



PAIN RELIEF TECHNOLOGIES IN NEONATAL CARE UNITS: AN INTEGRATIVE REVIEW OF LITERATURE

TECNOLOGIAS DO CUIDADO NO ALÍVIO DA DOR EM UNIDADES DE TERAPIA NEONATAL: ESTUDO DE REVISÃO INTEGRATIVA

TECNOLOGÍAS DEL CUIDADO EN EL ALIVIO DEL DOLOR EN UNIDADES DE TERAPIA NEONATAL: UNA REVISIÓN INTEGRADA DE LA LITERATURA

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ABSTRACT

Objective: to analyze the pain relief technologies for neonates (NB) undergoing painful procedures in Neonatal Care Units. **Methodology:** this is an integrative review of literature comprised of research in the BDNF, LILACS, SciELO, MEDLINE and the Cochrane Library using controlled keywords “Neonatal ICU”, “pain”, “care” and “analgesia”. The study took place from the questioning, what and how technologies are used for pain relief in neonates in the ICU. Delimited as inclusion criteria, full text, which deal with the subject and published in the period 2002-2011, and exclusion, studies not consistent with the research proposal and duplicate articles. Was employed for analysis, lifting bibliographic, reading exploratory, selective reading, analytical reading, interpretive reading and preparation of text summarizing the results. **Results:** there were 15 (fifteen) scientific productions analyzed, which were grouped on charts and tables systematically describing studies’ properties, emphasizing the key technologies (pharmacological and non-pharmacological therapies) in newborn pain relief care, clinical applicability and indication methods. **Conclusion:** safety and effectiveness in pharmacological therapies is a relevant fact to be considered by the healthcare professionals upon facing the clinical implication in favor of the newborn, therefore, such actions should be incorporated in daily professional nursing, together with the humanized care. **Descriptors:** intensive care; newborn; technology; pain.

RESUMO

Objetivo: analisar as tecnologias de alívio à dor em recém-nascidos submetidos aos procedimentos dolorosos em Unidade de Terapia Neonatal. **Metodologia:** estudo de revisão integrativa de literatura consolidada a partir da pesquisa nos bancos de dados BDNF, LILACS, SciELO, MEDLINE e Biblioteca Cochrane utilizando descritores controlados “UTI neonatal”, “dor”, “cuidado” e “analgesia”. A pesquisa se deu a partir dos questionamentos: quais as tecnologias de alívio à dor são utilizadas em neonatos em UTI? Como são utilizadas as tecnologias de alívio à dor em neonatos em UTI?. Delimitou-se como critérios inclusão texto na íntegra, que versam sobre a temática e publicada no período de 2002-2011; e exclusão, estudos não condizentes com a proposta de pesquisa e artigos duplicados. Empregou-se para análise, levantamento bibliográfico, leitura exploratória, leitura seletiva, leitura analítica, leitura interpretativa e elaboração do texto sintetizando os resultados os quais foram agrupados em figuras. **Resultados:** analisaram-se 15 produções científicas, descrevendo sistematicamente suas propriedades, enfatizando as principais tecnologias no cuidado do alívio da dor no recém-nascido, os métodos de aplicabilidade e indicações clínicas, considerando os marcadores fisiológicos, sensitivos e comportamentais do neonato. **Conclusão:** segurança e eficácia nas terapias farmacológicas é um fato relevante a ser considerado pelos profissionais perante os cuidados prestados frente à implicância clínica em favor do recém-nascido, portanto, ações dessa natureza devem estar no cotidiano do profissional da enfermagem, juntamente ao cuidado humanizado. **Descritores:** cuidados intensivos; recém-nascido; tecnologia; dor.

