
EMBRYOGENESIS AND HUMAN DEVELOPMENT IN THE FIRST FORTY DAYS

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I. Introduction.

The Qur'anic passages indicate that human development goes through various successive stages:

«وَقَدْ خَلَقَكُمْ أَطْوَارًا» (سورة نوح 71: آية 14)

“It is He Who has created you in diverse stages.” (Surah Nūḥ, 71: Āyah 14)

«يَخْلُقُكُمْ فِي بُطُونِ أُمَّهَاتِكُمْ خَلْقًا مِّن بَعْدِ خَلْقٍ فِي ظُلُمَاتٍ ثَلَاثٍ» (الزمر: آية 6)

“He makes you in the wombs of your mothers in stages, one after another, in three veils of darkness...” (Surah Az-Zumar, 39: Āyah 6)

The aḥādīth (plural form of “ḥadīth”) of the Prophet determine that the 7th week of development represents a distinct point in the embryo's life and describe its form in the first 40 days and the shape it acquires later.

The Prophet had indicated the details of each stage. This paper reviews the aḥādīth which describe the embryo in the first 40 days. The paper also reviews the views of Muslim scholars in the light of philology, semantics, and the principles of religious text exegesis. Then, the relevant established scientific facts are underlined and the miraculous aspect of the aḥādīth highlighted.

II. The first 40 days.

The Prophet describes the first 40 days in the following ḥadīth, narrated by ‘Abdullah Ibn Mas‘ūd:

«عَنْ عَبْدِ اللَّهِ بْنِ مَسْعُودٍ رَضِيَ اللَّهُ عَنْهُ – قَالَ حَدَّثَنَا رَسُولُ اللَّهِ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ – وَهُوَ الصَّادِقُ الْمَصْدُوقُ، قَالَ: إِنَّ أَحَدَكُمْ يُجْمَعُ خَلْقُهُ فِي بَطْنِ أُمِّهِ أَرْبَعِينَ يَوْمًا، ثُمَّ يَكُونُ فِي ذَلِكَ عِلْقَةً مِثْلَ ذَلِكَ، ثُمَّ يَكُونُ مُضْغَةً فِي ذَلِكَ مِثْلَ ذَلِكَ، ثُمَّ يَبْعَثُ اللَّهُ مَلَكًا يُؤَمِّرُ بِأَرْبَعِ كَلِمَاتٍ، وَيُقَالُ لَهُ: اكْتُبْ عَمَلَهُ وَرِزْقَهُ وَشَقِيًّا أَوْ سَعِيدًا، ثُمَّ يَنْفَخُ فِيهِ الرُّوحَ» (أَخْرَجَهُ الْبُخَارِيُّ وَمُسْلِمٌ وَاللَّفْظُ لَهُ، وَأَبُو دَاوُدَ وَالتِّرْمِذِيُّ وَابْنُ مَاجَةَ وَعَبْدُ الرَّزَّاقُ فِي مَصْنَفِهِ وَأَحْمَدُ فِي الْمَسْنَدِ مِنْ طَرِيقٍ أُخْرَى وَأَبُو نَعِيمٍ فِي الْحَلِيَّةِ)

“The Prophet (peace be upon him), the truthful and trusted, told us, ‘In every one of you, all components of your creation are collected together in your mother’s womb by 40 days, and in that it is an ‘alaqah like that, then in that it is a muḍghah like that. Then God sends an angel ordered with four instructions. He is told to record his (the human being now developing) deeds, his provision (future benefits), whether he will be miserable or happy, and then the spirit is breathed into him (the soul is acquired).” (narrated by Muslim, Al-Bukhārī, Abū Dawūd, At-Tirmidhī, Ibn Mājah, Aḥmad, ‘Abdur-Razzāq, and Abū Na‘īm)¹

The preceding ḥadīth indicates two facts:

1. The components of human creation are collected together in the first 40 days.
2. The first stages of development, i.e., nuḥfah, ‘alaqah, and muḍghah are formed and completed during this period (the first 40 days).

