

BIRTH PHYSIOLOGY: AN OVERVIEW

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What are the basic needs of human mammals when they are giving birth? In spite of thousands of years of cultural interferences, it is possible today to rediscover such needs with the help of a small number of physiological concepts (Odent 2001).

BASIC MAMMALIAN NEEDS

Our current understanding of birth physiology is based on the adrenaline–oxytocin antagonism: **when mammals release adrenaline they cannot release oxytocin**. We use the word ‘adrenaline’ as a simplified way to refer to the ‘fight and flight system’. Such an antagonism has been understood for a long time and evaluated in relation to myometrial response (Zuspan 1962) and milk ejection response (Whittlestone 1954). The first data have been confirmed by clinical studies among humans (Lederman 1978). Today oxytocin is often presented as ‘the mirror image of adrenaline’. (Uvnas-Moberg 2003).

It is well known that **mammals (including humans) release adrenaline in situations such as being scared, feeling observed, or being cold**. We can therefore draw the preliminary conclusion that **in order to give birth a woman needs to feel secure, without feeling observed, in a warm enough place**.

Although the adrenaline-oxytocin antagonism is theoretically established, it is not well-digested knowledge. It disagrees with deep-rooted beliefs. It is still commonplace, in natural childbirth circles, to include recommendations based on the simplistic idea that walking and using the force of gravity will make labour easier. Finding these recommendations strange is not new. As early as 1833, William DeWees wrote that ‘the preposterous custom of obliging her (the laboring woman) to walk the floor with a view to increase the pains when tardy should be peremptorily forbidden’. Today scientific evidence tends to support De Wees’ point of view. **Since the prerequisite for labour to establish itself properly is a low level of adrenaline, it is a good sign when a laboring woman does not feel the need to stand up and walk. During the first stage of an easy and fast birth, women are often passive, for example on all fours or lying down. To suggest any sort of muscular activity at that phase can be counter-productive**, even cruel.

This belief that a woman in labour should walk can still influence medical circles as well. This is how we can explain the popularity of the term ‘walking epidural’ and also the publication of randomized controlled trials to evaluate the effect of walking on labour and delivery. Of course none of the studies could demonstrate any effect. It is significant that, in the most authoritative of these studies, 22% of the women who were assigned to walking stayed in bed. (Bloom 1998)

In natural childbirth circles, laboring women are also often compared with athletes who are advised to consume large amount of carbohydrates before starting extreme physical exertion, such as running a marathon. Authors of articles about nutrition during labour have suggested that we should learn from sports medicine. Many birth attendants are influenced by these comparisons and encourage women to eat food such as pasta at the onset of labour, and to drink something sweet when labour is established: ‘You need energy!’.

These ideas about nutrition are also in contradiction with our current understanding of the adrenaline-oxytocin antagonism. A low level of adrenaline and good progress in the first stage imply that the striated muscles are at rest. When a birth is as physiological as possible, the laboring woman has a tendency to be immobile during the first stage. **When all the skeletal muscles are at rest, such as when the mother is lying on her side or is on all-fours, energy expended is insignificant, and the need for carbohydrates is minimal, insofar as glucose is the favorite fuel of skeletal muscles**. The energy expenditure of the uterine muscle is insignificant. Smooth muscles are between 20 and 400 times more energy efficient than skeletal muscles. Furthermore they can easily use fatty acids (rather than glucose) as fuel. In practice there is no risk of fuel shortage for the smooth muscles. The observations by Paterson and colleagues are highly significant. They found that ketone levels were higher in women who had been starved for twelve hours before an elective caesarean under general anesthesia than they were for women who had been in labour. This confirms that laboring women spend less energy than those who are only waiting for an operation without being in labour.

Comparing laboring women to marathon runners is misleading and potentially dangerous. The side effects of sugar during labour are well documented. **There is evidence that when the mother has been given an infusion containing glucose, the risk of lactic acidosis in the fetus is increased and the intensity of jaundice in the neonate is greater** (Kenepp et al 1982)..

