

- Australian Council of Operating Room Nurses (ACORN), (2008). *Postanaesthesia Recovery (PAR) Nurse: NR6*. ACORN, Sydney.
- Australian and New Zealand College of Anaesthetists, (2006). *Recommendations for the Post-Anaesthesia Recovery Room*. Review PS4.
- Barhydt, S. J. (Ed). (1996). *Operating Room Nursing: Perioperative Practice*. (3rd ed) New York: Appleton & Lange.
- Colwill, B. (2001). Nurse autonomy: Pain control and discharge from recovery. *British Journal of Perioperative Nursing*, 11(7), 300-306.
- Creswell, J. W. (1998). *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*. London, Sage.
- Drain, C. B. (2003). *Perianesthesia Nursing: A Critical Approach*. (4th ed). Sydney: W.B. Saunders.
- Fraulini, K. (1987). *After Anesthesia: A guide for PACU & ICU Medical-Surgical Nurses*. New York: Appleton & Lange.
- Hatfield, A., & Tronson, M. (2001). *The Complete Recovery Room Book*. (3rd ed). New York: Oxford University Press.
- Hooper, V. (2005). 20 years of History: Has that much changed? *Journal of Perianesthesia Nursing*, 20(1), 1-2.
- Kiekkas, P., Pouloupoulou, M., Papahaizi, A. & Souleles, P. (2005). Is postanesthesia care unit length of stay increased in hypothermic patients? *AORN Journal*, 81(2), 379 - 392.
- Kohn, M. L. & Atkinson, L. J. (eds). (1992). *Berry & Kohn's Operating Room Technique*. (7th ed). St Louis, Mo: C.V. Mosby.
- Lunn, J. N. (1994). Recovery from anaesthesia. *British Medical Journal*, 308(6932), 804.
- Mills, M., & Sullivan, K. (2000). Patients with operative oesophageal cancer: Their experience of information-giving in a regional thoracic unit. *Journal of Clinical Nursing*, 9(2) 236-246.
- Odom, J. (2003). The Perianesthesia Nurse: Standard Bearer. *Journal of Perianesthesia Nursing*, 18(4), 225-226.
- Radford, M. (2003). Recovery nursing services: An evolution. *British Journal of Perioperative Nursing*, 13(4), 155.
- Sandelowski, M. (2000). Focus on research methods: Whatever happened to qualitative description? *Research in Nursing and Health*, 23, 334-340.
- Sullivan, E. E. (2002). Standards of Perianesthesia Nursing Practice 2002. *Journal of Perianesthesia Nursing*, 17(4), 275-276.

Perineal Trauma And Childbirth: A Discussion Paper

Christina Teale, Bn student

School of Nursing & Midwifery, Faculty of Health, University of Newcastle

Lyn Ebert, M Phil (UoN), Midwifery lecturer

School of Nursing & Midwifery, Faculty of Health, University of Newcastle

Carol Ann Norton, Lecturer

School of Nursing & Midwifery, Faculty of Health, University of Newcastle

Abstract

Objective: The aim of this paper is to identify midwifery and medical strategies that reduce pain and morbidity resulting from perineal trauma. The question put forward was What midwifery and medical strategies reduce pain and morbidity associated with perineal trauma resulting from birth?

Method: A review of the literature was undertaken. Both qualitative and quantitative research-based literature related to perineal pain was examined.

Findings: Cold therapy and analgesia reduce pain and oedema in the immediate postnatal period, while pelvic floor exercises reduce incontinence in the longer term.

Conclusion: Prevention of perineal trauma is most favourable outcome for birthing women. Where perineal trauma exists, women should be offered analgesia and/or cold therapy to relieve immediate and short-term pain and morbidity. Longer-term morbidity and the incidence of postnatal incontinence is reduced with adherence to exercise programs. Midwives must become more proactive in preventative measures that reduce perineal trauma and provide pain relief strategies when perineal trauma exists.

Key Words: Perineum, Pain, Perineal Trauma, Childbirth

INTRODUCTION

Perineal trauma contributes to longer term morbidity following childbirth (Williams, Herron-Marx, & Hicks, 2007; Nilsen & Reinart, 2000; Hedayati, Parsons & Crowther, 2003). In 2004, data revealed that 44.2% of birthing women in Australia sustained first or second degree perineal lacerations, 17% had an episiotomy (Laws, Grayson & Sullivan, 2006), and 1.3% had third or fourth degree tears (Laws, Grayson & Sullivan, 2006). These figures indicate that a large number of Australian women sustain perineal trauma with the potential to cause pain and the likelihood of longer term complications (Laws, Grayson & Sullivan, 2006).