¹ روى أبو عوانة الحديث بإدراج لفظ “نطفة” بعد قوله “أربعين يوماً” أي أن روايته هي: “إن أحدكم يُجمع خلقه في بطن أمه أربعين يوماً نطفة”، إلا أن هذه الرواية ضعيفة السند، كما أن هذا اللفظ المدرج لا أصل له في جميع روايات البخاري ومسلم ولا حتى في غيرهما من الروايات في كتب الأصول. (فتح الباري: 479/11-481)

This ḥadīth had been narrated also by Abū ‘Awānah, but with the insertion of “nuḥfah” after “40 days,” and it reads: *“In every one of you, all components of your creation are collected together in your mother’s womb by 40 days as a nuḥfah...”* However, this version has a nonauthentic chain of narrators, and all authentic versions do not have this addition. (See *Faṭḥ Al-Bārī*, vol. 11, pp 479-481)

A. The collection of components (jam' al-khalq).

The Prophet described the embryo in the first 40 days in the ḥadīth narrated by Ibn Mas'ūd:

"In every one of you all components of your creation are collected together in your mother's womb by 40 days..."

The version of this ḥadīth related in Ṣaḥīḥ Al-Bukhārī is the same except it is without the phrase "in that."

Embryology has established that in the 5th week, the embryo acquires a characteristic "C"-shaped curvature, its size does not exceed 0.5 inch, its upper part is two-thirds of its total size, it acquires limb buds, and it has a tail and a primitive heart which beats regularly. The upper limbs appear during the 4th week. In the beginning of the 5th week, they look like a paddle. However, the upper limbs begin, by the end of the 5th week, to show some regional differentiation as the hand plates develop and show finger rays (Figure 7-1).

By the end of the 6th week, before the 42nd day, the face is neither distinct nor looks human (Figure 7-2).

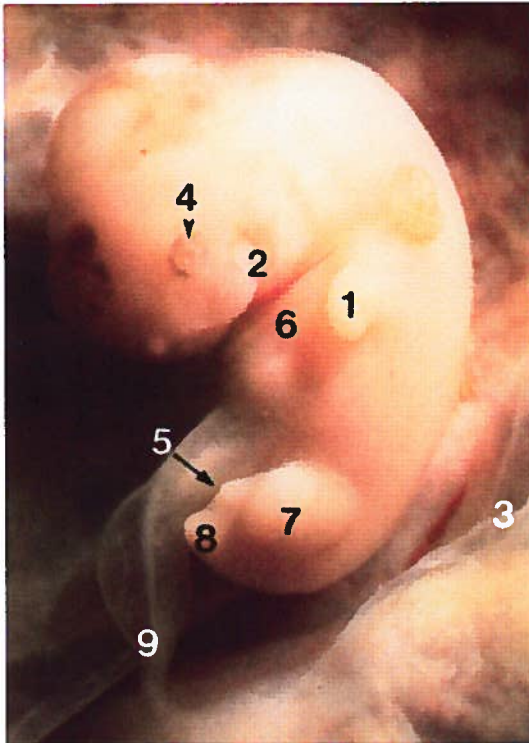


Figure 7-1. Embryo at 6 weeks (Day 34-36) attached by the umbilical cord to the early membranes. The size is 12 mm from crown to rump. 1, arm bud. 2, branchial arches. 3, early membranes. 4, eye. 5, genital tubercle. 6, heart bulge. 7, leg bud. 8, tail. 9, umbilical cord. (Reproduced with permission from England, *Color Atlas of Life Before Birth*, Chicago, Year Book Medical Publishers Inc., 1983)

