



Breastfeeding? Babies can do it in their sleep!

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Throughout recent history, infant feeding practices have evolved based on cultural beliefs, medical advice, and scientific understanding of newborn needs. One of the most significant debates in this evolution has been the contrast between **demand** or **baby-led feeding**—allowing a baby to breast or bottle-feed whenever they show signs of hunger—and **scheduled feeding**, which often follows a strict three-hourly timetable. To follow a baby-led approach, mothers are taught to breastfeed their babies when they cue or move in ways that indicate that they are ‘awake, alert, hungry and ready’ for a feed... a calm, neonatal awake state is believed to be “the window of optimal arousal when babies are ready to learn”.¹

Today mothers are very often taught to initiate breastfeeding when the baby is in a calm alert state of readiness. In this article, first we show the need to challenge this received idea and highlight its deleterious effect on exclusive breastfeeding rates. Then, using research evidence, we explain links between the sleeping foetus who develops sucking and swallowing competencies and the sleeping neonate who builds upon them to learn breastfeeding skills. We introduce the concept of the ‘wombling’, a foetus who is now outside the womb, but fundamentally the same. We have chosen the term ‘wombling’ to suggest a baby still very much in the rhythm of the womb world. We conclude that the ‘window of optimal arousal’ for nurturing and breastfeeding occurs during light/REM sleep and drowsy sleep. Don’t wake the baby! The watchword is ‘continuity’ of sleep states from womb to world.

The Baby Friendly Initiative (BFI)² created in 1992, proposed 10 steps to successful breastfeeding. These became crucial to implement the revised 2001 WHO recommendations: exclusive breastfeeding (EBF)

for the first six months, continuing for up to two years and beyond. Today the BFI 10 steps guide breastfeeding initiation in many European countries but few mothers continue to breastfeed exclusively beyond two months and around one third of European mothers supplement with formula milk whilst in the maternity hospital. For example, let's focus upon data for Norway, Germany and Sweden. These countries are often cited as models for the success of the BFI support protocols because they have high rates of EBF at birth (98%, 97% and 94% respectively). However, a shocking number of these babies (30%, 11% and 14% respectively) are topped up with artificial milk in hospital. As could be expected, this downward trend continues and at two months, there is a sharp decline in exclusive breastfeeding (with only 73%, 68%, 64% respectively still exclusively breastfeeding). Far from achieving the WHO recommendations, Norway's 17% exclusive breastfeeding rate at 6 months is the highest in Europe.^{4,5}

The situation in England is another case in point. The BFI 10 steps have controlled breastfeeding support since the early 1990s. Today, even though 73% of mothers initiate breastfeeding at birth, only 37% are breastfeeding exclusively at two months. Notably, one third of these UK mothers feel compelled to top up their babies with artificial milk during the first week.³ The UK national [infant feeding survey](#) (2010) reported that mothers who breastfeed exclusively during the first week are 30% more likely to continue breastfeeding exclusively into the second week. These statistics suggest an urgent need to challenge current BFI best practice and revise our breastfeeding support strategies.

Since 2014, baby-led or demand feeding is often called responsive feeding.^{6,7} However, the age-old question remains unchanged: most mothers ask: "When and how often should I feed my baby?" A [popular poster](#)⁸ illustrates the typical feeding guidance, using photos of babies lying on their backs. The first line portrays 'hungry' babies who stir, bring a hand to their mouths, turn their heads from side to side, and open their mouths. In the second line, we see 'really hungry' babies who open their mouths even wider, stretch, make isolated arm, leg or finger movements and grimace. Health professionals suggest that these movements are 'feeding cues'. As soon as babies make these movements, mothers are taught that they are 'ready' to feed.

In this article, we argue that the newborn baby breastfeeds optimally in sleep states and that the term 'ready' is inaccurate. Expecting the newborn to be in an early awake state limits breastfeeding opportunities and prevents babies from ingesting their full amount of colostrum. Responsive feeding often delays breastfeeding initiation: most babies transition quickly to an agitated awake state (fussy) and then cry. These behaviours are often labelled 'breast fighting', or 'breast refusal' and account for 33% of unplanned breastfeeding cessation during the first postnatal week.⁹ The following scenario illustrates a common failed breastfeeding experience.

