Undisturbed birth

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Sarah Buckley shows us what is stopping birth working

In modern Western countries, including Australia and the UK, rates of obstetric intervention have reached extreme levels, such that very few mothers and babies experience labour and birth without drugs and procedures to assist or hasten the process. This has led to the erroneous belief that human birth is an intrinsically faulty system, and that modern women have lost the ability to give birth.

However, our women's bodies have their own wisdom, and our innate system of birth, refined over one hundred thousand generations, is not so easily overpowered. This system, which I am calling undisturbed birth[1], has the evolutionary stamp of approval not only because it is safe and efficient for the vast majority of mothers and babies, but also because it incorporates our hormonal blueprint for ecstasy in birth. When birth is undisturbed, our birthing hormones can take us into ecstasy – outside (ec) our usual state (stasis) – so that we enter motherhood awakened and transformed. This is not just a good feeling; the post-birth hormones that suffuse the brains of a new mother and her baby also catalyse profound neurological changes. These changes give the new mother personal empowerment, physical strength, and an intuitive sense of her baby's needs, and they prepare both partners for the pleasurable mutual dependency that will ensure a mother's care and protection and her baby's survival.

Undisturbed birth represents the smoothest hormonal orchestration of the birth process, and therefore the easiest transition possible; physiologically, hormonally, psychologically, and emotionally, from pregnancy and birth to new motherhood and lactation, for each woman. When a mother's hormonal orchestration is undisturbed, her baby's safety is also enhanced, not only during labour and birth, but also in the critical postnatal transition from womb to world. Furthermore, the optimal expression of a woman's motherhood hormones, including the fierce protectiveness of her young, will ensure that her growing child is protected and well nurtured, adding another layer of evolutionary fitness to the process of undisturbed birth.

The hormones of birth

There are many hormones involved in mammalian birth, and our understanding of their complex orchestration is limited. This article focuses on the hormones oxytocin; beta-endorphin; the catecholamines (adrenaline and noradrenaline); and prolactin. As the hormones of love, pleasure and transcendence, excitement, and tender mothering, respectively, these form the major components of an ecstatic cocktail of hormones that nature prescribes to aid birthing mothers of all mammalian species. An optimal hormonal orchestration provides ease, pleasure, and safety during this time for mother and baby. Conversely, interference with this process will disrupt this delicate hormonal orchestration, making birth more difficult and painful, and potentially less safe. All of these hormones are produced primarily in the middle or mammalian brain, also called the limbic system or emotional brain. For birth to proceed optimally, this more primitive part of the brain needs to take precedence over our neocortex – our 'new' or higher brain – which is the seat of our rational mind. This shift in consciousness, which some have called 'going to another planet', is aided by (and also aids) the release of birthing hormones such as beta-endorphin, and is inhibited by circumstances that increase alertness, such as bright lighting, conversation, and expectations of rationality.

Mother Nature's pragmatic and efficient principles dictate that these hormones should also help the baby at birth, and this is being increasingly confirmed by scientific research. This hormonal interdependence contradicts the common medical response to natural birth as the mother's prizing of her own experience over her baby's safety, and underlines the mutual dependency of mother and baby, even as they begin their physical separation.

Oxytocin

Oxytocin has been called the hormone of love because of its connection with sexual activity, orgasm, birth, and breastfeeding. In addition, oxytocin is produced in social situations such as sharing a meal, making it a hormone of altruism or, as Michel Odent regularly suggests, of 'forgetting oneself '.

Oxytocin is also the most powerful uterotonic (contraction-causing) hormone, and its release is associated with the contractions of labour and birth in all mammalian species. Oxytocin is made in the hypothalamus, deep in the middle brain, and is released in pulses from the posterior pituitary into the bloodstream every three to five minutes during early labour, becoming more frequent as labour progresses.

The number of oxytocin receptors in a pregnant woman's uterus increases substantially late in pregnancy, increasing her sensitivity to oxytocin. Oxytocin has also been shown to have a painkilling effect in rats and mice. Oxytocin catalyses the final powerful uterine contractions that help the mother to birth her baby quickly and easily. At this time, the baby's descending head stimulates stretch receptors in a woman's lower vagina, which trigger oxytocin release from her pituitary. This oxytocin release causes more contractions that promote more fetal descent, inducing more stretchreceptor stimulation and therefore even more release of pituitary oxytocin. This 'positive feedback loop' is also known as the Ferguson reflex.

After the birth, ongoing high levels of oxytocin, augmented by more pulses released as the baby touches, licks, and nuzzles the mother's breast, help to keep her uterus contracted and so protect her against postpartum haemorrhage. Skin-to-skin and eye-to-eye contact between mother and baby also help to optimise oxytocin release. Blood oxytocin levels peak at around thirty minutes postpartum and subside towards the end of the first hour. Oxytocin levels in the brain, which switch on instinctive maternal behaviour, may be elevated for substantially longer.

Newborn oxytocin levels also peak at around thirty minutes after birth so that during the first hour after birth, both mother and baby are saturated with high levels of oxytocin, the hormone of love. Newborn babies have elevated levels of oxytocin for at least four days after birth, and oxytocin is also present in breastmilk.

