Easing perineal pain and Low-Level Laser therapy (LLLT)

Giving birth is one of the most intense and unique moments in a woman's life. Ideally it should not be associated with pain. Postpartum perineal pain is all the more complex and problematic since it can last for some time after delivery, especially when episiotomy is involved. Today’s new technologies such as low-level laser therapy may be part of the solution in addition to a whole range of more traditional pain-killers. A pilot study was led in Brazil to assess the limits and benefits of such a method. Jaqueline de Oliveira Santos (PhD, Nurse Midwife) et al. describe the whole procedure of clinical trial of this innovation in the following article. This might help new generations of midwives assist mothers more efficiently with a new approach to what is known in English as pain management, pain medicine or even ‘algiatry’...

Perineal pain is a frequent morbidity in the postpartum period. It is usually associated with instrumental deliveries and episiotomies. It can result in difficulties with self-care, breast feeding and newborn care and can also interfere with sleep, rest, movement, urination, evacuation and even appetite. A cohort study of 241 postpartum women revealed that 173 (92%) of them reported perineal pain in the first days after birth, regardless of the perineal trauma suffered. In a study conducted in the USA, reporting the experience of 1,573 women with pain two months after delivery, perineal pain was cited by 48% of mothers who delivered vaginally. Among these women, 68% had an instrumental delivery (forceps and vacuum), 63% underwent an episiotomy and 43% had vaginal deliveries without an episiotomy. Despite the high prevalence of perineal pain in the postpartum period, there is no available evidence on the best method for its relief. Conventionally, oral analgesics, local anaesthetics, cooling and hot topical applications have been employed, along with the use of low-level laser therapy (LLLT). Scientific studies examining the effectiveness of these therapies have been developed. Irradiation with LLLT involves the emission of light energy, which is absorbed by and dispersed throughout the tissue, thereby stimulating or inhibiting enzyme activities and chemical reactions. These reactions result in physiological and therapeutic processes that generate analgesic, anti-inflammatory and tissular actions. Such effects are known as biomodulatory effects. The mechanisms of these photobiological effects are still unknown. In recent studies, the analgesic effects observed in clinical trials in the dentistry field and some structural similarities between oral and vaginal mucous membranes suggest that these outcomes could also be obtained for perineal pain relief.

Keywords
• Analgesics
• Episiotomy
• LLLT (low level laser therapy)
• Pain management
• Perineum
• Placebo

