



## REVIEW

## Hazards of labour pain and the role of non-neuraxial labour analgesia

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## S U M M A R Y

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Labour pain is one of the worst pains known to women. Labour pain induces multisystem changes in the mother which may have an effect on the baby as well. Although neuraxial analgesia is considered the Gold Standard for labour analgesia, not every maternity hospital has the facilities to administer it. Women themselves for various reasons may not want to consider the neuraxial blockade. We have given the detailed account of the hazards of labour pain and the non-neuraxial methods of labour analgesia with their current scientific evidence. In this review we have given the detailed account of the non-neuraxial methods of labour analgesia and their current scientific evidence. Every pregnant woman should be told the various methods of pain relief and her wish should be respected.

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## 1. Introduction

Labour pains are arguably the worst pains women have to go through during labour. Pain has effects not only on the mother but also on the baby. There are many physiological and psychological consequences of labour pain. Hence there is a need for pain relief during labour. There are two broad methods of relieving labour pain, namely Neuraxial methods and Non Neuraxial methods. There are many factors on which the parturient may base her decision of type of labour analgesia she may wish to use during labour. Not every parturient would look at neuraxial analgesia as the only form of labour pain relief. They may wish to choose a non-neuraxial form of labour analgesia. There is no doubt that none of the non-neuraxial methods would provide as much analgesia as neuraxial methods do. This must be emphasised to the parturient prior to choosing the labour analgesic method.

Arrival of a newborn is arguably one of the most exciting things in the parent's life. Labour pains are arguably the worst pains women have to go through during labour. Pain wherever it might be, is an unpleasant experience and some women are extremely apprehensive about their labour pain. It is quite common to see the women in the antenatal classes who express their fear about pain and having to cope with it throughout the labour. Even though the pain in some situations may be protective, as it helps the individual

to withdraw from the potential cause of the injury, this does not apply to labour pain.

Pain perception can vary during pregnancy. The facts are that there may be a fear of pain primarily and usually in nulliparous women, and may be associated with pre-existing psychological morbidity and/or ignorance, or secondary e.g., as a result of a previous bad experience. There could be increased susceptibility to pain due to generalized anxiety related to the pregnancy, its outcome, its implications for the woman, or other concerns. Younger women may have a different tolerance to pain than older women but older multiparae may be more relaxed and therefore less fearful. Positive attitudes towards pregnancy and its social implications may increase tolerance to pain, especially in labour (pain is seen as a "positive" force rather than a destructive one). Poor knowledge and/or misinformation may exacerbate the above. The neuroendocrine system especially progesterone can modulate the opioid system during pregnancy increasing pain tolerance.<sup>1</sup>

Pain has effects not only on the mother but also on the baby. There are many physiological and psychological consequences of labour pain. Labour pain can result in increased sympathetic activity resulting in increased plasma catecholamine concentrations. This would lead to an increase in cardiac output, blood pressure and heart rate. These can pose significant problems in parturients with cardiac disease. Circulating catecholamine levels may increase between 200% and 600% during unmedicated labour which would then reduce the uterine blood flow. This along with anxiety and stress would lead to prolonged and dysfunctional labour.<sup>2–5</sup>

Increased oxygen consumption along with maternal hyperventilation in response to the labour pain can lead to hypocapnea which could lead to vasoconstriction including that of uterine

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vessels. Respiratory alkalosis can lead to a reduction in plasma ionic calcium concentration and in a worse scenario, tetany. There is a concern of possible shift of maternal oxygen dissociation curve, counteracting the double Bohr effect. Possible cerebral vasoconstriction can lead to dizziness, lightheadedness, nausea and in severe cases, a blackout. A neuroendocrine reaction is evoked by labour. There have been reports of prolonged plasma cortisol and adrenocorticotropin (ACTH) during labour and immediate postpartum. Severe labour pains have been shown to be associated with long term stress, and may adversely affect the mental health of the mother and family relationships and could contribute to the postpartum depression.<sup>6</sup>

Maternal pain and stress may have adverse foetal effects. The metabolic outcome is hyperglycaemia with a poor insulin response, lipolysis with increased free fatty acids, ketones and lactate. Such acids cross the placenta and together with catecholamines, increase the foetal oxygen requirement, so maternal metabolic acidosis from this further cause is compounded in the baby. The longer the duration of the labour, the higher the chances of having an umbilical cord with a lower pH. By contrast the foetal stress response to labour, which results in a conspicuous catecholamine surge, is beneficial for adaptation to extrauterine life and is not suppressed by maternal neuraxial analgesia.<sup>7,8</sup>

Hence there is a need for pain relief in labour. With the advent of neuraxial analgesia which probably would be considered as the gold standard for labour pains, it would be reasonable to classify the methods of labour analgesia into two broad categories: Neuraxial methods and Non Neuraxial methods.