During breastfeeding, oxytocin mediates the milkejection, or letdown, reflex and is released in pulses as the baby suckles. During the months and years of lactation, oxytocin continues to act to keep the mother relaxed and well nourished, by enhancing the efficiency of her digestion. Other studies indicate that oxytocin is also involved in cognition, tolerance, and adaptation, and researchers have recently found that oxytocin also acts as a cardiovascular hormone, with effects such as slowing the heart rate and reducing blood pressure.

Uvnas-Moberg describes a 'relaxation and growth response' to oxytocin release[2] which reflects its ability to turn on the parasympathetic nervous system, which is involved with digestion and growth, and to reduce activity in the sympathetic 'fight-or-flight' system. Malfunctions of the oxytocin system have been implicated in conditions such as schizophrenia, autism, cardiovascular disease, and drug dependency, and it has been suggested that oxytocin may mediate the antidepressant effect of drugs such as Prozac.

Beta-endorphin

Beta-endorphin is one of a group of naturally occurring opiates (drugs derived from the opium poppy), with properties similar to pethidine, morphine, and fentanyl, and has been shown to work on the same receptors of the brain. It is secreted from the pituitary gland under conditions of pain and stress, when it acts to restore homeostasis (physiological balance); for example, by acting as a natural painkiller. Beta-endorphin also activates the powerful mesocorticolimbic dopamine reward system, producing reward and pleasure in association with important reproductive activities including mating, birth, and breastfeeding. Beta-endorphin is also released during episodes of social and physical contact, reinforcing pro-social behaviours among all mammals.

Like the addictive opiates, beta-endorphin reduces the effects of stress and induces feelings of pleasure, euphoria, and dependency. Beta-endorphin levels, as measured in the mother's bloodstream, increase throughout labour, peaking at the time of birth, and subsiding in the first one to three hours. Levels in the new mother's limbic system are elevated for much longer, as beta-endorphin takes more than twenty-one hours to break down within the brain and cerebrospinal fluid (CSF).

In labour, such high levels help the labouring woman to transcend pain, as she enters the altered state of consciousness that characterises an undisturbed birth. In the hours after birth, elevated beta-endorphin levels reward and reinforce mother-baby interactions, including physical contact and breastfeeding, as well as contributing to intensely pleasurable, even ecstatic, feelings for both.

Beta-endorphin is also important in breastfeeding. Levels peak in the mother twenty minutes after commencement, and beta-endorphin is also present in breastmilk. Researchers have found higher levels, at four days postpartum, in the breastmilk of mothers who have had a normal birth, compared with caesarean mothers; they speculate that this extra dose of beta-endorphin is designed to help the newborn with the stressful transition to life outside the womb.

Beta-endorphin, as a component of ongoing motherbaby interactions, induces a pleasurable mutual dependency for both partners, reinforcing and rewarding behaviours such as breastfeeding and physical contact that are associated with long-term well-being and survival.

Catecholamines

The fight-or-flight hormones adrenaline and noradrenaline (epinephrine and norepinephrine in US literature) are part of the group of hormones known as catecholamines (CAs) and are produced by the body in response to stresses such as hunger, fear, and cold, as well as excitement. Together they stimulate the sympathetic nervous system for fight or flight.

During labour, maternal CA levels slowly and gradually rise, peaking around transition. However, high adrenaline levels in early labour, which reflect activation of the woman's fight-or-flight system in response to fear or a perception of danger, have been shown to inhibit uterine contractions, therefore slowing or even stopping labour. Noradrenaline also acts to reduce blood flow to the uterus and placenta and therefore to the baby.

This reflex makes sense for mammals birthing in the wild, where the presence of danger would activate the fight-or-flight response, inhibiting labour and diverting blood to the major muscle groups so the mother can fight or, more likely, flee to safety. In humans, high levels of adrenaline have been associated with longer labour and adverse fetal heart rate (FHR) patterns, which indicate that the baby is low in oxygen (hypoxic), consistent with CA-mediated reductions in uterine blood flow.

Research has also shown that very high CA levels can paradoxically stimulate uterine contractions, which may contribute to the fetus ejection reflex. According to Odent, this reflex occurs at transition, or perhaps even earlier in labour, and almost always follows an undisturbed birth, perhaps because low CA levels in early labour are necessary for its full expression. The mother experiences a sudden and enormous increase in CA levels, giving her a rush of energy and strength; she will be upright and alert, with a dry mouth and shallow breathing and perhaps the urge to grasp something. She may express fear, anger, or excitement, and the CA surge will produce, in concert with high oxytocin levels (associated with the Ferguson reflex), several very strong and irresistible contractions that will birth her baby quickly and easily.

After the birth, the new mother's CA levels drop steeply. If she is not helped to warm up, the cold-related stress will keep her CA levels high, which will inhibit her uterine contractions and therefore increase her risk of postpartum haemorrhage.