RESUMEN

Objetivo: analizar las tecnologías de aliviar el dolor en los neonatos (RN) sometidos a procedimientos dolorosos en Unidades de Terapia Neonatal. **Metodología:** se trata de una revisión integrada de la literatura consolidada de la investigación en las bases de datos en Base de BDNF, LILACS, SciELO, MEDLINE y la Biblioteca utilizando descriptores controlados “UTI neonatal”, “dolor”, “precaución” y “analgesia”. El estudio se llevó a cabo a partir del cuestionamiento, cuáles y cómo las tecnologías se utilizan para el alivio del dolor en los recién nacidos en la UCI. Delimitado como criterios de inclusión, texto completo, que se ocupan del tema y se publicó en el período 2002-2011, y la exclusión, de los estudios no son consistentes con la propuesta de investigación y artículos de duplicados. Se empleó para el análisis, levantamiento bibliográfico, la lectura exploratoria, lectura selectiva, lectura analítica, lectura interpretativa y la preparación de un texto que resume los resultados. **Resultados:** se analizaron 15 (quince) producciones científicas, que se agruparon en cuadros y tablas que sistemáticamente describen las propiedades de los estudios enfatizando las principales tecnologías (terapias farmacológicas y no farmacológicas) en el cuidado de alivio del dolor en recién nacidos, los métodos de aplicabilidad y las indicaciones clínicas. **Conclusión:** la seguridad y eficacia en los terapias farmacológicas es un hecho relevante a considerar por los profesionales antes de enfrentarse a la implicación clínica en favor del recién nacido, por lo tanto, tales acciones deben ser incorporados en el personal de enfermería diaria, junto con el cuidado humanizado. **Descritores:** cuidados intensivos; recién nacido; tecnología

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INTRODUCTION

Pain is a qualitative sensation which integrates people's lives. While young people and adults can define and express to others the type, degree, the intensity and location of this, newborns do not have the capacity for interaction.

Pain in newborns (NB) was not a concern to clinicians and researchers for a long time, because there was the belief that the neonate was incapable of feeling pain. This concept became suspect in the 1960s that the NB was really capable of feeling pain, when it was possible to observe that myelination was not essential for the transmission of nerve impulses.^{1,2}

Therefore, it is known that the neonate has all the functional components and neurochemicals necessary for the receipt and transmission of painful stimulus. In this understanding, it is essential that nurse awareness on pain and the need for assessment and control in order to prevent or treat pain in this population segment, certainly seen as more important in care.^{1,3}

In the meantime, there has been, considerable innovative care technologies that evoke a process in the demand for the nursing and interdisciplinary team in the incorporation of technical and scientific knowledge that enables the alleviation of pain stimuli in the neonate, a victim of numerous painful procedures when hospitalized in an Intensive Care Unit (ICU).

The ICU's are places that provide specialized care, which feature complex technologies and methods, is a stressful environment which involves the subjects' lives such as the family, patient and professional where frequently, it values the procedure in detriment of the human care subjectivity.⁴

Despite all the advances in pain and therapeutic resources available, there is still a gap between the theoretical-practical knowledge in pain measurement for the majority of neonatal services. Health professionals are not prepared to relieve pain and suffering of the client, but rather to heal them.⁵

For this reason, the subject reiterates issues about assessment and, above all in the reduction of painful sensation by means of more efficient technologies in their relief. Therefore, one may consider that the dealing with the NB becomes an even more complex process.

Therefore, on behalf of health care providers raised the inquiry about the issue derived from the following question: What pain relief technologies are currently used with newborns in Neonatal therapy Units and how?

Therefore, this article aims to analyze pain relief technologies in NBs through an integrated literature review.

METHOD

This is an integrated literature review because it presents the condition, finding strong evidence to review existing research related to a broad methodological approach, allowing the inclusion of non-experimental and experimental studies for the understanding of the analyzed phenomenon.⁶

The research from studies is conducted in the following databases: BDENF (Data Bank on nursing), LILACS (Latin American and Caribbean System on Health Sciences Information), MEDLINE (Medical Literature Analysis and Retrieval System Online), SciELO (Scientific Electronic Library Online) and in the Cochrane library.

For the location of the studies, controlled keywords were used: "Neonatal ICU", "pain", "care" and "analgesia" in the Portuguese language and/or in its derivations in the English language.

Later research using these keywords, the review from studies, excluding those not consistent with the criteria and the proposed research and duplicated productions were conducted.

The inclusion criteria were studies that have addressed the: articles with full text, articles that touch on the proposed theme and published in the last ten years (2002-2011).

Following established criteria, by systematic stage analysis of the research literature was employed, considering: the primary literature in the databases mentioned above, the reading of exploratory studies, verifying the feasibility of the studies found for the literature review, the selective reading, analyzing, specifically, the relevance of the studies, the analytical reading, summarizing the information found in a critical way, interpretative reading, articulating the knowledge learned in all the studies reviewed, and preparation of the final text summarizing the results of the literary research.⁷

The studies on this research were based on data collected gathered in tables so that their

properties / characteristic thereof are best described and interpreted.