Postpartum scenario: the baby too sleepy to breastfeed

A healthy term baby boy, born at 4 AM, held in skin-to-skin contact for an hour, does not suckle.⁹ At 8 AM, he's sleeping in the cot next to his mother's bed. The mother intermittently observes for hunger cues, but the baby continues to sleep soundly. At 2 PM he has not yet woken for a feed. Mum's worried; she calls the midwife who suggests gentle waking strategies, like a nappy change. This works: the baby

arouses and cries. However, when placed at the breast, the baby again falls sound asleep. At 3 PM, the mother is urgently shown how to hand express her colostrum; a few drops to a teaspoon (0.05 mls)¹⁰ are given to the baby via a syringe. 'Just to be sure', the baby is cup-fed 30 mls of artificial milk. The next day, the baby has still not latched or sucked adequately, directly from the breast; maternal confidence is low: the more she worries, the less milk she is able to hand express. Her baby has lost weight and routine top-ups of her colostrum mixed with artificial milk are given after each attempt to breastfeed. On day 3, her milk volume has increased, and she is demand-feeding on cue but each time she puts her baby back to sleep in the cot, within 10 minutes, the baby stirs and cues for another feed. Because she's been told that these movements mean he's hungry, she immediately thinks that she doesn't have enough milk. During the first week, she continues to express, mixing her dwindling milk supply with regular top-ups of artificial milk. This mother represents one of the 28% who stop breastfeeding at two weeks due to perceived milk insufficiency and exhaustion.³

If not hunger cues indicating readiness to feed, what are the movements on the poster?

The movements on the poster are taken directly from Brazelton's Neonatal Behavioural Assessment Scale (NBAS), first published in the 1960s. Brazelton uses body, facial and eye movements, to evaluate the infant's **level of arousal, neurological maturity, and ability to respond to the environment.**¹ Together with breathing and heart rate, these movements identify six baby states: 2 sleep states, 3 awake states and drowsy, a transitional state towards sleep or wakefulness. The criteria for the definition of each behavioural state concern duration - the movements remain stable for at least 3 minutes - and transition. When the baby changes state, the differentiating movements all change at the same time.

Look at the movements described in Table 1 for REM (rapid eye movement) and drowsy sleep states. Do you see that these are the same as the ones described on the poster showing "hunger cues"? In other words, the movements on the poster have been *misinterpreted* as hunger and readiness cues. In the early days and weeks, in REM and drowsy sleep, these movements are **un-planned, involuntary neonatal actions or reactions** that occur regularly together indicating sleep states.

Table 1 Continuity of Behavioural State from Foetus to Neonate

Foetal Behavioural State Semeia et al. 2022	F1 Quiet sleep similar to neonatal behavioural state Deep sleep	F2 Active sleep/REM sleep similar to neonatal behavioural state Light sleep	The equivalent to a drowsy state is not identified in the fetus	F3 Quiet wakefulness rarely observed and recently removed from fetal state classification, similar to neonatal behavioural state Quiet Alert	F4 Agitated awake similar to neonatal behavioural state Fussy	The equivalent to a crying state is not observed in the fetus
Neonatal Behavioural State Brazelton & Nugent 2013	Deep sleep	Light sleep	Drowsy	Quiet Alert	Fussy	Crying
Body Movements	Occasional Still, Startles, Occasional head turning	Finger movements Isolated arm leg, torso movements Torso stretches	Mostly still	Still, head turning Reactive to auditory / visual stimulants	Arm, leg thrusts Increase in amplitude & intensity	Uncontrolled high motor activity Head shaking
Facial Movements	Absent	Occasional grimace or smile	Frequent grimaces & smiles	Focused attention	Grimaces	Grimaces Contortions
Mouth Movements	Vacuum sucking*	Vacuum sucking bursts Tongue & jaw	May purse lips	Relaxed or open May coo	Mouth open Brief fussy vocalisations	Open, tense lips Intense crying
Eye Movements	Absent	Closed REM under closed lids Occasionally slightly open	May be open but dull or closed or flutter Heavy lidded	Open Glazed look alternates with Bright look	Open or closed	Often tightly closed
Breathing Rate	Slow, regular	More rapid	Slow, regular	Slow, regular	Rapid	Apnea possible

*Vacuum movements are those movements that occur without any apparent sensorial stimulation

A surprising continuity from foetus to neonate

The introduction of 2D, 3D and 4-dimensional ultrasound, foetal magnetocardiography and magnetoencephalography has enabled direct, prolonged and repeated foetal observations. Starting in the 1970s, these new techniques enabled real breakthroughs in the field of developmental neurology. In 1993, Prechtl, an Austrian neurologist, suggested striking similarities between the brain of the mature foetus and that of the newborn baby.¹¹ In other words, there is an age-specific resemblance in brain structure and function from foetus to neonate. The term 'wombing' would perhaps be better suited to

describe newborn competency during the first 8 postnatal weeks.