For women suffering perineal trauma, pain and oedema are the most crucial concerns in first few days following birth (Chiarelli & Cockburn, 1999). These women have an initial decrease in mobility and the ability to perform daily activities. Difficulty in sitting as a result of perineal pain may impede the

initiation of breastfeeding and affect mother-infant bonding. These restrictions add pressure to new mothers attempting to socialize into the role of motherhood (East, Marchant, Begg & Henshall, 2006). Perineal trauma contributes to urinary and fecal incontinence and sexual dysfunction (Williams, Herron-Marx, & Hicks, 2007). Up to 60% of women with perineal trauma report pain during intercourse three months after birth, with 30% experiencing pain at six months (Nilsen & Reinart, 2007).

Perineal wounds requiring medical care and pain management may result in longer hospital stays, causing further stress on women, their families and the health care system (Laws, Grayson & Sullivan, 2006). Women discharged early also require extra attention from community midwives for ongoing management of wounds. Women suffering longer term postpartum complications are reluctant to seek help, resulting in silent suffering of treatable conditions (Calvert & Flemming, 2007). There is a possibility that these issues lead

to significant psychological problems (Dahlen, Ryan, Homer & Cooke, 2006).

Prevention of perineal trauma is the best option for birthing women. Pain and morbidity associated with perineal trauma have been reduced in the immediate postpartum period as a result of improved techniques in perineal repair and suture materials. Research around strategies aimed at improving perineal well being in the longer term is scarce (Calvert & Flemming, 2000). A discussion of published research focusing on perineal trauma follows.

SEARCH STRATEGY

Databases were searched, initially using the terms "episiotomy" and "perineal trauma". Wild cards and truncation were then used to refine the search (Hek, Langton & Blunden, 2000). Various online nursing and medical journals were searched (Schneider, Elliot, LoBiondo-Wood, Haber, 2003), and finally the reference lists of articles accessed were examined for additional sources of published research (Davies & Logan, 2003).

Initially, only studies published since 1998 were to be included. However, an initial search revealed a paucity of material. A decision was then made to include relevant studies published earlier than 1998. Inclusion criteria for studies were constructed allowing for specific groups, such as primiparous women birthing vaginally, multiparous women with previous perineal trauma (including episiotomy) and women experiencing urinary incontinence. To reduce confounding variables, exclusion criteria for studies were also set. These included women with co-morbidity, mothers of stillborn children or women with a retained placenta. Studies focusing on surgical management of perineal repair, such as suturing materials and techniques were not included.

RESULTS

The search resulted in a number of recurring topics, which were reviewed according to their relevance and ability to provide an answer to the question What midwifery and medical strategies reduce pain and morbidity associated with perineal trauma resulting from birth? The findings from individual studies and systematic reviews have been grouped according to the focus of the intervention or study. Research around perineal trauma focused generally on preventative measures, medication to alleviate perineal pain, alternative and complementary therapies to reduce perineal discomfort, and pelvic floor exercises. A discussion of these areas of research follows.

Preventative Measures

The single most effective means of reducing pain and morbidity associated with perineal trauma is to prevent trauma in the first place. A systematic review by Beckmann & Garret (2006) concluded that antenatal perineal massage from 35 weeks gestation helps reduce perineal trauma during birth and pain afterwards. The review included three large studies and reported an overall reduction in trauma requiring suturing (mostly episiotomies) by 9%. The impact of antenatal perineal massage was clear for primiparous women, but was less clear for multiparous women (Beckmann & Garrett, 2006).

Two single studies examining intrapartum perineal massage revealed no benefit for women in terms of perineal trauma or postpartum pain (Stamp, Kruzins & Crowther, 2001; Al-

bers, Sedler, Bedrick, Teaf & Peralta, 2005). Positioning of the woman during labour and birth has been examined with mixed results. Lithotomy and squatting positions in labour are associated with increased incidences of anal sphincter tears (Gottvall, Allebeck & Ekeus, 2007). On the other hand left sided positioning in labour decreases the rate of perineal tears (Nicholl & Cattell, 2006).

In Australia a significant improvement in perineal tear statistics was achieved for women requiring interventions during labour and/or birthing with the implementation of a clinical practice improvement strategy (Nicholl & Cattell, 2006). The Plan, Do, Study, Act (PDSA) process improved the rate of perineal tears at Royal North Shore Hospital, Australia. Clinicians were advised to cease directed pushing during the second stage of labour. Women were encouraged to birth on their left side rather than in the lithotomy position and vacuum extraction was employed rather than forceps for assisted birthing (Nicholl & Cattell, 2006).