RESULTS AND DISCUSSION

• Characterization of the studies

Database	Researched Studies	Excluded Studies	Repeated Studies	Included Studies
BDENF	0	0	0	0
LILACS	5	2	0	3
SciELO	0	0	0	0
MEDLINE	116	111	1	5
Biblioteca Cochrane	50	43	0	7
Total	171	156	1	15

Figure 1. Literary research, selection and inclusion of studies in the literary review, 2011.

There were 171 articles selected for research methodology, of which 156 were excluded because temporal dimension, not available in its entirety, as well as studies with discordant themes. There were also accounts of duplicate articles that by reason of consistency variables were placed in exclusion, totaling only 1 study. At the end of the research, the remaining 15 studies are to be discussed.

There was the systematic analysis of 15 productions relevant to the research which will be described in two axes. The first will be submitted to the characterization of the studies in synoptic tables (Tables 1, 2 and 3) highlighting the name of the article, country of production and year of publication, methodology and the technology used, as well

researched

Figure 1 presents the quantity picked from the literature taking into account the databases, the criteria for inclusion / exclusion as well as other variables.

as systematically describing the properties of the literary review studies(2011), emphasizing that the technologies employed are consistent with the similarity between them; and then put into relevant the reports brought about by theoretical studies emphasizing the methods of using the care technologies in relief, reduction or cessation of pain in newborns hospitalized in the Neonatal Intensive Care Units.

The 15 studies included in the review, most of them were published in the last five years, of which 12 are international (80%) and three national (20%). They have the virtue of evidence, as they are studies with methodological designs and high clinical examination accuracy, a fact considered positive for this study.

Title	Country and Year	Methodology:	Technology used
Pain assessment in preterm infants during respiratory physiotherapy ⁸	Brazil, 2008	Longitudinal Prospective	Sweet solutions, positioning, tactile stimulation and respiratory therapy
Oral sucrose and a pacifier for pain relief during simple procedures in newborn preterm infants: a randomized controlled study ⁹	Saudi Arabia, 2009	Double-blind, randomized and controlled	Sucrose solution to 24% combined with pacifier
Kangaroo mother care diminishes pain from heel lance in very preterm neonates: A crossover trial ¹⁰	Canada, 2008	Crossover Study, randomized single-blind	Kangaroo Mother Method
Sucrose for analgesia in newborn infants undergoing painful procedures ¹¹	Canada, 2004	Systematic Review	Sucrose solution at 24%
Skin-to-skin care is procedural pain in neonates [protocol] ¹²	Canada, 2011	Review Protocol	Skin-to-skin contact of the baby with another person (mother, father, professional)

Figure 2. Technologies for non-pharmacological pain relief in neonates.

Health Technology must not be identified by only products, but also by knowledge and tools that can be used in various areas of health care. In this respect the non-pharmacological therapies have an important role in relieving pain in newborns.

The sugary solutions (sucrose 24 %) are

widely used in some Neonatal Care Unit services. Generally, they use a method quite conventional and easy to administer. The professional administers the volume of 0.5 ml or 0.12 g of solution combined with a pacifier or syringe, orally offered for 30 seconds to 2 minutes before the painful procedure. This method is employed to relieve tracheal

cannula pain from mechanical ventilation; vein, arterial and calcaneus punctures It is believed that the time interval coincides with the release of endogenous opioids through the bloodstream.^{8-9, 11}

Another non-pharmacological therapy which also deserves mention, which the affection between mother and child, and the Kangaroo Mother Method (KMM). The baby wears diapers while in the vertical position with an angle of approximately 60°, between the mother's breasts, giving maximum

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contact between the baby's skin and the mother's. Clothes and a blanket are place on the child's back and bent on both sides of the mother. The baby remains in this position for at least 15 minutes before the painful procedure.^{10, 12}

The KMM is strongly recommended for premature newborns of 28-36 weeks, the mothers are allowed to speak to their child, reducing the pain response, the sucrose can also use as an adjuvant.

Title	Country and Year	Methodology:	Technology used
Factors related to use of systemic analgesia in neonatology ¹³	Brazil, 2008	Literature review	Morphine, Fentanyl, Remifentanyl; Non-opioids: Paracetamol
Frequency of analgesics usage in university neonatal intensive care units ¹⁴	Brazil, 2005	Prospective cohort study, observational and multicentric	Fentatil, Lidocaine and Morphine
Feasibility of sedation and analgesia interruption following cannulation in neonates on extracorporeal membrane oxygenation ¹⁵	USA, 2010	Observational Prospective	Morphine, Fentanyl and Midazolam and Phenobarbital
Intravenous midazolam infusion for sedation of infants in the intensive care unit neonatales ¹⁶	Canada, 2002	Systematic Review	Midazolan
Opioids for neonates receiving ventilation ¹⁷	Italy ,2007	Systematic Review	Morphine, Fentanyl, Alfafentanyl, Sufentanyl
Drugs of Choice for Sedation and Analgesia in the NICU ¹⁸	USA, 2009	Literary Review	Opioids: Morphine, Fentanyl Benzodiazepines, Barbiturates; Non-opioids: NSAIDS.