These theoretical considerations are supported by what we can learn from observation. Mammals in general do not eat during the process of parturition. For several decades, either in a hospital or at home, I have learned from thousands of women who were neither encouraged nor discouraged to eat and drink in labour. Although there are always exceptions, it is possible to summarize several simple observations. The first point is that **labour rarely starts when a pregnant woman is hungry**. This makes sense since hunger tends to increase the level of catecholamines. Second, **when labour is really well established, women do not feel the need to eat**.

OVERCOMING THE SPECIFICALLY HUMAN HANDICAP

A specifically human handicap during the process of parturition is the huge development of the neocortex in our species. During the birth process (or during any sort of sexual experience) most inhibitions are related to neocortical activity. In general, rational control of the procreative drives is a byproduct of human brain evolution.

The evolutionary process found a way of overcoming this vulnerability. **Neocortical activity simply becomes reduced during the birth process**. This had not been understood by the Pavlovian physiologists whose theories are, directly or indirectly, at the root of most current schools of 'natural childbirth'. It is, on the other hand, easily interpreted by those who have the experience of undisturbed, unmanaged and "uncoached" births. **When a woman is giving birth easily, without any interference, there is a time when she seems to cut herself off from our world. She becomes indifferent to what is happening around her. She tends to forget her plans and received ideas. She behaves in a way that would be considered unacceptable in the daily life of a civilized woman. When, for example, she dares to scream, or to swear, or to be impolite, it means that there is reduction in neocortical control. She can find herself in the most bizarre, unexpected, and often primitive, quadrupedal and typically mammalian postures. She seems to be "on another planet". This reduction of neocortical activity is an essential aspect of birth physiology among humans.** It implies that **laboring women need to be protected against any sort of neocortical stimulation**. We must remember the main stimulants of the human neocortex are, if we are to avoid such stimulations.

Language is a specifically human stimulant of the neocortex. When we communicate with language we process what we perceive with our neocortex. This implies, for example, that **if there is a birth attendant, one of her main qualities is her capacity to keep a low profile and to remain silent, to avoid in particular asking precise questions**. It will probably take a long time for people to realize that a birth attendant must remain as silent as possible. It is difficult to get rid of the after-effects of the Pavlovian theories. Velvovski and other Pavlovian theoreticians had understood the neocortical origins of inhibitions during human parturition. However, probably because they were not practitioners directly involved in childbirth, they ignored the reduction of neocortical control as an essential aspect of birth physiology in our species. They assumed that the practical objective should be to 'recondition' women in order to eliminate the inhibitions and to make childbirth painless. From their point of view labour pain is a conditioned reflex, and therefore cultural. Such theories lead to the concept of 'verbal analgesia'. After visiting the Pavlovian theoreticians in Russia in 1951, Lamaze introduced their concepts in Western countries. This is how the birth attendants started to overuse language and became invasive guides, helpers and even 'coaches'.

Light is another well-known stimulant of the human neocortex. Electroencephalographers know that the trace exploring neocortical activity is influenced by visual stimulation. We usually close the curtains and switch off the lights when we want to reduce the activity of our intellect in order to go to sleep. This implies that, from a physiological perspective, a dim light should in general facilitate the birth process. These are important considerations in the age of electricity, when we have the power to switch on a bright light simply by pressing a button. It is noticeable that **as soon as a laboring woman is on 'another planet' she is spontaneously driven towards postures that tend to protect her against all sorts of visual**

stimulations. For example she may be on all fours, as if praying. Apart from reducing the back pain, this common posture (with many asymmetrical variants) has several positive effects, such as eliminating the main reason for fetal distress (no compression of the vena cava), influencing the process of rotation, and therefore minimizing the mechanical difficulties that characterize human parturition.