In 1982, Nijhuis et al. studied foetal movements to discover if neonatal behavioural states developed in the womb. At 38-40 gestational weeks, they identified eye, body and facial movements representing foetal behavioural states. These pave the way to competent neonatal motor and sensorial response.¹² Likewise, Prechtl observed a repertoire of 16 foetal movements from 7½ gestational weeks. Unexpectedly, he reported that these same movements were also seen after birth, without exception. Each movement has an adaptive function from foetus to newborn. For example, sucking and swallowing occur from 12½ weeks. One week later, the young foetus swallows amniotic fluid intermittently both day and night, in rhythmic sucking bursts. At 14 weeks, the rate of these bursts resembles that of a full-term baby swallowing breastmilk.¹¹ Importantly until around 28-32 weeks, the foetus is sound asleep, a state known as quiescence.¹² The only awake state, what Brazelton terms 'fussy' in the newborn, is observed around 34 gestational weeks.¹³

What about the calm, alert state of readiness?

Recent research suggests that a calm, alert state of readiness is only observed after birth.^{13,14,15,16,17} In other words, the newborn experiences this awake state for the first time, at birth. Widstrom et al (2011) suggest that some newborn babies have bouts of focused attention on the mother's breast and face during the first 30 minutes after birth. However, the duration is unspecified. After about an hour, babies, reportedly, 'feel sleepy'.⁹ Taken together, these observations suggest that if a baby has not suckled during the 'golden hour', s/he won't breastfeed. Thereafter, periods of a calm, alert state of readiness, are usually of short duration. For example, on day 3, Brazelton counts state changes every 15 seconds. Some babies transition from one state to another up to 24 times during a 30-minute evaluation.¹ In any case, neonatal awake states are only observed 10% to 15% of the time in 24 hours.^{18, 19} However, most new mothers say that their awake babies are either agitated ('fussy') or crying.

Building upon these new understandings, we argue that sleep states, which predominate 85% to 90% of the time,¹⁸ are optimal for the newborn 'wombling' to coordinate his foetal sucking and swallowing competencies with breathing. The mature foetus makes 2 to 6 sucking movements before wide-mouth opening and swallowing.¹⁸ During this time, he swallows from 500 to 1000 mls of amniotic fluid per 24 hours.²⁰ We could guess-estimate that if every swallow equates to 0.5 ml, ideally, the 'wombling' would swallow between 250 and 500 mls during the first 24 hours. In other words, the 'wombling' would transfer a full complement of colostrum. This can only happen if new mothers are encouraged to be proactive: not only keeping their newborn babies sleeping on their breast **during the day**, but also helping the 'wombling' latch, when appropriate. During the first 24-48 hours, when the newborn is only allowed to breastfeed in a calm, alert state of readiness, transferring a full complement of colostrum becomes nearly impossible. Short, alert and awake periods lasting 3% to 5% of the time are insufficient to enable continuity of suck-swallow movements from foetus to newborn. Continuity is central to the theoretical framework that underpins biological nurturing (BN).



Biological Nurturing enables the wombling to transfer a full complement of colostrum.

What is Biological Nurturing - Laid-back breastfeeding (BN)?

Biological nurturing describes the instinctual breastfeeding behaviours mothers and babies exhibit when they are in close, constant abdominal contact. Importantly, in BN, the angle at which the mother reclines changes from mother to mother and always optimises baby gazing and eye-to-eye contact when the baby is awake.

Biological nurturing research, observing 52 mother-baby dyads (12 healthy late preterm and 40 healthy term babies), demonstrates that babies breastfeed optimally during the first postnatal month in REM and drowsy sleep.^{21,22} If they do not, mothers express colostrum directly into their babies' mouths. A mouthful of colostrum triggers the familiar suck-swallow feeding patterns released during foetal life.²²

During doctoral research, twenty-two spontaneous breastfeeding movements and reflexes were identified and correlated with state, demonstrating that the same number of movements were observed in awake and asleep states.²³ Importantly, the movements observed in sleep states were smoother: the baby's responses to sensorial stimulation were slower and calmer. Mothers practising biological nurturing had both hands free; they were able to help their babies, when necessary, to ensure pain-free, effective latch and milk transfer. Breastfeeding the sleeping baby during the day enabled 85% of the sample to overcome those problems associated with early supplementation. Significantly, all 12 healthy late preterm babies were breastfed exclusively, at hospital discharge. Additionally, all 40 healthy term babies were breastfeeding at 6 postnatal weeks (87.5% exclusively).