Figure 3. Pharmacological Technologies (opioids) for the relief of pain in neonates.

In referring to pharmacological therapies, opioids are found in all neonatal care services. It is noted that the frequency of analgesic use in neonates is a substantial practice, however, it is known that the effects of these drugs are harmful to the newborn, respiratory depression may occur, chest wall rigidity, tolerance, withdrawal and dependence.¹³⁻⁴

On the other hand, it is also known that opioid analgesics are extremely important in various and numerous achievements of painful procedures such as arterial, lumbar, capillary and venous punctures. The use of opioids is widely accepted in the Neonatal Therapy Unit during more invasive procedures by means of "protocols" established in the intervention of pain, especially when the intensive care not objectively describes the pain felt (without correct measurement) by the newborn infant, such as insertions of central catheter, necrotizing enterocolitis, insertion of drains, tracheal cannula insertions for Extra Corporeal Oxygenation and also Mechanical Ventilation (MV), in which the opioid is administered for the reduction of pain and

stress and to avoid further complications.¹⁴⁻⁸

With this understanding, the main opioids are morphine infused intermittently from 0.05 to 0.2 mg / kg / dose and continuous administration in newborns accordance 5-20 mcg / kg / hour and premature 2 10 mg / kg / hour; fentanyl have rapid action hemodynamic stability being intermittently administered 1-4 mg / kg 2-4 hours for continuous administration in the newborn at term from 0.5 to 3 mg / kg / hour and premature 0.5 to 2 mg / kg / hour.¹³⁻⁵

Remifentanyl is also a commonly used synthetic opioid; the doses vary according to the objective, bolus infusion for 1 to 3µg/kg intubation and for continuous infusion of 0.1 to 5µg/kg/minute.¹³

Other opioids are cited for analgesia, namely: Phenobarbital, Midazolam, alfentanyl, sufentanyl, pethidine, meperidine, codeine, but the use selective is indicated based on the clinical evaluation of pain indicators.¹⁵⁻⁸

Title	Country and Year	Methodology:	Technology used
How effective is tetracaine 4% gel, before a venipuncture, advertised in procedural pain in infants: a randomized double-blind placebo controlled trial ¹⁹	Canada, 2007	Double-blind, randomized and controlled	Topical Tetracaine 4%
Local anaesthetic eye drops for prevention of pain in preterm infants undergoing screening for retinopathy of prematurity ²⁰	Ireland, 2011	Systematic Review	Proximetacaine
Propofol for procedural sedation/anaesthesia in neonates ²¹	Canada, 2011	Systematic Review	Propofol
Premedication for endotracheal intubation in neonates [protocol] ²²	Canada, 2011	Review Protocol	Anticholinergic, analgesic and anxiolytic drugs

Figure 4. Pharmacological Technologies (non-opioids) for the relief of pain in neonates.

The non-opioid pharmacological technologies are highlighted in different intensive a non-intensive therapeutic events, analgesics are administered during pre-medication for pain relief and to sedate the newborn.

The tetracaine gel 4% was assessed at a hospital in Ottawa, Canada, before the dosage: 1.1g of tetracaine on the skin 30 minutes prior to venipuncture, the gel must be removed before this procedure. It is valid to point out that this method was not seen in neonates with immature skin, with suspicion or evidence of abnormalities in the Central Nervous System (CNS), those who receive opioids or sedatives and those with facial abnormalities, thus making the interpretation of pain through facial expression. In this aspect, physiological indicators of pain were recorded (heart rate, blood pressure, respiratory rate and oxygen saturation).¹⁹

Under the statistical power, topical tetracaine is safe, but does not significantly decrease pain in venipuncture procedures.¹⁹

Proparacaine, a topical anesthetic eye was studied in infants undergoing screening for Retinopathy of Prematurity (ROP). Proximetacaine was instilled in the eye at least 30 seconds before the examination. The anesthetic action is one to five minutes it was identified due to the pain assessment findings - in the fifth minute the expressions of pain are lower than in the first minute, therefore the pain was not eliminated.²⁰