Feeling observed is a situation associated with neocortical stimulation. When we feel observed, we tend in return to observe ourselves and to correct our attitude. This is another way to interpret the importance of privacy (i.e. not to feel observed) as a basic need during labour. Understanding the need for privacy makes us anticipate, for example, that there is a difference between a midwife staying in front of a laboring woman and watching her, and another one sitting in a corner. It might also make us anticipate that devices that are perceived by the laboring woman as observing tools (such as a camera or an electronic fetal monitor) should be introduced with extreme caution in a birthing place. The surprise produced by the results of randomized controlled trials comparing the effects on statistics of electronic fetal monitoring versus intermittent auscultation is a symptom of a lack of understanding of birth physiology. It might have been anticipated that the only fact that a laboring woman knows that her body functions are continuously monitored tends to stimulate her neocortex. Stimulating the neocortex risks making the labour longer, more difficult, and therefore more dangerous so that more babies must be rescued via the abdominal route. Photos in books for the general public and videos shown in conferences constitute proof that the need for privacy is not understood by the natural childbirth movements: it is commonplace to see a woman in labour surrounded by several people watching her.

The perception of danger is another possible stimulant of the neocortex. Since in situations of danger it is an advantage to be alert and attentive, neocortical activity is an appropriate response. Analyzing such a situation is another way to consider the need to feel secure as basic during human parturition.

Understanding the solution the evolutionary process found in order to overcome the specifically human handicap in parturition appears today to be a necessary step towards rediscovering the basic needs of laboring women.

BASIC NEEDS DURING THE THIRD STAGE OF LABOUR

Provided there have been no major deviations from the physiological reference during the previous phases of labour, mother and baby share similar basic needs during the third stage. From a physiological perspective there is a key event between the birth of the baby and the delivery of the placenta. It is the high peak of oxytocin that human mothers have the capacity to release immediately after the birth, which is arguably the highest level of oxytocin a woman can reach during her whole life. (Nissen 1995) This peak of oxytocin is vital, since it is necessary for a safe and bloodless delivery of the placenta, and since oxytocin is the main component of the 'cocktail of love hormones' that is supposed to be released in the perinatal period.

Whatever the circumstances, a release of oxytocin is highly influenced by the environment. We must therefore look at the factors that can have a positive or negative effect at the beginning of the mother-newborn interaction. By mixing theoretical considerations and clinical observations we can identify two main groups of factors. At this phase of labour, the vulnerability of mothers to an inappropriate ambient temperature is well known. This is why shivering (a sign of adrenaline release) is a frequent physiological response to an insufficiently high room temperature. In fact, just after the birth of the baby, mothers never complain because the place is too hot, while nonverbally they often indicate that it is not warm enough. The concept of adrenaline-oxytocin antagonism, alongside clinical observation, must bring us to the conclusion that, as soon as the baby is born, the thermo-regulation of the mother must be at rest. In other words, maintaining an appropriate ambient temperature should be the first preoccupation. An undisturbed interaction between mother and newborn is another factor facilitating oxytocin release. **During the third stage of labour an appropriate maternal hormonal balance is more easily obtained if, in an atmosphere of privacy, the mother can feel the skin-to-skin contact, can try to establish eye-to-eye contact, and can smell the odor of her baby...without any distractions.** Eliminating any distractions is difficult: as soon as a baby is born, there is always an irrational need for activity around; there is always somebody who wants to do something or to say something. This need for activity has been ritualized in many societies. It is impossible to offer an exhaustive catalogue of all the possible ways to interfere with the mother-newborn intimacy. Let us imagine, for example, that a mother is still in such a state of

consciousness that she has forgotten the rest of the world while discovering her baby; suddenly somebody appears with two clamps and a pair of scissors in order to cut the cord. This distraction is a dangerous interference with the physiological processes.

At the very time when we are starting to understand the importance of the third stage for the 'development of the capacity to love', we have to realize that this particular phase of labour has been dramatically disturbed by all cultural milieus via a great diversity of beliefs and rituals. Furthermore we have to realize that, in the age of the safe caesarean, this phase of labour can be purely and simply eliminated for the first time in the history of mankind.

References

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