Medication to Alleviate Perineal Pain

For women who have sustained perineal trauma during childbirth the best strategies to minimize pain and suffering must be offered. A systematic review of rectal analgesia following birth concluded that rectal analgesia provides pain relief for up to 24 hours with reduced need for further pain medication (Hedayti, Parsons & Crowther, 2003). A later systematic review by Hedayti, Parsons & Crowther (2005) examined topically applied anaesthetics and found compelling evidence to support the use of topically applied medications. Outcomes were measured up to four days after birth.

Three single studies have examined medication effectiveness using self-reported numerical pain scores at timed intervals, and the women's need for additional analgesia (Corkhill, Lavender & Walkinshaw, 2001; Peter, Janssen, Grange & Douglas, 2001; Searles & Pring, 1998). Participants in all three studies had recently given birth. They were randomly allocated into either a placebo or treatment group. There were no substantial differences in the demographics of the sample group. Searles & Pring (1998) tested rectal diclofenac against a placebo. Rectal diclofenac provided good pain management for two days postpartum and reduced the need for additional analgesia (Seales & Pring, 1998).

Peter, Janssen, Grange & Douglas (2001) used randomised groups who were given oral ibuprofen or acetaminophen with codeine. No variation in efficacy was detected, however ibuprofen's ease of use and cost-effectiveness was noted (Peter, Janssen, Grange & Douglas, 2001).

A double blind randomised control trial comparing 2% lignocaine gel with a placebo concluded a reduction in pain at 24 hours after birth for women allocated to the lignocaine group (Corkhill, Lavender & Wilkinshaw, 2001). Although these findings contradict the systematic review by Hedayti, Parsons & Crowther (2005), the findings were limited to 24 hours after birth, and the authors state there was no difference in the need for oral analgesia between the treatment group and placebo group. Further research into women's acceptance of treatments and compliance with self-medication for perineal pain is required.

All systematic reviews and single studies examined short-term outcomes. No studies included the impact on initiation and maintenance of breastfeeding or effects on daily activities as measured outcomes.

Alternative Therapies to Reduce Perineal Discomfort

Alternative or complimentary therapies to reduce perineal discomfort have also been researched (Steen, Cooper, Marchant, Griffiths-Jones & Walker, 2000; Hill, 1989; Hur & Han, 2004; Knobloch, 1987). All four studies selected participants at random.

Outcomes from the studies were derived from subjective measurements:

two studies relied on midwives' visual appraisal of the effectiveness of the intervention (Hur & Han, 2004; Hill, 1989);

two studies included patient response as part of the evaluation tool (Knobloch, 1987; Steen, et al. 2000).

When examining the effects of hot and cold therapies, cold sitz baths were found to provide greater relief (Knobloch, 1987). Alternating cold and warm perineal packs as opposed to warm sitz baths resulted in no significant differences in outcomes for either treatment (Hill, 1989). The inclusion of aromatherapy in sitz baths proved beneficial in reducing discomfort (Hur & Han, 2004). Maternity gel pads were found to provide a high level of relief (Steen, Cooper, Marchant, Griffiths-Jones & Walker, 2000).

The findings from these studies indicate that cold therapies provided some relief from perineal pain, due to numbing of the local area and possibly reduction of oedema. However this was not conclusively tested in any of the studies. Treatments were not tested against 'no treatment' and as such the absolute effectiveness cannot be measured. Sample groups were small, with all the authors discussing the need for larger studies to confirm findings.

Pelvic Floor Exercises

Pregnancy and birth place great stress on the pelvic floor muscles. This group of muscles is vitally important for urinary, faecal and sexual well being (Berzuk, 2007). A literature review by Briggs (2006) concluded that pelvic floor exercise programs promote compliance and are effective in alleviating and preventing urinary incontinence (Briggs, 2006). Two single studies involved random selection of participants into a postnatal intervention or standard care group, and also reported a reduction in incontinence and reduced severity of the incontinence. The intervention groups received guided pelvic floor exercises (Glazener, et al. 2001; Chiarelli, Murphy & Cockburn, 2002). A study by Reilly, et al. (2002) trialed antenatal supervised pelvic floor exercises. The incidence and severity of incontinence was reduced.