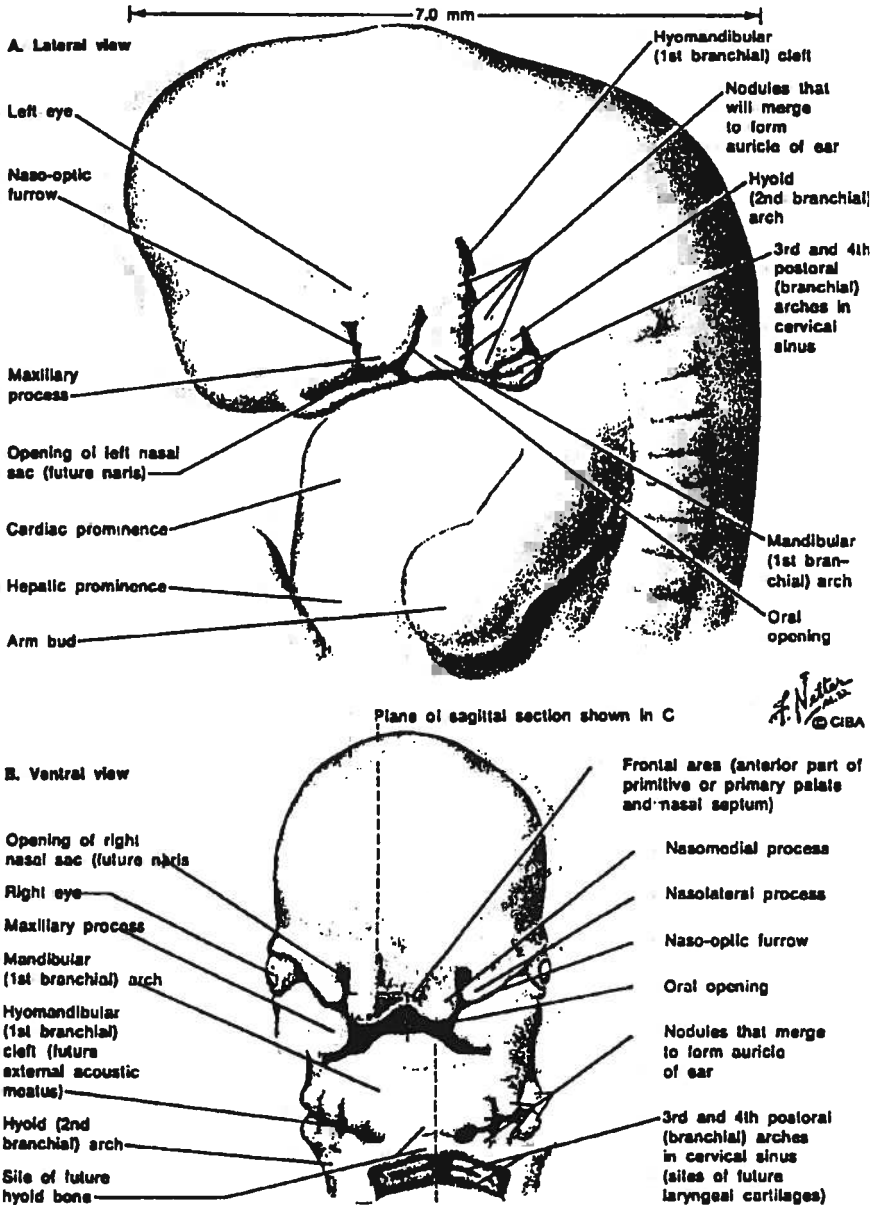


Figure 7-2. Drawing of embryo at 6 to 7 weeks. The appearance at this time cannot be clearly distinguished as that of a human embryo. (Reproduced with permission from CIBA, *Clinical Symposia*, vol. 28, No. 3)

Before the 40th day, the embryo has primitive eyes, ears, and genitalia that are functionless and do not look human. However, during the 4th week the eyes start to develop; optic vesicles form, and then the optic cups are shaped which leads to lens formation before the end of the 5th week. The retina, then, starts to differentiate, and optic fibers appear which lead to the formation of the optic chiasma.

In the beginning of the 5th week, the inner ears start to develop from a thickened plate of surface ectoderm, the otic placode. Each placode soon invaginates and sinks below the surface ectoderm into the underlying mesenchyme to form an otic pit. Ears, at this initial stage, have no human appearance.

This description of the conceptus' development is consistent with the phrase "all components of your creation" in the ḥadīth narrated by Ibn Mas'ūd, for this phrase describes the external "C"-like appearance as well as the internal anatomy of the embryo, where the body organs and systems are collected in their primitive forms inside this small mass.

Hence, the above-mentioned term expresses accurately the anatomical aspect of the embryo.

B. Stages of the embryo in the first 40 days.

1. Nuṭfah Stage.

In very early development, one observes fusion of not only the male and female genomes, but intermingling of fluid. The existence of a fluid milieu is consistent with very recent observations that mitochondrial DNA is transferred from oocyte cytoplasm to offspring, male or female; such transfer must take place within fluid media.

