth potential of the infant.
- 2.3.2 The fetus does not achieve the expected in utero growth potential due to genetic or environmental factors.
- 2.3.3 Moderate IUGR is defined as birth weight in the 3rd to 10th percentile, and severe IUGR as less than the 3rd percentile.
- 2.3.4 IUGR can be symmetrical (reduced, weight, length, and head circumference) or asymmetric growth with a relatively normal or "headsparing" growth pattern.

2.4 Estimation of gestational age is achieved by considering date of the last menstrual period, and early ultrasound (if available), in combination with physical and neurological features of the newborn; The New Ballard Score (NBS).

3. POLICY:

3.1 All infants will be evaluated for gestational age soon after admission to NICU by Specialist or by resident.

3.2 For infants more than 26 weeks GA, the score is valid when performed from 30 minutes to 96 hours of age, ideally within 24 hours. It is part of the patient assessment within the first 8 hours of admission.

3.3 For infants less than 26 weeks perform NBS before 12 hours of age as validity decreases markedly after 24 hours of age.

4. PROCEDURE:

4.1 Assess gestational age by history of:

- 4.1.1 The last menstrual period (LMP), has accuracy ± 2 weeks,
- 4.1.2 First trimester ultrasound dating: The most accurate GA dating by ultrasonography occurs at 6 to12 weeks' gestation and is usually accurate to within ±3 - 4 days. Measurements at 10 to 14 weeks' gestation are accurate within 5 days; however, generally accuracy diminishes after 12 weeks to be within 10 days and after 26 weeks to be ±3 weeks.

4.2 Assess gestational age by :

4.2.1 **Neuromuscular maturity**

4.2.1.1 Posture: Observe the unrestrained infant in the quite, supine position.

4.2.1.2 Square window: Flex the wrist and measure the minimal angle between the ventral surface of the forearm and the palm.

4.2.1.3 Arm recoil: With the infant supine and the head midline, hold the forearm against the arm for 5 seconds, then fully extend and release the arm. Note the time it takes the infant to resume a flexed posture.

4.2.1.4 Popliteal angle: Flex the hips with the thighs on the abdomen. Then, without lifting the hips from the bed surface, extend the knee as far as possible until resistance is met. (You may overestimate the extent of extension if you attempts to continue extending the knee beyond the point where resistance is first met).

4.2.1.5 Scarf sign: Keeping the head in the midline, pull the hand across the chest to encircle the neck as a scarf and note the position of the elbow relative to the midline.

4.2.1.6 Heel to ear: With the infant supine and the pelvis kept on the examining surface, the feet are brought back as far as possible toward the head, allowing the knees to be positioned alongside the abdomen.

4.2.2 **Physical maturity**

4.2.2.1 Skin: With maturation, the skin becomes thicker, less translucent and, eventually, dry and peeling.

4.2.2.2 Lanugo: This fine, non-pigmented hair is evenly distributed over the body and is most prominent at 27 to 28 weeks' gestation, then it gradually disappears, usually first from the lower back. Although present over the entire body, the lanugo over the back is used for gestational age assessment.

4.2.2.3 Plantar surface: As with the hands, the presence of creases in the foot is a reflection of intrauterine activity as well as maturation. The absence of creases may indicate an underlying neurologic problem as well as immaturity.

4.2.2.4 Breast: The aerola development is not dependant on adequacy of intrauterine nutrition. There is no difference in male or female infants.

4.2.2.5 Ear cartilage: With maturation the ear cartilage becomes increasingly stiff and auricle thickens. Fold the top of the ear and assess the recoil.

4.2.2.6 Eyelid opening: Tightly fused are defined as both lids being inseparable by gentle traction and loosely fused as either lid being able to be partly separated by gentle traction.

4.2.2.7 External genitalia, male: Palpate for level of testicular descent and observe the degree of rotation.

4.2.2.8 External genitalia, female: The labia minora and clitoris are prominent in the immature newborns, at times leading the inexperienced examiner to suspect clitoromegaly. With maturation, the labia majora becomes fatfilled and therefore prominent. The undernourished fetus may have relatively thin labia majora.

4.3 For newborn with no arm or other deformities, breech deliveries or other situations where the criterion cannot be performed, a score similar to the others can be assigned e.g. A similar score to the popliteal angle and heel to ear. If it is skipped or given a zero, the assessment will result in a falsely low score.