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after episiotomy. The histological findings also indicate that irradiation with LLLT can accelerate the healing process. Based on these considerations, the present study was proposed, with the aim of evaluating LLLT’s effects on the relief of postpartum perineal pain and the episiotomy healing process in women who had undergone this procedure. This study was a double-blind, randomised, parallel, controlled trial. [...] The study was conducted at an in-hospital Birth Centre and a rooming-in unit in Amparo Maternal, a maternity service located in the city of Sao Paulo, Brazil, which uses active labour management. This institution is part of the Brazilian National Health System and serves women of low socio-economic status with low to medium pregnancy risk. [...] In August 2008, there were 762 deliveries, of which 80.2% (611) were normal deliveries, 19.4% (148) were c-sections and 0.4% (3) were forceps-assisted. Regarding perineal outcomes, 42.9% (262) of women had an intact perineum, 13.3% (81) underwent an episiotomy, 34.9% (213) had first-degree lacerations, 8.6% (52) had second-degree lacerations, and 0.3% (3) had third-degree lacerations. Assistance during labour, normal delivery and the postpartum period is provided by nurse midwives, with a team of obstetricians in charge of the women’s admission examinations, operative deliveries and cases involving clinical and obstetric problems. Episiotomy is selectively practiced in normal deliveries and is preceded by an infiltration of local anaesthesia with lidocaine and no vasoconstrictor. [...] Inclusion criteria included the following: minimum age of 18; no previous vaginal deliveries; vaginal delivery with a mediolateral episiotomy; full-term pregnancy with a single live fetus with cephalic presentation; no infectious diseases, haemorrhoids, bruising or varicose veins on the perineum; no perineal preparation in pregnancy; no use of photosensitising endogenous or exogenous drugs; and no clinical or obstetric complications. [...] The final sample was composed of 52 women who were randomly divided into two groups: an experimental group subjected to low-level laser irradiation and a control group that received a simulation of the treatment without the irradiation. The women were allocated to the control or experimental groups using a computer-generated randomisation list. [...] The source of irrigation was a clinical model, portable LLLT Twin Laser [...], registered with the National Agency for Sanitary Surveillance [...]. The experimental group underwent three sessions of irradiation with a low-level laser placed directly on the episiotomy. The first session occurred immediately after suturing or up to two hours after delivery, the second session occurred between 20 and 24 hrs postpartum and the third one occurred between 40 and 48 hrs postpartum. The irradiation was performed touching the laser pen tip on three points of the episiotomy (central, upper and lower portions), regardless of its length. Similar to the experimental group, the control group participants also underwent three treatment sessions, but without the emission of irradiation, which facilitated the assessment of possible placebo effects (simulation group). [...] Perineal pain intensity was assessed before and immediately after each session of irradiation using a numerical scale from 0 to 10, with zero indicating no pain and ten indicating unbearable pain. A representation of this scale was shown to each postpartum woman, and she was asked to point to the value that best represented the intensity of her pain. Measurements The healing process was assessed with the REEDA scale (Redness, Edema, Ecchymosis, Discharge Approximation) before each of the three irradiation sessions and between 15 and 20 days after discharge. The REEDA scale comprises five items that assess healing: hyperaemia, oedema, ecchymosis, level of wound discharge and approximation of the skin edges at the site of episiotomy. Each item is given a score from zero to three, with 0 indicating no trauma and 3 the most trauma. The maximum value of 15 corresponds to the worst perineal condition. The PeriRuleTM1 was used to evaluate the healing process and the length of episiotomy. It is a measuring device 105 mm long and 10 mm wide made of soft plastic with a millimetre scale imprinted on one side. [...] In both groups, the mean age of the participants was 23.4 ± 4.9 years, with a median of 22 years and minimum and maximum ages of 18 and 39 years, respectively. 8 participants had had a previous caesarean section; most women were nulliparous (84.6%), non white ethnic group (51.9%) and non-smokers (86.5%) and lived with their partner (76.9%). The length of the episiotomy ranged from 1.7 to 5cm, with a mean length of 3.2 ± 0.8 cm, and catgut thread was used in all perineal suturing, using a continuous suture technique in 88.5% (46) of cases. All deliveries included in this study were attended by nurse midwives. Infant birth weight ranged from 2,570 to 4,160 g, with an average of 3,257.3 ± 394.6 g. Infant head circumference ranged from 31 to 37 cm with a mean of 33.6 ± 1.3 cm. [...] This study aimed to evaluate the effect of LLLT on alleviating perineal pain and accelerating perineal wound healing after episiotomy for a vaginal birth. [...] The comparison between the experimental and control groups (integroup) did not show significant differences in perineal pain. The therapeutic effects observed in the groups may have resulted from personal care involved
in the treatment, (Hawthorne effect), which occurs when participants in clinical research change their behaviour when they are targets of interest or receive special attention, regardless of the specific nature of the intervention. [...] Systematic reviews of LLLT’s effectiveness in reducing the pain of rheumatoid arthritis, osteoarthritis and non-specific low back pain have not led to definitive conclusions, due to the heterogeneity of the populations studied and the treatments applied. Chow et al. (2009) reported that the effectiveness of this intervention depends on several factors, such as the wavelength used and the location, duration and dose of the LLLT. It is possible that a combination of systemic and localised treatments is necessary to achieve adequate pain relief that will meet individual women’s needs. The use of analgesics can be considered a limitation of the current study, but it also can be seen as a pragmatic condition because the medication is usually given routinely. Pragmatic studies consider the elements of reality and strengthen the external validity of results, increasing the possibility of their applicability. [...] Regarding the effects of LLLT in accelerating the healing process, experimental studies in vitro and in vivo suggest that this benefit can be triggered by the promotion of cell proliferation and the formation of granulation tissue, by stimulating collagen synthesis and adenosine triphosphate (ATP) in the mitochondria and by activating lymphocytes. [...] Future research... In the current study, no significant difference was found between the experimental and control groups regarding perineal wound healing in the four assessments. [...] The only significant difference between groups was smoking status. The association between smoking and deficiencies in healing is known and it has been reported in some clinical trials. In the maternity service studied, routine postpartum care includes the administration of oral analgesics; therefore, all participants in this pilot study were treated with dipyrone, which is used to treat pain and fever. [...] However, we observed in this study that even after the administration of oral analgesics, a large number of postpartum women (30–57.7%) reported perineal pain [...] indicating the insufficiency of that medical treatment for perineal pain relief. Another limitation of the current study was the reduced period for healing assessment, which was limited to the hospital stay of the women, approximately 48 hrs after the perineal suture. [...] Despite the reduction in perineal pain when the control and experimental groups were compared, the dosimetry and the wavelength of LLLT used in this pilot study was not effective. The red light beam was probably not powerful enough to reach the muscle layers affected by the episiotomy. [...] Given the depth reached by the LLLT beams used in this study, the type of injury and the tissues to be irradiated, we propose developing a randomised controlled study employing a new dosimetry and adding the infrared wavelength of 780 nm, to allow comparisons of results and better evaluation of LLLT for the relief of perineal pain. [...] A new research proposal to examine the effectiveness of the therapy in reducing perineal pain in the perineum could be developed based on another irradiation protocol. Red and infrared irradiation wavelengths could be employed in a new research proposal [...].” [1]

References

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Assertions
Right or wrong?
1. Fortunately perineal pain is quite rare nowadays.
2. It is often associated with instrumental deliveries and episiotomies.
3. The mechanisms of pain medicine in laser therapy are crystal clear.
4. In this study the experimental and control groups did not show significant differences.
5. New research with better dosimetry is needed.

Vocabulary
Match the following words with their French counterparts.
1. undergo/underwent/undergone (v) A. cicatrisation
2. topical (adj) B. issue/séquelles
3. healing (n) C. blessure
4. outcome (n) D. évaluation
5. bruising (n) E. subir
6. assessment (n) F. longueur onde
7. relief (n)/alleviating G. local
8. layer (n) H. contusions/"bleus"
9. injury (n) I. soulagement
10. wavelength (n) J. couche

Keys: 1E, 2G, 3A, 4B, 5R, 6D, 7I, 8J, 9C, 10F.