Therefore the beginning of this stage is formed from a nuṭfah of two fluids intermingled in a fluid milieu. This stage lasts for the first 6 days of conception. Then it transforms into the 'alaqah stage.

In addition to sperm, egg and zygote existing within solutions, fluid filled structures also exist in later embryonic development. In the morula, multiple cells develop within a fluid milieu. Furthermore, all this is occurring within the fluid-filled Fallopian tubes. The nuṭfah also continues its development in the uterus in a fluid milieu.

Following implantation on day 6 or so, the embryo burrows under the surface of the endometrium. Thus the nuṭfah stage is

completed in around day 14 of fertilization, taking its share of the first 40 days (See Chapter 2, “The Nuṭṭah Stage”).

2. ‘Alaqah Stage.

After the nuṭṭah stage, cells continue to accumulate. The embryo becomes more solid as more and more cells begin to accumulate, later indenting as the neural fold develops. At this stage, about 21 days of age, the embryo bears the analogy to a leech-like structure (See Chapter 4, “Alaqah and Muḍghah Stages”). It is attached to the placenta and has the shape of a leech. Blood islands in the embryo’s blood vessels give it the color of a piece of congealed blood. In this manner, the ‘alaqah stage takes its share of the first 40 days.

The following phrase from the Qur’ān refers to this process:

«ثُمَّ خَلَقْنَا النُّطْفَةَ عَلَقَةً» (سورة المؤمنون 23: آية 14)

“Then we made the nutfah into a leech-like structure (‘alaqah)” (Surah Al-Mu’minūn, 23: Āyah 14).

3. Muḍghah Stage.

This stage begins with the formation of body masses, or somites, on day 24 or 25, at the upper part of the embryo, and continue to form gradually to its tail.

Later somites will form the backbone of the embryo. By 28 days after conception, the embryo consists of various somites. Indentations are identified between somites, and with these indentations, the embryo resembles a chewed substance like gum in external appearance (Figure 7-3). Gradually, the muḍghah attains a size of about 1 cm, the smallest chewable size. With this development, the muḍghah stage completes the rest of the first 40 days.

Gradually the embryo acquires the muḍghah shape which applies with the Qur’anic description:

«فَخَلَقْنَا الْعَلَقَةَ مَضْغَةً» (سورة المؤمنون 23: آية 14)

“Then of that leech-like structure (‘alaqah) is made a chewed substance (muḍghah)” (Surah Al-Mu’minūn, 23: Āyah 14).

This stage is completed by the end of the 6th week. During the 7th week, the embryo gradually acquires a human appearance as the skeleton develops.

C. Timetable.

In review, then, each of the three stages - nuṭṭah, ‘alaqah,

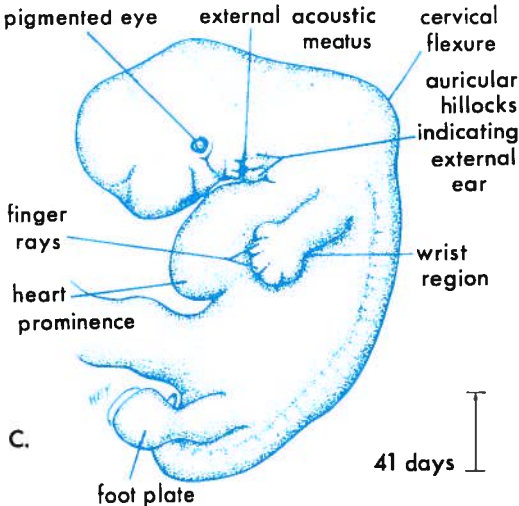
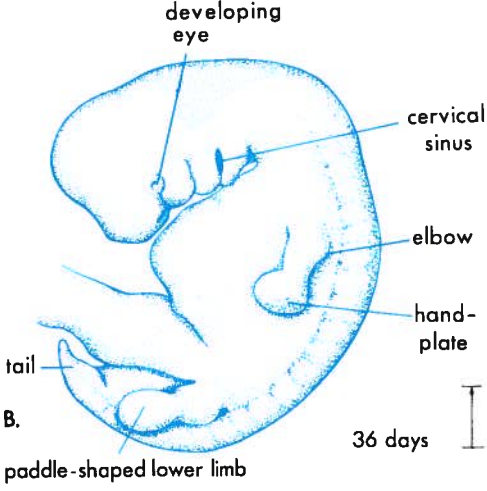
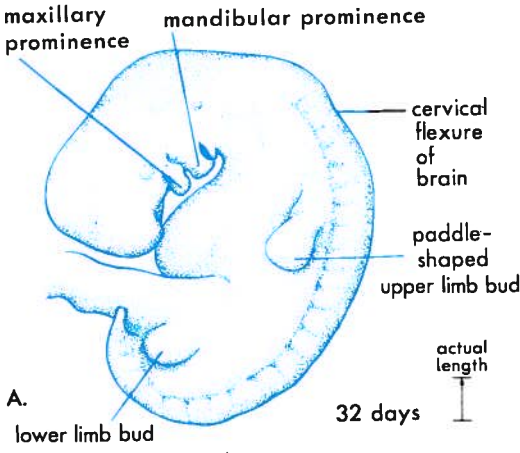


