

Evaluation of ‘medically inaccurate’ statements/ Daniels/ The Informed Consent Project/ Rutgers University

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The following is a list of statements from the proposed Texas WRTK 2016 brochure that were found to be ‘medically inaccurate’ by our research team. Statements were rated as either ‘scientifically incorrect’ or ‘misleading’ (meaning ‘gives an incorrect impression’) by either a panel of specialists in human anatomy and by comparison to leading embryological textbooks. Each statement is followed by an excerpt, where available, of relevant statements from scientific sources. See reference list at end for full citations.

Weeks listed are ‘LMP’ (weeks since first day of ‘last menstrual period’)

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Week 4 The bone tissue is growing.

The ‘foreshadowing of bones’ appear, but no ‘bone tissue.’

...by the sixth week of development [8 weeks LMP] the first so-called hyaline cartilage models, foreshadowing the bones of the extremities, can be recognized.” (Langman’s, p. 130)

Week 4 Your baby’s brain and spinal cord begin to form

The ‘first indications’ of the nervous system and the primordia of the future brain appear.

“The neural tube differentiates into the central nervous system.” (Moore, p. 454)

“The first indications of the developing nervous system appear during the third week [5 LMP] as the neural plate and neural groove develop on the posterior aspect of the trilaminar embryo (Moore, p. 389). Neurulation--formation of the neural plate and neural tube--begins during the fourth week (6 LMP). At this stage, the cranial 2/3s of the neural plate and tube, as far caudal as the fourth pair of somites, represent the future brain (the primordia of which are the forebrain, midbrain, and hindbrain), and the caudal 1/3 of the plate and tube represents the future spinal cord.” (Moore, p. 391).

Week 4 The stomach and intestines are forming

The 'primordial gut' which will later develop into the stomach and intestines appears at 6 LMP.

The primordial gut forms during the fourth week (6 LMP) (Moore, 213). Initially, the distal part of the foregut is a tubular structure. During the fourth week, a slight dilation indicates the site of the primordium of the stomach (Moore, 215). As the midgut elongates, it forms ventral, U-shaped loop of intestine--the midgut loop--that projects into the remains of the extraembryonic coelom in the proximal part of the umbilical cord. The midgut loop of the intestine is a physiologic umbilical herniation, which occurs at the beginning of the sixth week (8 LMP). During the 10th week (12 LMP), the intestines return to the abdomen (Moore, p. 227).

As a result of the rapid growth and the simultaneous expansion of the liver, the abdominal cavity temporarily becomes too small to contain all the intestinal loops and they enter the extra-embryonic coelom in the umbilical cord during the sixth week of development [8 LMP]. (Langman's, p. 223).

Week 4 The heart begins to form

The primordial system that will later develop in to the heart begins to form:

The primordial heart and vascular system appear in the middle of the third week [5 weeks LMP] (Moore, p. 289)

Week 4 ...the length is less than 1/8 inch

Accurate size is approximately the period at the end of this sentence. Brochure does not provide visual representation of 'actual size' at any stage of development.

At implantation of the blastocyst (6 days), the actual size of the conceptus is 0.1 mm, approximately the size of the period at the end of this sentence. (Moore, page 42, Figure 3-1); Size at 14-15 days [4 LMP] is 0.2 mm (Langman's, p. 84)

Week 6 Brain activity can be recorded

No source confirms brain activity or recording of brain activity at this stage.

Week 6: ...the brain and spinal cord are completing development

The 'neural plate and tube' begin primordial stages of brain and spinal cord development:

"The first indications of the developing nervous system appear during the third week as the neural plate and neural groove develop on the posterior aspect of the trilaminar embryo (Moore, 389). Neurulation--formation of the neural plate and neural tube--begins during the fourth week (6 LMP). At this stage, the cranial 2/3s of the neural plate and tube, as far caudal as the fourth pair of somites, represent the future brain (the primordia of which are the forebrain, midbrain, and hindbrain), and the caudal 1/3 of the plate and tube represents the future spinal cord (Moore, 391)."(Moore, pp. 389 and 391)

Week 6 Eyes are present

Only the 'primordia' of the eye--the precursor to eye development--is present:

"The first evidence of eye development is at 22 days [5 weeks LMP] when optic grooves appear in the neural folds at the cranial end of the embryo." (Moore, 431).

Week 8 All essential organs have begun to form.

Primitive forms of organs have begun to develop out of three 'germ layers.'

"During these 5 weeks [6-10 weeks LMP], representing the major part of the embryonic period, all major organs and systems of the body form from the three germ layers." (Moore, p. 104).

Week 8 Facial features – the eyes, nose, lips, and tongue – continue to develop

The 'predecessors' to facial features begin development:

"The eye, auricular hillocks (primordia of the external ear), and external acoustic meatus (auditory canal) are now more obvious" (Moore Color Atlas p. 41) The formation of a primordial nose is not mentioned until 51 days from fertilization. (Moore's Color Atlas, p. 44)

"The eyelids develop during the sixth week from neural crest cell mesenchyme and from two folds of skin that grow over the cornea." (Moore, p. 502).