For the baby also, labour is an exciting and stressful event, reflected in increasing CA levels. In labour these hormones have a very beneficial effect, protecting the baby from the effects of hypoxia (lack of oxygen) and subsequent acidosis by redistributing cardiac output (blood supply) and by increasing the capacity for anaerobic glycolysis (metabolism of glucose at low oxygen levels).

The baby experiences a marked surge in CA hormones, especially noradrenaline, close to the time of birth, probably triggered by pressure on the head. This surge plays a very important role in the baby's adaptation to extrauterine life. It aids newborn metabolism by increasing levels of glucose and free fatty acids, which protect the newborn's brain from the low blood sugar that can occur in the early newborn period when the baby loses the placental supplies of glucose.

In addition, catecholamines enhance respiratory adaptation to life outside the womb by increasing the absorption of amniotic fluid from the lungs and stimulating surfactant release. Surfactant is essential for smooth inflation of the newborn lungs. CAs also assist with the necessary newborn shift to nonshivering thermogenesis (heat production), increase cardiac contractility, stimulate breathing, and enhance responsiveness and tone in the newborn.

High CA levels at birth also ensure that the baby is wide-eyed and alert at first contact with the mother. The baby's CA levels also drop steeply after an undisturbed birth, being soothed by contact with the mother, but noradrenaline levels remain elevated above normal for the first twelve hours. High newborn noradrenaline levels, triggered by a normal birth, have been shown to enhance olfactory learning during this period, helping the newborn to learn the mother's smell.

Prolactin

Prolactin, known as the mothering or nesting hormone, is released from the pituitary gland during pregnancy and lactation. Prolactin is named for its well-known prolactation effects, preparing a pregnant woman's breasts for lactation and acting postnatally as the major hormone of breastmilk synthesis.

Prolactin levels increase throughout pregnancy, helping to organise the expectant mother's brain for maternity. Prolactin's lactogenic (milk-producing) effect is blocked during pregnancy by high levels of progesterone, produced by the baby's placenta. When progesterone levels drop with the birth of the placenta, prolactin can begin stimulating milk production.

Prolactin levels decline during labour, reaching the lowest point when the labouring woman's cervix is fully dilated. Prolactin then rises again steeply in the moments after birth, perhaps due to stimulation of the mother's cervix during birth, reaching peak levels in the following two to three hours. After this, levels decline again slowly and reach another nadir from nine to twenty-four hours postpartum.

This postpartum maternal surge in prolactin provides maximum levels, available to brain and body, in the hour or so after birth. This elevation may be important in optimising maternal behaviours at this time, as well as ensuring successful lactation.

Animal studies show that prolactin release is also increased by carrying infants, and its association with paternal nurturing (including in humans) has earned it the added title 'the hormone of paternity.' Human studies have shown that just before the birth, fathers-to-be have elevated prolactin levels, which parallel the rise of prolactin in their partners. New fathers with higher prolactin levels are more responsive to newborn cries.

In summary

Mother Nature's superb design is hard-wired into our female bodies, providing an elaborate orchestration of hormones to enhance ease, pleasure and safety in labour, birth and postpartum. These hormones also ensure an ideal start to, and ongoing pleasure and reward from, breastfeeding and attachment, optimising well-being and survival for mother and offspring in the medium and long terms.

The full expression of these labouring hormones requires specific conditions: that the labouring mother feels private, safe and unobserved. This basic need is recognised by traditional systems of maternity care, which prioritise the emotional well-being of the labouring woman and ensure that she is cared for in a familiar place with known and trusted helpers. These factors will keep her as calm and relaxed as possible, and her adrenaline levels low.

Conversely, if she is not feeling private, safe and unobserved in labour, her adrenaline levels will increase, slowing labour and decreasing blood and oxygen supply to the baby and leading to fetal distress for vulnerable babies. Our current maternity care system does not done for slow labour and fetal distress. Interventions used for these indications such as synthetic oxytocin and caesarean surgery can further interfere with the hormonal orchestration for mother and baby, creating a cascade of intervention and depriving both of the ideal start that Mother Nature intends.

As Professor Kloosterman states so eloquently: 'Spontaneous labour in a normal woman is an event marked by a number of processes so complicated and so perfectly attuned to each other that any interference will only detract from the optimal character. The only thing required from the bystanders is that they show respect for this awe-inspiring process by complying with the first rule of medicine – nil nocere [do no harm].'

Following her recent UK seminars (recorded and available on DVD) Sarah adapted Chapter 6, Undisturbed Birth: Mother Nature's Blueprint for Safety, Ease, and Ecstasy, of her book Gentle Birth, Gentle Mothering, to produce this article for AIMS. Sarah's books, DVDs and articles are available at www.sarahbuckley.com

References

1. Buckley, SJ (2009) Gentle Birth, Gentle Mothering. Celestial Arts Buckley, SJ (2009) Gentle Birth, Gentle Mothering. Celestial Arts
2. Uvnas-Moberg, K (2011) The Oxytocin Factor : Tapping the Hormone of Calm, Love and Healing. 2nd edition. Pinter & Martin Ltd.

Further references and additional reading suggestions are available at www.sarahbuckley.com/undisturbed-birth-aims-reference