Figure 7-3. Drawings of lateral views of embryos in the mudghah stage during the 5th and 6th weeks of development. All the early components have been collected together and are in bud form by 40 days. (Reproduced with permission from Moore, K.L., *The Developing Human, Clinically Oriented Embryology*, 4th ed., Philadelphia, W.B. Saunders Co., 1988)

muḍghah - is accomplished within the first 40 days. By the end of this period, the embryo resembles a chewed-like structure which does not resemble a human being. Thereafter bones are laid down. By day 45, organogenesis is essentially completed. Cell division obviously still proceeds, with fine tuning of differentiation. However, major steps in differentiation have been completed by 40-45 days.

III. Controversial understanding of the preceding ḥadīth.

Controversy had arisen among ancient Muslim scholars concerning the understanding of the above-mentioned ḥadīth narrated by Ibn Mas‘ūd. They differed on defining the timetable of the nuṭfah, ‘alaqah and muḍghah stages. Was it 40 days for each stage, or for the three stages in total?

Some interpreted this ḥadīth as meaning that the nuṭfah, ‘alaqah and muḍghah stages occur in sequential 40 day intervals. They understood that “like that” referred to the period of 40 days, thus concluding that the completion of the muḍghah stage occurs only after 120 days.

A. Linguistic resolution of conflict.

Once the various relevant texts are compiled, compared, scrutinized and studied, several reasons can be identified that make the 120 day interpretation incorrect:

1. The ḥadīth narrated by Ibn Mas‘ūd has been reported by Muslim and Al-Bukhārī, but Muslim’s version inserts “in that” in two places; between “and” and “it is an ‘alaqah” and between “then” and “it is a muḍghah”. This addition is acceptable and considered as part of the preceding ḥadīth. On this basis, the complete version of the ḥadīth will be as that reported by Muslim:

“In every one of you all components of your creation are collected together in your mother’s womb by 40 days and in that it is an ‘alaqah like that...”

2. The Qur’ān indicates that the bones begin to form after the muḍghah stage:

“We changed the muḍghah into izam (bones)” (Surah Al-Mu’minūn, 23: Āyah 14)

The Prophet states in the ḥadīth narrated by Ḥudhayfah that the bones begin their formation immediately after 42 days from the beginning of the nuṭfah formation. This ḥadīth states:

«إِذَا مَرَّ بِالنُّطْفَةِ ثِنْتَانِ وَأَرْبَعُونَ لَيْلَةً بَعَثَ اللَّهُ إِلَيْهَا مَلَكًا فَصَوَّرَهَا، وَخَلَقَ سَمْعَهَا وَبَصَرَهَا، وَجَلَدَهَا، وَلَحَمَهَا وَعِظَامَهَا...» (أَخْرَجَهُ مُسْلِمٌ وَأَبُو دَاوُدَ وَالطَّبْرَانِيُّ وَالسَّيُوطِيُّ وَجَعْفَرُ الْفَرِيَابِيُّ وَذَكَرَهُ ابْنُ حَجْرٍ فِي الْفَتْحِ)
“If forty-two nights have passed over the conceptus, God sends an angel to shape it and create its hearing, sight, skin, muscles and bones....” (narrated by Muslim, Aṭ-Ṭabarānī, Abū Dawūd, and Ja‘far Al-Firyābī in *Faṭḥ al-Bārī*, vol. 11, p 484) (1).