The tooth buds for permanent teeth that have deciduous predecessors begin to appear at about 10 weeks [12 LMP] from deep continuations of the dental lamina." (Moore, p. 522-3).

Week 8 The brain...begins to control organs.

Only the primordia of the brain is forming at this stage. No sources state when the brain "controls organs." Organs are still in primordial development:

During the 5th week (7 LMP), the forebrain partly develops into 2 secondary brain vesicles, the telencephalon and diencephalon; the midbrain does not divide; and the hindbrain partly divides into 2 vesicles, the metacephalon and myelencephalon (Moore, p. 404).

Week 8 Sex organs are beginning to form

Sexual differentiation occurs at 14 LMP:

"[in the eighth week] Although sex differences exist in the appearance of external genitalia, they are not distinctive enough to permit accurate sexual identification" (Moore, p. 100). [By] the 12th week [14 weeks LMP], external genitalia develop to such a degree that the sex of the fetus can be determined by external examination (ultrasound). (Langman's, p. 96)

Week 10: Your baby has his or her first spontaneous movements (movements that happen on their own)

Spontaneous movements occur, but are described as 'twitching:'

Movements begin at week 12 (14 LMP), but are usually not felt by the mother (Langman's, p. 98). Embryos in the sixth week (8 LMP) show spontaneous movements, such as twitching of the trunk and limbs (Moore, p. 80).

Week 10 Elbows are formed

Elbow structures are 'present,' but are not described as 'formed.'

At 50-56 days (10 LMP), limbs are long and upper limbs are bent at elbows. (Langman's, p. 84, Table 6.4)

Week 10 Fingernails appear

Fingernails are present at 26 LMP.

"...fingernails are present by 24 weeks (from fertilization) [26 LMP]" (Moore's Color Atlas, p. 57)

but also see: "early fingernail development" occurs at around 12 weeks LMP (Moore's Color Atlas, p. 52)

Week 10 *The external ears begin to take final shape*

"Auricular hillocks" are the external primordial ear, not the final ear shape:

"During the [9th week LMP] the auricular hillocks begin to enlarge, differentiate, and fuse to produce the definitive form of the auricle. As the face develops, the auricle is gradually translocated from its original location low on the side of the neck to a more lateral and cranial site." (Larsen's Essentials of Human Embryology, p. 264)

Week 12 *The fibers that carry pain to the brain are developed.*

See review of scientific studies which evaluate (and refute) fetal pain before the 3rd trimester:

Lee SJ, Ralston HJ, Drey EA, Patridge JC, Rosen MA. Fetal Pain: A Systematic Multidisciplinary Review of the Evidence. JAMA 2005; 294(8):947-954.

Week 12 *All the body parts and organs are formed.*

No source described body parts and organs as 'formed.'

"By the end of this period, the main organ systems have started to develop." (Moore, p. 71).

Week 12 *...the neck lengthens.*

No sources describe the neck 'lengthening' at this stage:

[in a chart at 12 weeks/14 weeks LMP] Well-defined neck. (Moore, p. 109).

Week 12 Fingernails appear.

Fingernails are present at 26 LMP:

"...fingernails are present by 24 weeks (from fertilization) [26 LMP]" (Moore's Color Atlas, p. 57)

but also see: "early fingernail development" occurs at around 12 weeks LMP (Moore's Color Atlas, p. 52)

Week 14 The length is about 3 1/2 inches long from head to bottom

120mm (Moore p. 109) [or 4.7 inches]

Week 14 Your baby's mouth makes sucking motions

Sucking movements begin at 24 weeks (26 LMP) (Langman's, p. 99 (Table 8.2)).

Week 14 Hiccup movements are present

Hiccup movements begin at 16 LMP, but typically do not occur until the end of the 2nd or 3rd trimester (see Kurjak, p. 80).

Week 16 Hand-to-face movements are common.

Hand-to-face movements are not described as 'common' in any source:

Hand-head contact may "appear from 10th week (12 LMP) onwards and at first they usually represent an accidental contact of a hand with the face or mouth" (Kurjak, p. 653).

Week 18 Your baby's arms and legs begin to punch and kick

No source described the fetus as 'kicking and punching,' although they affirm fetal movements:

...fetuses at 18-20 weeks [20-22 LMP] performed slow and harmonious movements with isolated leg movements..." (Kurjak, p. 583)

[Seventeen to Twenty Weeks] The limbs reach their final relative proportions and fetal movements – quickening – are commonly felt by the mother. (Moore, p. 112)

Week18 Your baby is about 5 1/2 inches long from head to bottom

Correct average size is longer:

Correct average size is 7 ½ inches (Langman's p. 96, Table 8.1).