4.4 Plot the infant's weight, length and head circumference on the fetal growth charts: (appendices 7.2,7.3)

4.4.1 Assess appropriateness of weight, length and head circumference to each other SGA infant can be:

4.4.1.1 Symmetrically growth restricted (decreased weight, length and head circumference),

4.4.1.2 Asymmetrically growth restricted (decreased weight, relatively normal length with relative "head sparing"),

4.4.1.3 Some foetuses have growth restriction and do not achieve their full genetic growth potential, but the intra-uterine insult may not be sufficient to curtail their birth weight to the10th percentile and they are therefore not labelled 'IUGR'. The diagnosis of growth restriction in such infants can be made by demonstrating asymmetric or disproportionate growth.

4.4.1.4 Thus, careful assessment is essential as infants with IUGR may or may not be SGA, and infants who are SGA, may not have been affected by growth-restricting processes that cause IUGR.

4.4.1.5 Factors intrinsic to the fetus in general cause symmetrical growth restriction; whereas asymmetric IUGR is often associated with maternal medical problems.

4.4.2 Take accurate maternal and pregnancy history and physical examination to determine the presence of evidence of fetal growth restriction (appendices 7.4).

4.4.3 IUGR on Ballard score:

4.4.3.1 Physical maturity: they may have diminished vernix caseosa, cracking and peeling of the skin, less well formed ear cartilage, diminished breast tissue, and less mature-appearing female genitalia.

4.4.3.2 The neurologic portion of the examination is less affected by IUGR and can be used to more accurately confirm gestational age.

5. MATERIAL AND EQUIPMENT:

5.1 The ballard score sheet
5.2 Growth charts

6. RESPONSIBILITIES:

6.1 Physician
6.2 Nurse

7. APPENDICES:

7.1 The ballard score sheet
7.2 Fenton preterm growth chart-girls
7.3 Fenton preterm growth chart-boys
7.4 Causes of fetal growth restriction

8. REFERENCES:

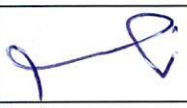
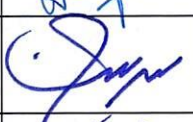
8.1 Lissauer T et al. Size and Physical Examination of the Newborn infant. Klaus and Fanaroff s Care of the high-risk neonate. Sixth edition.20l3.

8.2 Fenton TR. et al., A systematic review and meta-analysis to revise the Fenton growth chart for preterm infants. BMC Pediatrics. 2013: 13:59

8.3 Ballard JL et al. New Ballard Score expanded to include extremely premature infants. J Pediatr. l99l Sep; l l9 (3):417-23

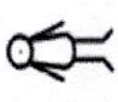
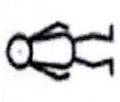
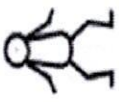
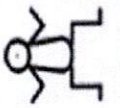
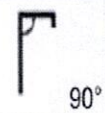
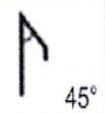
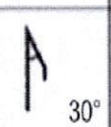
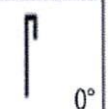
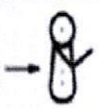
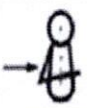
8.4 Rosenberg A. The IUGR Newbom. Semin Perinatol;32;219-224;2008.

9. APPROVALS:

	Name	Title	Signature	Date
Prepared by:	Ms. Afrah Saud Al Shammari	NICU Head Nurse		January 05, 2025
Prepared by:	Dr. Falah Nabhan Al Shammari	NICU Quality Coordinator		January 05, 2025
Reviewed by:	Mr. Sabah Turayhib Al - Harbi	Director of Nursing		January 07, 2025
Reviewed by:	Dr. Sarhan Hamdan Al Shammari	NICU Head of the Department		January 08, 2025
Reviewed by:	Mr. Abdulellah Ayed Al Mutairi	QM&PS Director		January 09, 2025
Reviewed by:	Dr. Tamer Mohamed Naguib	Medical Director		January 12, 2025
Approved by:	Mr. Fahad Hazam Al - Shammari	Hospital Director		January 19, 2025

APPENDICES 7.1: The Ballard Score Sheet

Neuromuscular Maturity

Score	-1	0	1	2	3	4	5
Posture							
Square window (wrist)	 >90°	 90°	 60°	 45°	 30°	 0°	
Arm recoil		 180°	 140°–180°	 110°–140°	 90°–110°	 <90°	
Popliteal angle	 180°	 160°	 140°	 120°	 100°	 90°	 <90°
Scarf sign							
Heel to ear							