To say that the bones are formed after 120 days would be in contradiction with the apparent meaning of the ḥadīth narrated by Ḥudhayfah.

3. Modern, well-established and conclusive embryological studies have proven that osteogenesis begins immediately after the 6th week, and not after the 17th week, as was previously believed. This substantiates the evident and explicit meaning of this ḥadīth. Hence, “like that” in the ḥadīth narrated by Ibn Mas‘ūd cannot refer to similarity with regard to the period of 40 days (2).

To reconcile the various relevant aḥādīth, we can say that since the demonstrative article “like that” can refer to one of three events already mentioned in the ḥadīth; namely i) the collection of the components of creation; ii) the mother’s womb; and iii) 40 days. Therefore “that” is collective and should be understood according to its indications and the manifest meanings of the other passages.

The ḥadīth of Ḥudhayfah, mentioned above, prevents us from interpreting “like that” as referring to “40 days,” since the rule of shariah principles is that the collective meaning should be understood according to a detailed, manifest meaning in another version.

The demonstrative article cannot refer to “the mother’s womb,” since its repetition is meaningless. Otherwise, the text would read as follows:

“In every one of you, all components of your creation are collected together in your mother’s womb by 40 days, then in that womb it is an ‘alaqah like that, then in that womb it is a muḍghah like that.” The repetition of the word “womb” is inconsistent with the Prophet’s eloquence.

Since the demonstrative “that” refers neither to “40 days” nor to “mother’s womb,” it refers then to the collecting together of the

components of creation. This conclusion had been determined by the 7th century AH Muslim scholar, Ibn Az-Zamlakānī,² who reached the conclusion that the stages of nuṭfah, ‘alaqah, and muḍghah were completed during the first 40 days. He said:

قال ابن الزملاكاني: «وأما حديث البخاري فَمُنزَلٌ عَلَى ذَلِكَ، إِذْ مَعْنَى "يُجْمَعُ فِي بطنِ أُمِّهِ" أَي يُحْكَمُ وَيُتَقَرَّنُ، وَمِنْهُ رَجُلٌ جَمِيعٌ أَي مُجْتَمِعُ الخَلْقِ».

“The ḥadīth of Al-Bukhārī (mentioned through ‘Abdullah Ibn Mās‘ūd) should be understood according to the rule above. Thus, the meaning of being collected in the mother’s womb means being perfected and established. As an example we say that a ‘collected man’ has his personality gathered to a high standard” (4).

Ibn Az-Zamlakānī also stated:

وقوله: «ثُمَّ يَكُونُ عِلْقَةً مِثْلَ ذَلِكَ» أَي ثَمَّ إِنَّهُ فِي الأربَعينِ المذكَورَةِ يَكُونُ عِلْقَةً تامَةً الخَلْقِ، متقنَةً محكمةً الإحكامَ الممكنَ لها، الذي يليقُ بِنِعْمِهِ، فهما متساويان في مُسَمَّى الإِتقانِ والإحكامِ لا في خصوصهِ، ثَمَّ إِنَّهُ يَكُونُ مُضغَةً في حَصَّتِها أيضاً من الأربَعينِ، محكمةً الخَلْقِ مثلما أَنَّ صُورَةَ الإنسانِ محكمةٌ بعدَ الأربَعينِ يوماً، فنصب "مثلَ ذلك" على المصدرِ لا على الظرفِ، ونظيرُهُ في الكلامِ قولك: إنَّ الإنسانَ يَتَغَيَّرُ في الدُّنيا مُدَّةَ عُمُرِهِ، ثَمَّ تَشْرَحُ تَغْيِيرُهُ فتقول: ثَمَّ إِنَّهُ يَكُونُ رُضيعاً، ثَمَّ فَطيماً، ثَمَّ يافعاً، ثَمَّ شاباً، ثَمَّ كهلاً، ثَمَّ شيخاً، ثَمَّ هرمًا يتوفاهُ اللهُ بعدَ ذلكَ، وذلكَ من بابِ ترتيبِ الإخبارِ عن أطواره التي ينتقلُ فيها مُدَّةَ بقائه في الدنيا». (البرهان: 275)