Week 18 The skin is wrinkled

Skin is described as 'wrinkled' at 22-24 LMP. In addition, this information is not provided:

"The skin is now covered with a greasy, cheese-like material—vernix caseosa." (Moore, on line, Loc 3107)

The fetuses are usually completely covered with fine downy hair—lanugo—that helps to hold the vernix caseosa on the skin." (Moore, on line, Loc 3126)

"The fetus is covered with fine hair, called lanugo hair..." (Langman's, p. 97.)

Week 20 In consideration of the potential for fetal pain, Texas limits abortion to under 20 weeks.

[note: this statement appears in the 'preface' to fetal development section in brochure.]

See review of scientific studies which evaluate fetal pain before the 3rd trimester:

Lee SJ, Ralston HJ, Drey EA, Patridge JC, Rosen MA. Fetal Pain: A Systematic Multidisciplinary Review of the Evidence. JAMA 2005; 294(8):947-954.

Week 20 Your baby is more active...including turning side to side and front to back

No source described turning from side to side or front to back at this stage.

Week 20 The structures of the ears are well-developed.

No source described ear structure as 'well-developed' at this stage of development.

Week 20 Ovaries containing eggs have formed in females

Primordial ovarian development has occurred, but is not described as 'formed.'

By 18 weeks [20 LMP] the uterus is formed and canalization of the vagina has begun. By this time many primordial ovarian follicles containing oogonia have formed

Week 20 ...testes begin to descend in males

Development at 22 LMP, but testes still located on 'abdominal wall:'

By 20 weeks [22 LMP] the testes have begun to descend, but they are still located on the posterior abdominal wall, as are the ovaries in female fetuses. (Moore, 113)

Week 20 Meconium...begins to form....This will be the baby's first bowel movement.

No source described this as source of 'first bowel movement.'

The bile entering the duodenum through the bile duct after the thirteenth week gives the meconium (intestinal contents) a dark green color." (Moore, p. 279)

Week 22 ...eyes are fully functional

No source described the eyes as 'fully functional' at 22 LMP.

Week 24 The inner ear has reached adult size.

No source described inner ear in size relative to 'adult size.'

Week 26 Your baby's lungs are now fully formed.....

Lungs are described as 'still immature:'

"Although a 22- to 25- week [24-27 LMP] fetus born prematurely may survive if given intensive care..., it may die because its respiratory system is still immature." (Moore, p. 113)

[Twenty-six to Twenty-Nine Weeks] "The lungs and pulmonary vasculature have developed sufficiently to provide adequate gas exchange." (Moore p. 114)

Week 26 The lines on the skin of the fingers (fingerprints), toes, palms of the hands and soles of the feet are now formed.

'Ridges,' which will become toe/fingerprints, develop:

"At the end of the fourth month the epidermis acquires its definitive arrangement and four layers can be distinguished. The basal layer...later forms ridges and hollows, which are reflected on the surface of the skin in the fingerprint." (Langman's, p. 315)

Week 28: The lungs... are fully formed...

Lungs are able to permit survival, but are not described as 'fully formed:'

"The lungs and pulmonary vasculature have developed sufficiently to provide adequate gas exchange." [Twenty-six to Twenty-Nine Weeks] (Moore p. 114)

"By the end of the seventh month [30 LMP], sufficient numbers of mature alveolar sacs and capillaries are present to guarantee adequate gas exchange, and the premature infant is able to survive." (Langman's, p. 205, Fig. 14.9)

Week 28: The ...digestive system [is] fully formed...

No source described the digestive system as 'fully formed' at 28 LMP.

Week 28 Your baby's brain is fully formed

No source described the brain as 'fully formed' at 28 LMP.

Week 32 Toenails and fingernails start to grow

Toenails and fingernails begin to grow at 26 LMP:

The fingernails reach the fingertips by approximately 32 weeks (34 LMP); the toenails reach the toetips by approximately 36 weeks (38 LMP) (Moore, 9th ed, 460). Between 26-29 weeks [28-31 LMP], the toenails become visible (Moore, 7th ed, 107)

Week 34 Your baby is active (moving) 60 percent or more of the time.

No source described fetal activity in terms of percentage of active time.

References

Kurjak and Chervenak, *Donald School Textbook of Ultrasound in Obstetrics and Gynecology*, Jaypee Brothers Medical Pub. 2011, 3rd Ed)

Larsen, William James, *The Essentials of Human Embryology*, (Churchill Livingstone Inc. 1998)

Moore, Keith, et. al. *Color Atlas of Clinical Embryology* 2nd edition (Pub: Saunders, 2000)

Moore, Keith, TVN Persaud, and Mark G. Torchia, *The Developing Human: Clinically Oriented Embryology*, 9th Edition, (Elsevier, 2013)

Sadler, T.D., *Langman's Medical Embryology* 12th Edition (Lippincott, Williams and Wilkins, 2012)