Biological nurturing consists of six behavioural components. A behaviour is an action or a reaction. Here, we talk about 'movements', those gestures and reflexes that you see and can describe objectively, whilst mothers and babies are breastfeeding.²⁴ In BN, the baby's position is as important as the mother's. When practising BN, innate breastfeeding behaviours are reciprocal. Every time the sleeping baby moves on mum's body, she responds. These interactions are involuntary; in other words they cannot be taught. In BN, the mother is proactive: she places her SLEEPING baby 'tummy on mummy' during the day. Ironically, the baby feeds asleep but the mother is always awake. Importantly, the baby is not held under the breast but lies on top, even when the mother is sitting semi-upright. This usually means that the baby lies obliquely or up and down on the maternal body rather than across her midriff. Mothers do not apply pressure to their babies' backs, shoulders or necks to hold them in place. Instead, the weight of gravity does the job!

In these positions, babies move freely on mum's body: their fingers grasp mothers' clothes and massage their breasts preparing the let-down of early colostrum pearls; babies' feet find support on maternal thighs. With every turn of their heads, their faces brush against the mother's breast; at latch, babies' noses and mouths are in contact with the nipple and the mother watches over her baby, protectively. Sleeping cheek to breast, tummy on mummy, these babies are at "the right address" to condition foetal movements to breast stimuli. Spontaneous movements are rewarded with sensorial stimulation just as they were in the womb. Read more in our [companion article](#).

Conclusion

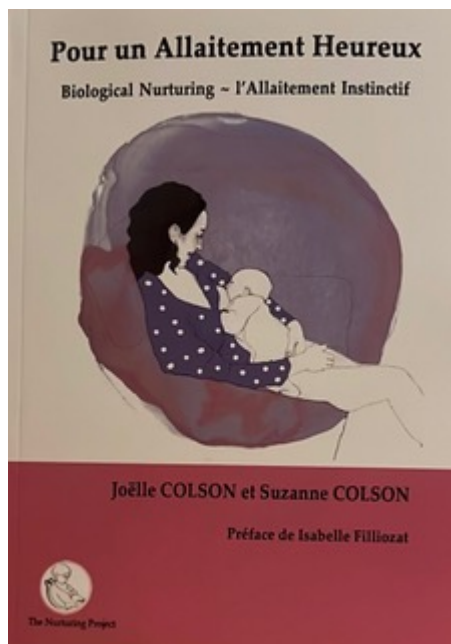
Maintaining continuity of behavioural state from womb to world is a newly developed research-based concept. To ingest the full complement of colostrum, the 'wombling' newborn latches and transfers colostrum optimally, in the same familiar sleep states in which they transfer amniotic fluid. Following birth and during the early weeks, newborn babies spend 85-90% of their time asleep. Although there is great variation, breastfeeding newborns when they are awake, alert and 'ready' often exceeds neonatal competence. 'Readiness' is an adult interpretation. For many years, this received idea has misguided infant feeding instructions, delaying breastfeeding initiation. The only behavioural state where the wombling/newborn could be termed 'ready' is in the active alert state. Research findings suggest that, during the first postpartum days, few newborns can modulate or maintain this state for longer than three

to five minutes. There is a strong physiological argument that early breastfeeding competencies develop through body learning, not through mental acuity, concentration and attention.

Finally, suggesting that the movements identifying REM and drowsy behavioural states are hunger cues is erroneous. This interpretation often leads to perceived milk insufficiency and routine supplementation with artificial milk. It's a vicious cycle leading to early unintended breastfeeding cessation.

Static and low European EBF rates in hospitals suggest that we need a rethink. During the first two months, major neurological transformations impact the amount of time a newborn can maintain focused attention in a quiet, alert state. Responsive feeding does not suit the 'wombling'; it corresponds better to the needs of an older baby, who experiences longer periods of wakefulness and cues for hunger.

It would be easy to replace reactive feeding guidelines, during the first weeks, with age-appropriate proactive recommendations based on neurological continuity from foetus to neonate. Is it now time for healthcare professionals and breastfeeding supporters to recognise that the newborn baby feeds optimally whilst asleep. Don't wake the baby!



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For more information see www.biologicalnurturing.com

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<https://www.unicef.org.uk/babyfriendly/baby-friendly-resources/relationship-building-resources/responsive-feeding-infosheet/>

8 Baby Feeding cues/ signs : Hunger cues The Royal Children's Hospital Melbourne, Australia

https://www.rch.org.au/cocoon/project/caring-for-baby/Hunger_cues/

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19 Editor's note: The act of exposing the fetus to ultrasound waves will change fetal behaviour as the waves can be heard by the fetus and could be disturbing. This means that the behaviour observed by ultrasonography is unlikely to represent the normal behaviour of the fetus.

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