There are many factors on which the parturient may base her decision of type of labour analgesia she may wish to use during labour. Some of these could be the level of expectation of pain relief, social factors, religious beliefs, influence of childbirth training, fear of side effects of neuraxial techniques and desire to have a complete medication free delivery. Hence, not every parturient would look at neuraxial analgesia as the only form of labour pain relief. They may wish to choose a non-neuraxial form of labour analgesia.

There is no doubt that none of the non-neuraxial methods would provide as much analgesia as neuraxial methods do. This must be emphasised to the parturient prior to choosing the labour analgesic method.

A systematic review found that the most important factors influencing a woman's rating of her childbirth experience as good were

- Personal expectations.
- The amount of support from caregivers.
- The quality of the caregiver–patient relationship.
- The involvement in decision making.

These factors overrode the influence of age, socioeconomic status, ethnicity and pain.<sup>9</sup>

Non-neuraxial methods can be further classified into

#### 1 Non-invasive techniques.

- 2 Minimally invasive techniques and
- 3 Pharmacological methods (Table 1)

## 2. Non-invasive techniques

### 2.1. Breathing and relaxation

There is some data showing the analgesic benefits of relaxation techniques in labour. In the Cochrane systematic review, only a few met the criteria for inclusion although 11 studies were included. Relaxation techniques included in this review were guided imagery, progressive muscle relaxation, breathing techniques and meditation. These studies indicated that such techniques may provide a reduction in pain intensity during the latent and active phases of labour, increased satisfaction with pain relief and decreased likelihood of assisted vaginal delivery.<sup>10</sup>

One controlled trial of breathing and relaxation techniques was described in a systematic review of complementary therapies used during labour.<sup>11,12</sup> Women were randomised into an experimental group that received 'respiratory autogenic training' (progressive muscle relaxation and focused slow breathing) and a control group that attended a 'traditional psychoprophylactic course'. Although a significant reduction in reported intrapartum pain was noted for women in the experimental group, this was only found after adjusting for women who were very anxious during pregnancy. Postnatal reports of labour pain and labour experience did not differ significantly between the two groups.

The Lamaze and Bradley techniques of delivery use breathing and relaxation. Whilst further, larger studies are required to prove efficacy, women should not be discouraged from using breathing and relaxation techniques during labour.<sup>13</sup>

The Continuing Education Module could be used. There are various methods described but the Lamaze and Bradley techniques have been used in the past with some success claimed by the authors.<sup>14,15</sup>

Another approach described which combines a few complementary medicine techniques is the Bonapace Method (BM). Women choose to follow the specific pain management program with their partners. The curriculum of the BM incorporates the understanding of pain modulation mechanisms and the teaching of practical techniques related to those mechanisms. They include (A) breathing, relaxation, and cognitive structuring (origin of labour pain and endogenous pain modulating mechanisms); (B) non-painful stimuli, such as ambulation and light massage of the back by the partner between labour contractions, which activates non-nociceptive fibres and produces pain inhibition, as described in the Gate Control Theory and (C) hyperstimulation, by the partner during contractions, using deep painful massage of acupuncture trigger points in the lower back (namely, Shanglia BL31, Cilia BL32, Zhongliao BL33 and Xialiao BL34), alternating with trigger points in the hand (Hegu LI4), the foot (Taichong L3), and on the buttocks (Huantiao GB30). Partners are taught to use whichever mechanisms suited them best during childbirth. The training program lasts about 8 h over a four-week period. The women included are approximately in their 30th week of pregnancy, and the entire program is dedicated to pain management and partner participation.<sup>16</sup>

### 2.2. Yoga

Yoga, meditation and hypnosis may not be so accessible to women, but together these techniques may have a calming effect and help the women to manage by providing a distraction from pain and tension. The review of 11 randomised controlled trials, with data reported on 1374 women, found that relaxation

**Table 1**

Non-invasive techniques	Minimally invasive techniques	Pharmacological methods
Breathing and relaxation	TENS	Inhalational analgesia
Yoga	Acupuncture	Systemic opioids
Touch and massage	Acupressure	
Biofeedback and aromatherapy	Sterile water blocks	
Hydrotherapy (water immersion)		
Support during labour		
Hypnosis		

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