“In that it is an ‘alaqah like that’ means that in the aforementioned 40 days, the conceptus will be an ‘alaqah which is completely and perfectly formed within the perfection which is possible for it. Thus [the descriptions of collecting the components together and of the ‘alaqah and muḍghah] are equal in [referring to] their completion in general and not in particularities. ‘In that it is a muḍghah like that’ means that in its own share of the 40 days the muḍghah is also completely formed as the complete human being is formed. Here we define the name rather than its temporal meaning, just as it can be said that a man changes during his life as in, ‘then he becomes an infant,

² His full name is Kam āl ‘Abdul-Wahid Ibn ‘Abdul-Karim Az-Zamlakānī (d. 651 AH; 1253 AD), and he wrote *Al-Burhān al-Kāshif ‘An I’jāz al-Qur’ān* (3).

then he is weaned, then he is a child, then he is a youth, then he becomes middle-aged, then he becomes an old man, and then he dies by God's will.' This is an arrangement of events according to the stages which a man passes through during his life." (5)

It is known that in the Arabic language, the word *thumma* (then) indicates the sequence and the delay of events before and afterwards, unless there is an indication to the contrary, as the Qur'ān indicated in Surah Al-An'ām, 6: Āyāt 153, 154:

«ذَلِكُمْ وَصَّاكُم بِهِ لَعَلَّكُمْ تَتَّقُونَ ، ثُمَّ آتَيْنَا مُوسَى الْكِتَابَ ..» (الأنعام : آيتا 153, 154)
 "...Thus doth He command you, that ye may be righteous. Moreover, We gave Moses The Book..." Here *thumma* has been translated as "moreover".

Therefore, the meaning of the ḥadīth must be, "In every one of you, all components of your creation are collected together in your mother's womb by 40 days and in that (in this period of time) it is an 'alaqah (a collected and completed creation as determined for it) like that (just like the collection of your components in 40 days), then in that (in the same 40 days) it is a mudghah (a collected and completed creation as determined for it) like that (just like the collection of your components in 40 days)."

With this reconciliation of the texts the controversy is resolved. The meaning of "and in that it is an 'alaqah like that" is that it is a fully developed and perfected 'alaqah, and similarly, the mudghah is fully developed and perfected, in a manner for both that befits His favors.

IV. Scientific aspects of the first forty days.

A. The collection of the components.

It is related in the ḥadīth, "...all components of your creation are collected together in your mother's womb by 40 days." It is evident from this that the components of the human creation are collected in 40 days. It is now known in the field of embryology that all the organs are created during the first 40 days and are all collected together in the embryo with the end of the 40 days. All the organs and the systems are collected in the form of buds in a space of not more than 1.0 cm. The fetus is collected around itself in the form of an arc (Figure 7-4).

B. "...And in that it is an 'alaqah like that":

The embryo becomes a completed 'alaqah in the 40 days as determined for it, just like the collection of the components during this