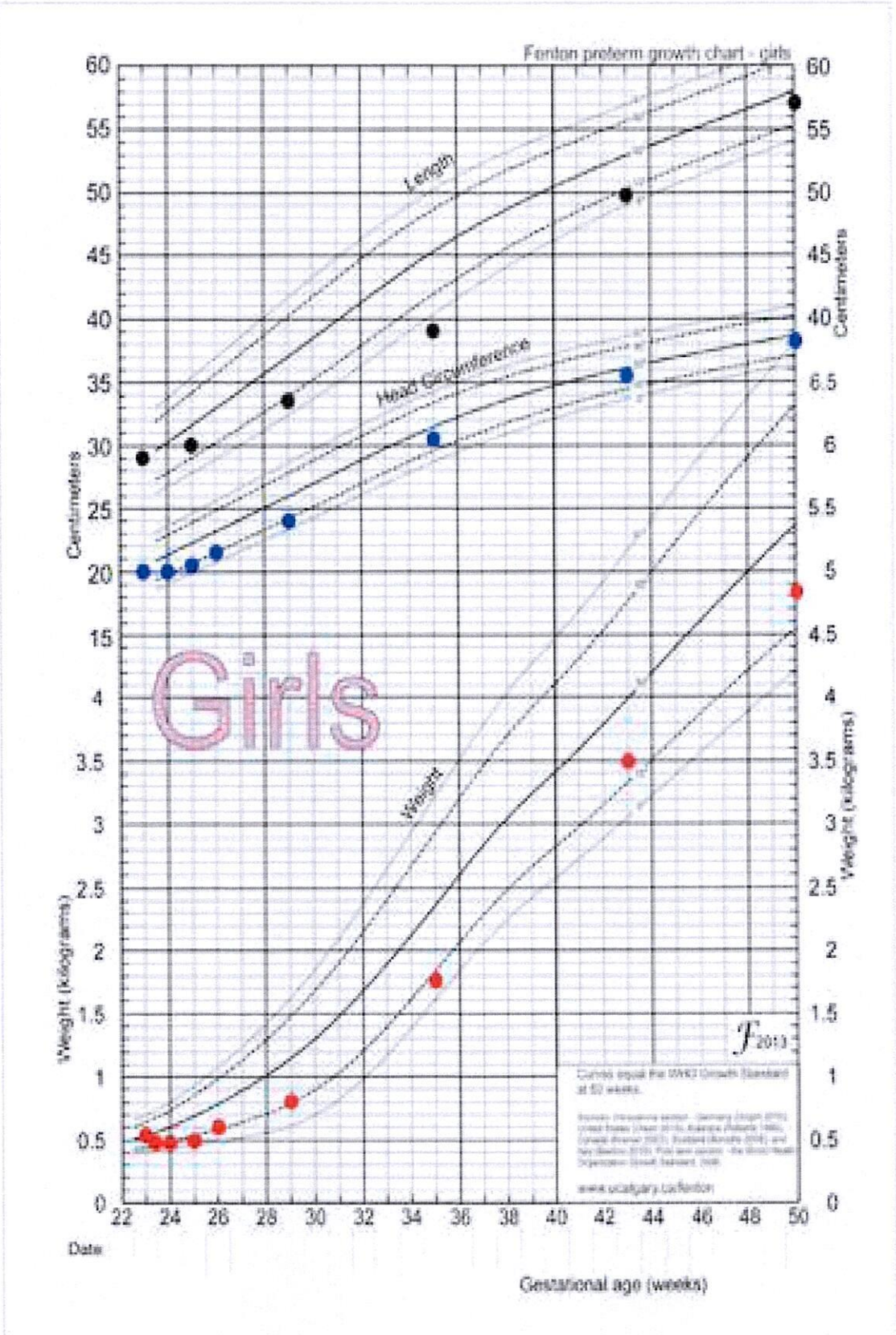
Physical Maturity

Skin	Sticky, friable, transparent	Gelatinous, red, translucent	Smooth, pink; visible veins	Superficial peeling and/or rash; few veins	Cracking, pale areas; rare veins	Parchment, deep cracking; no vessels	Leathery, cracked wrinkled
Lanugo	None	Sparse	Abundant	Thinning	Bald areas	Mostly bald	
Plantar surface	Heel-toe 40-50 mm: –1 <40 mm: –2	>50 mm, no crease	Faint red marks	Anterior transverse crease only	Creases anterior ⅔	Creases over entire sole	
Breast	Imperceptible	Barely perceptible	Flat areola, no bud	Stippled areola, 1–2 mm bud	Raised areola, 3–4 mm bud	Full areola, 5–10 mm bud	
Eye/Ear	Lids fused loosely: –1 tightly: –2	Lids open; pinna flat; stays folded	Slightly curved pinna; soft; slow recoil	Well curved pinna; soft but ready recoil	Formed and firm, instant recoil	Thick cartilage, ear stiff	
Genitals (male)	Scrotum flat, smooth	Scrotum empty, faint rugae	Testes in upper canal, rare rugae	Testes descending, few rugae	Testes down, good rugae	Testes pendulous, deep rugae	
Genitals (female)	Clitoris prominent, labia flat	Clitoris prominent, small labia minora	Clitoris prominent, enlarging minora	Majora and minora equally prominent	Majora large, minora small	Majora cover clitoris and minora	