Propofol is already a parenteral anesthetic, and feasible in newborns for intubation, significantly reducing the duration of preparation, procedure time and post-procedure recovery. There is no increase in the incidence of side effects attributable to Profopofol, however, more recent studies indicate that this drug has an impact on the heart rate, oxygen saturation and blood pressure.²¹

Regarding the anesthetic drugs, anxiolytics and anticholinergics, in the same way as some opioids, the administration protocols are “accountable” for the use in neonatal units, because the safety of this is not yet defined.²¹⁻²

CONCLUSION

This review disposed knowledge how the care technologies in Neonatal Care Units are used and what their purposes are. In this same aspect, the use of the main drugs and non-drugs was highlighted, in order to update, the caregiver subjects, in particular the intensivists, the most effective means for the relief and/or cessation of pain and avoiding the consequences in the care process.

The non-pharmacological therapies deserve mentioning by way of medical care as they are knowledge developed so that newborns will be subjected to less aggravating procedures, thus promoting recovery.

With respect to pharmacological therapies, in turn, providers should evaluate the efficacy and safety of the newborn to indicate the administration of certain therapies in these conditions; one needs a more thorough analytical judgment and a careful approach to have practical clinical implications in favor of the newborn.

Evidently, the results of this research are limited, a fact that implies other questions. Therefore, the contributions of this study sought provide reflections from clinical practice and their controversies, as well as the professional posture facing pain in the newborn.

REFERENCES

1. Sousa BBB, Santos MH, Sousa FGM, Gonçalves APF, Paiva SS. Avaliação da dor como instrumento para o cuidar de recém-nascidos pré-termo. Texto Contexto Enferm. 2006; 15 (Esp): 88-96.