However Mason, Glenn, Walton & Hughes (2000) suggests that clinical trials of pelvic floor exercises are unreliable. Women trained and supported by professionals have higher compliance rates, which may artificially improve results (Mason, Glenn, Walton & Hughes, 2001; Chiarelli & Cockburn, 2002). Information retrieved through questionnaires indicates women feel they are given insufficient instructions and rarely comply with pelvic floor exercise programs without ongoing support or encouragement (Mason, Glenn, Walton & Hughes, 2000). Self-reporting may result in biased results. For example, women may feel uncomfortable reporting incontinence and women experiencing a negative birth experience may give prejudicial information (Chiarelli & Cockburn, 2002; Glazener, et al. 2001; Reilly, et al. 2002; Mason, Glenn, Walton & Hughes, 2000; Chiarelli, Murphy & Cockburn, 2003).

DISCUSSION

This paper reviewed current literature in an attempt to answer the question What midwifery and medical strategies reduce pain and morbidity associated with perineal trauma resulting from birth?

In order to reduce perineal pain and morbidity associated with childbirth, health professionals need to educate and be educated. Women need to be educated about the changes to and recovery of their perineum during childbirth (Boyle, 2006). Women must be educated in how to assess their own perineum to ensure good healing, and health professionals must be knowledgeable regarding the degree of the trauma and the outcomes for women (Boyle, 2006). Nicholl & Cattell, (2006) suggest that health professionals need to look towards evidence when discussing care options with women.

Effective wound care and pain relief must be provided. The Royal Women's Hospital clinical practice guidelines (2006) recommend management of perineal wounds that should include ice therapy to reduce oedema and laxatives to prevent constipation. Good perineal hygiene after bowel and bladder use reduces the risk of infection (Chiarelli & Cockburn, 1999). The rectal analgesia diclofenac was reported to provide good pain relief postpartum with no adverse side effects (Hedayati, Parsons & Crowther, 2003; Searles & Pring, 1998). Sitz baths provide effective pain relief and contrary to anecdotal evidence, do not increase the risk of infection or wound breakdown (Oladokun, Babarinsa, Adewole, Omigbodun & Ojengbede, 2000). Although cold sitz baths are reported to provide greater pain relief, the study indicates that women prefer warm baths (Boyle, 2006).

Preventative health care as well as long-term perineal well being strategies should be initiated by clinicians. Pelvic floor exercises have been shown to assist in alleviating urinary incontinence associated with perineal trauma (Briggs, 2006). Correct pelvic floor exercises provide greater blood flow and increase oxygen to the perineum (Berzuk, 2007).

Implications for Clinical Practice

Health professionals working with birthing women can reduce the incidence of perineal trauma by:

- Avoiding the practice of directed pushing with contractions during the second stage of labour;
- Encouraging women to birth on their left side rather than the lithotomy position; and
- Performing vacuum extraction rather than using forceps where possible for assisted birthing.

When perineal trauma exists, women should be offered:

- Cold therapy and/or analgesia for pain relief;
- Laxatives to reduce constipation; and
- Education regarding perineal hygiene and pelvic floor exercises.

Implications for Education

Health professionals working with pregnant and birthing women and new mothers must provide advice using evidenced-based practice. The care provided should be aligned with best practice guidelines to ensure optimal perineal well being during childbirth. Health professionals can be educated about perineal well being through pre-registration programs, Mandatory educational sessions, practical workshops (for

perineal suturing techniques), and reflective practice, evaluating their own care and seeking feedback from women.

Implications for Future Research

Research of postnatal morbidity is limited and further exploration into women's postnatal experiences is necessary. Research in the following areas may further reduce pain and morbidity associated with perineal trauma:

- Antenatal interventions aimed at improving perineal well being prior to birth;
- Birthing practices to reduce the incidence of intrapartum perineal trauma; and
- Strategies aimed at improving post-birth perineal well being in the longer term.

CONCLUSION

Perineal pain and morbidity associated with childbirth can be reduced. Research examined by this paper's author supports the following midwifery and medical strategies that should be employed to reduce pain and morbidity associated with perineal trauma.

These are the use of cold therapies to alleviate perineal discomfort and oedema and the use of analgesia postpartum to relieve perineal pain and reduce short-term complications.

In terms of reducing long-term morbidity, pelvic floor exercises carried out effectively are linked to a reduction in urinary incontinence. Birthing positions and techniques need to be further scrutinized. There is an indication that perineal tears during labour can be prevented by the use of different positions and techniques. Further research is required around preventative measures, long-term outcomes, and women's experiences of perineal trauma, and treatments.

References

Albers, L. L., Sedler, K. D., Bedrick, E. J., Teaf, D., & Peralta, P. (2005). Midwifery care measures in the second stage of labor and reduction of genital tract trauma at birth: a randomized trial. *Journal of Midwifery & Women's Health*, 50(5), 365-72.