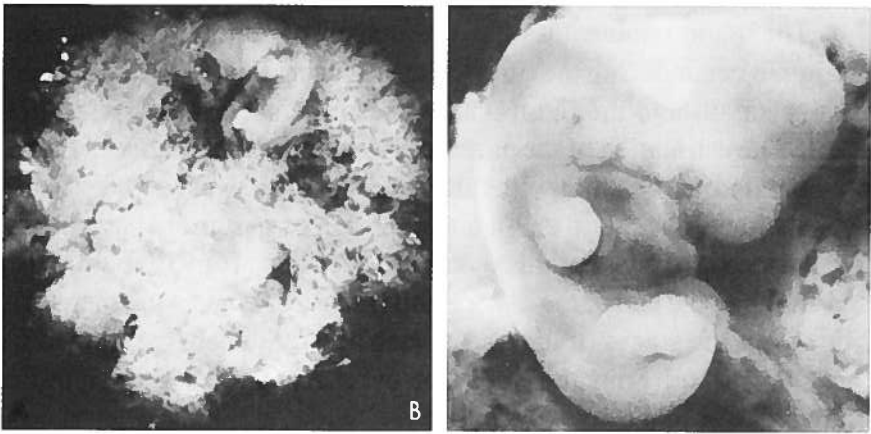


Figure 7-4. A, Photograph of an embryo in its amniotic sac, exposed by opening the chorionic sac (x 2). B, Higher magnification of the 12 mm (crown-rump length) embryo during the mudghah stage (41 to 42 days) (x 6). The embryo has an arc shape and the organ components are collected together during this stage. The cerebral vesicles, or primordia of the cerebral hemispheres, are especially prominent. (Reproduced with permission from Moore, K.L., *The Developing Human, Clinically Oriented Embryology*, 4th ed., Philadelphia, W.B. Saunders Co., 1988)

period as explained earlier. Modern science accepts that between days 15-24 the conceptus is in the shape of an ‘alaqah (leech) which lives in the water and attaches to animals (See Figures 4-2, 4-3 and 4-4, Chapter 4, “‘Alaqah and Muḍghah”).

C. “...Then in that it is a mudghah like that”:

This statement in the ḥadīth accurately defines the stage following that of the ‘alaqah. Specifically, the muḍghah stage develops gradually until it takes a curved shape and is characterized by indentations (somites) similar to those resulting from teeth imprints and by an irregular surface (See Figures 7-3, 7-4, and 4-6, Chapter 4). The appropriateness and accurateness of applying the term muḍghah, which is given in the Qur’ān and Sunnah, to the embryo is clearly indicated, although its size is not more than 1.0 cm. As mentioned in a previous presentation (6), in describing this stage, “The main organs start to differentiate inside. The cavities between the body masses produce a shape similar to a chewed mass (muḍghah) and gradually the embryo takes the shape of muḍghah.”

D. Sensitivity of timing and staging.

The ḥadīth indicates that the stages of nuṭfah, 'alaqah and muḍghah occur during the first 40 days. During this time, the embryo is very small, and the durations between the successive stages are short. The estimation of the embryo's age before the discovery of the ovum and its association with the menstrual cycle was very difficult, and error could result in an underestimation of gestational age by up to 21 days, since conception could have occurred at any time from the beginning to the end of the *tuhr* period (interval between the menses). Moreover, the stages of nuṭfah, 'alaqah and muḍghah, mentioned in the Qur'ān and Sunnah, were not even recognized by scientific knowledge at that time.



REFERENCES

1. Muslim, *Ṣaḥīḥ Muslim*, Kitāb Al-Qadr, vol. 4, p 2037, Ḥadīth No. 2645. Muslim also reports another chain of narration from Ḥudhayfah, Aṭ-Ṭabarānī, *Al-Mu'jam al-Kabīr*, vol. 3, p 198, Ḥadīth No. 3044, Abū Dawūd, *Kitāb al-Qadar*, pp 44-45, and Ja'far Al-Firyābī in Ibn Ḥajar's *Al-Fath*, vol. 11, p 483.
2. Al-Jamal, *Ḥāshiyat al-Jamal 'Ala Tafsīr al-Jalālayn*, vol. 3, p 185.
3. Az-Zamlakānī, Kamal 'Abdul-Waḥid Ibn 'Abdul-Karīm, *Al-Burhān al-Kāshif 'An I'jāz al-Qur'ān*.
4. Shaykh 'Abdul-'Aziz Bin Bāz said, "It is mentioned in Ash-Shafā'ah ḥadīth in the talking of Ḥasan Al-Baṣrī, 'He told us that twenty years ago, at that time he was a collected person.'" See *Fath al-Bārī*, vol. 13, p 474.
5. Az-Zamlakānī, Kamal 'Abdul-Waḥid Ibn 'Abdul-Karīm, *Al-Burhān al-Kāshif 'An I'jāz al-Qur'ān*, p 275.
6. "The first forty days of embryogenesis", presented by Joe Leigh Simpson in the *8th Saudi Medical Conference*, Oct. 30 - Nov. 3, 1983.