2. Guinsburg R, Kopelman BI, Almeida MFB, Miyoshi MH. A dor no recém-nascido prematuro submetido a ventilação mecânica através de cânula traqueal. *Jor Pediat*. 1994 Mar-Apr; 75(3):82-90.
3. Bueno M, Kimura AF, Diniz CSG. Evidências científicas no controle da dor no período neonatal. *Acta Paul Enferm* [Internet]. 2009 [cited 2011 Oct 15];22(6):828-32. Available from: <http://www.scielo.br/pdf/ape/v22n6/a16v22n6.pdf>
4. Adams F, Rodrigues FCP, Fontana RT. The light technologies in the nursing assistance in the Units of Intensive Therapy. *Rev enferm UFPE on line* [Internet]. 2011 Mar/Apr [cited 2011 Oct 15]; 5(2):417-25. Available from: http://www.ufpe.br/revistaenfermagem/index.php/revista/article/view/1366/pdf_449
5. Crescêncio EP, Zanelato S, Leventhal LC. Avaliação e alívio da dor no recém-nascido. *Rev Eletr Enf* [Internet]. 2009[cited 2011 Oct 15];11(1):64-9. Available from: <http://www.fen.ufg.br/revista/v11/n1/pdf/v11n1a08.pdf>
6. Souza MT, Silva MD, Carvalho R. Revisão integrativa: o que é e como fazer. *Einstein*. 2010; 8(1 Pt 1):102-6
7. Gil AC. Como elaborar projetos de pesquisa. 4ª ed. São Paulo: Atlas; 2007.
- 8- Nicolau CM, Pigo JDC, Bueno M, Falcão MC. Avaliação da dor em recém-nascidos prematuros durante a fisioterapia respiratória. *Rev Bras Saúde Matern Infant* [Internet]. 2008 Jul/Set [cited 2011 Oct 15];8(3):285-90. Available from: <http://www.scielo.br/pdf/rbsmi/v8n3/a07v8n3.pdf>
9. Elserafy FA, Alsaedi SA, Louwrens J, Sadiq BB, Mersal YA. Oral sucrose and a pacifier for pain relief during simple procedures in preterm infants: a randomized controlled trial. *Ann Med Arábia* [Internet]. 2009 May-June [cited 2011 Oct 15];29(3):184-8 Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2813645/?tool=pubmed>
10. Goulet C, Bell L, McNaughton K, Byron J, Aita M, Finley GA, et al. Kangaroo mother care diminishes pain from heel lance in very preterm neonates: A crossover trial. *BMC Pediatrics* [Internet]. 2008 Apr/Mai [cited 2011 Oct 15];8(13):1-9. Available from: <http://www.biomedcentral.com/content/pdf/1471-2431-8-13.pdf>
11. Stevens B, Yamada J, Ohlsson A. Sucrosa para la analgesia en recién nacidos sometidos a procedimientos dolorosos. *The Cochrane Library* [Internet]. 2004 Mar/Apr [cited 2011 Oct 27];2008(2):1-58. Available from: <http://www.update-software.com/pdf/CD001069.pdf> Cochrane Library number: CD001069
12. Johnston C, Campbell-Yeo M, Fernandes A, Inglis D, Streiner D, Zee R. Skin-to-skin care for procedural pain in neonates. *The Cochrane Library* [Internet]. 2010 Feb/Mar [cited 2011 Oct 27];2010(3):[about 4 p.]. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008435/full> Cochrane Library number: CD008435
13. Aymar CLG, Coutinho SB. Fatores relacionados ao uso de analgesia sistêmica em neonatologia. *Rev Bras Ter Intensiva* [Internet]. 2008 [cited 2011 Oct 27];20(4):405-10. Available from: <http://www.scielo.br/pdf/rbti/v20n4/v20n4a14.pdf>
14. Prestes AC, Guinsburg R, Balda RC, Marba ST, Rugolo LM, Pachi PR, et al. Frequência do emprego de analgésicos em unidades de terapia intensiva neonatal universitárias. *J Pediatr* [Internet]. 2005 [cited 2011 Oct 27];81:405-10. Available from: <http://www.scielo.br/pdf/jped/v81n5/v81n5a12.pdf>.
15. Wildschut ED, Hanekamp MN, Vet NJ, Houmes RJ, Ahsman MJ, Mathot RAA, et al. Feasibility of sedation and analgesia interruption following cannulation in neonates on extracorporeal membrane oxygenation. *Intensive Care Med* [Internet]. 2010 Apr/Mai [cited 2011 Oct 15];2010(36):1587-91. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2921052/pdf/134_2010_Article_1931.pdf.
16. Ng E, Taddio A, Ohlsson A. Infusión de midazolam intravenoso para la sedación de los lactantes en la unidad de cuidados intensivos neonatales. *The Cochrane Library* [Internet]. 2002 Sept [cited 2011 Oct 27];2008(4):1-20. Available from: <http://www.update-software.com/BCP/BCPGetDocument.asp?DocumentID=CD002052> Cochrane Library number: CD002052.
17. Bellù R, Waal KA de, Zanini R. Opiáceos para recién nacidos que reciben ventilación mecánica. *The Cochrane Library* [Internet]. 2007 Aug [cited 2011 Oct 27];2008(4):1-48. Available from: <http://www.update-software.com/BCP/BCPGetDocument.asp?DocumentID=CD004212> Cochrane Library number: CD004212.
18. Hall RW, Shbarou RM. Drugs of Choice for Sedation and Analgesia in the NICU. *Clin*

Perinatol [Internet]. 2009 Mar [cited 2011 Oct 15];36(1):15-26. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2662993/pdf/nihms96708.pdf>.

19. Lemyre B, Hogan DL, Gaboury I, Sherlock R, Blanchard C, Moher D. How effective is tetracaine 4% gel, before a venipuncture, in reducing procedural pain in infants: a randomized double-blind placebo controlled trial. BMC Pediatrics [Internet]. 2007 Feb [cited 2011 Oct 15];7(7):1-8. Available from: <http://www.biomedcentral.com/content/pdf/1471-2431-7-7.pdf>.

20. Dempsey E, McCreery K. Local anaesthetic eye drops for prevention of pain in preterm infants undergoing screening for retinopathy of prematurity. The Cochrane Library. [Internet] 2011 Sept [cited 2011 Oct 15];2011(9):1-22. Available from: <http://www.update-software.com/BCP/WileyPDF/EN/CD007645.pdf> Cochrane Library number: CD007645.

21. Shah PS, Shah VS. Propofol for procedural sedation/anaesthesia in neonates. The Cochrane Library [Internet]. 2011 Mar [cited 2011 Oct 27];2011(3):1-21. Available from: <http://www.update-software.com/BCP/WileyPDF/EN/CD007248.pdf> Cochrane Library number CD007248.

22. Lodha A, Ohlsson A, Shah VS. Premedication for endotracheal intubation in neonates. The Cochrane Library. [Internet]. 2003 Apr [cited 2011 Oct 27];2003(4):[about 4 p.]. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004499/full> Cochrane Library number: CD004499.

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