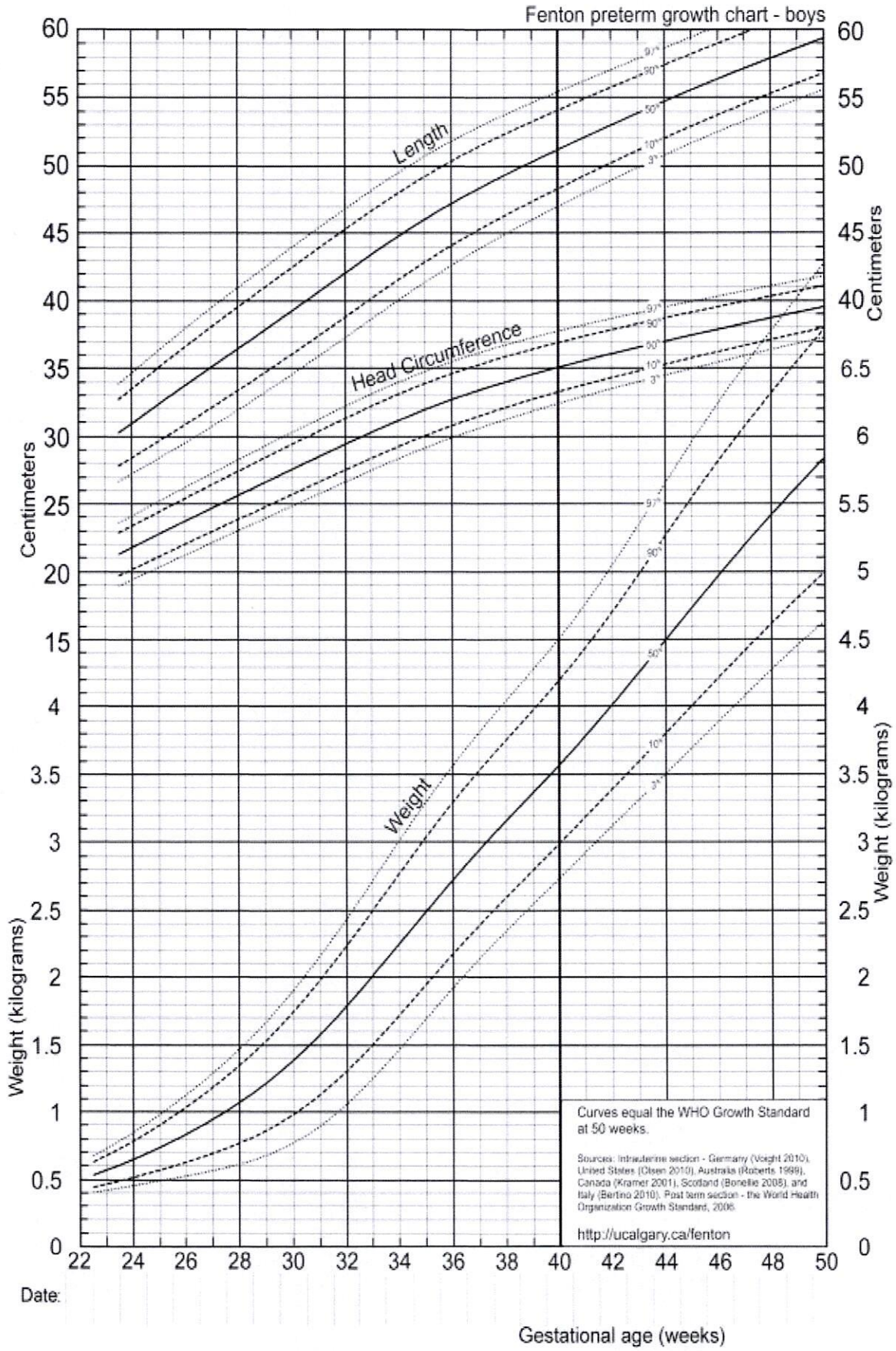
Maturity Rating

Score	Weeks
-10	20
-5	22
0	24
5	26
10	28
15	30
20	32
25	34
30	36
35	38
40	40
45	42
50	44

APPENDICES 7.2: FENTON PRETERM GROWTH CHART-GIRLS



APPENDICES 7.3: FENTON PRETERM GROWTH CHART-BOYS



APPENDICES 7.4: SOME CAUSES OF FETAL GROWTH RESTRICTION