Beckmann, M.M. & Garrett, A. J. (2006). Antenatal perineal massage for reducing perineal trauma. *Cochrane Database of Systematic Reviews*. Retrieved July 5, 2008, from <http://www.cochrane.org/reviews/en/ab005123.html>

Berzuk, K. (2007). A Strong Pelvic Floor: how Nurses Can Spread the Word. *The Association of Women's Health, Obstetric and Neonatal Nurses: Nursing for Women's Health*, 11(1), 55-61.

Borbosi, S., Jackson, D., & Langford, R. (2004). *Navigating the Maze of Nursing Research - An Interactive Learning Adventure*. Smidmore Street, Marrickville: Elsevier.

Boyle, M. (2006). *Wound Healing in Midwifery. Perineal Wounds*. Radcliffe Publishing Ltd: U.K.

Briggs, J. (2006). A pelvic floor muscle exercise programme for urinary incontinence following childbirth. *Nursing Standard*, 20(33). Retrieved September 8, 2007, from www.joannabriggs.edu.au

Calvert, S. & Fleming, V. (2000). Minimizing postpartum pain: a review of research pertaining to perineal care in childbearing women. *Journal of Advanced Nursing*, 32(2).

Carroli, G., & Belizan, J. (1999). Episiotomy for vaginal birth (Review). *The Cochrane Library*, (3). Retrieved August 25, 2007, from <http://www.thecochranelibrary.com>

Chiarelli, P., & Cockburn, J. (1999). Postpartum Perineal Management and Best Practice. *Australian College Of Midwives Incorporated Journal*, 12(1), 14 - 18.

Chiarelli, P., & Cockburn, J. (2002). Promoting urinary continence in women after delivery: randomised controlled trial. *British Medical Journal*, 324, 1-6.

Chiarelli, P., Murphy, B., & Cockburn, J. (2003). Women's knowledge, practices, and intentions regarding correct pelvic floor exercises. *Neurology and Urodynamics*, 22(3), 246-249.

Corkill, A., Lavender, T., Walkinshaw, S. A., & Alfirevic, Z. (2001). Reducing postnatal pain from perineal tears by using lignocaine gel: a double blind randomized trial. *Birth*, 28(1), 22-27.

Dahlen, H. G., Ryan, M., Homer, C. S. E., & Cooke, M. (2006). An Australian prospective cohort study of risk factors for severe perineal trauma during childbirth. *Midwifery*, 23(2), 196 -203.

Davies, B. & Logan, J. (2003). *Reading Research. A User-Friendly Guide for Nurses*

and Other Health Professionals. Elsevier: Canada

Flemming, K. (1998). Asking answerable questions. [Electronic version]. *Evidence-based Nursing*, 1(2), 36-37.

Glazener, C. M. A., Herbison, G. P., Wilson, P. D., MacArthur, C., Lang, G.D., Gee, H., & Grant, A. M. (2001). Conservative management of persistent postnatal urinary and faecal incontinence: randomised controlled trial. *British Medical Journal*, 323, 1-5.

Gottvall, K., Allebeck, P., & Ekeus, C. (2007). Risk factors for anal sphincter tears: the importance of maternal position at birth. *British Journal of Obstetrics and Gynaecology*, 114(10), 1266-1272.

Guideline No. 23. (2004). Methods And Materials Used In Perineal Repair. *Royal College of Obstetricians & Gynaecologists*. Retrieved August 22, 2007, from www.rcog.org.uk

Hedayati, H., Parsons, J., & Crowther, C. A. (2003). Rectal analgesia for pain from perineal trauma following childbirth (Review). *The Cochrane Library*, (3). Retrieved September 11, 2007, from <http://www.thecochranelibrary.com>

Hedayati, H., Parsons, J., & Crowther, C. A. (2005). Topically applied anaesthetics for treating perineal pain after childbirth. *The Cochrane Library*, (3). Retrieved September 30, 2007, from <http://www.thecochranelibrary.com>

Hek, G., Langton, H., & Blunden, G. (2000). Systematically searching and reviewing literature. *Nurse Researcher*, 7(3).

Herron-Marx, S., Williams, A., & Hicks, C. (2007). A Q methodology study of women's experience of enduring postnatal perineal and pelvic floor morbidity. *Midwifery*, 23(3).

Hill, P. D. (1989). Effects of heat and cold on the perineum after episiotomy / laceration. *Journal of Obstetric, Gynecologic and Neonatal Nursing*, 18(2), 124-129.

Hur, M. H., & Han, S. H. (2004). Clinical trial of aromatherapy on postpartum mother's perineal healing, 34(1), 54-62. Retrieved September 2, 2007, from <http://www.thecochranelibrary.com>

Kettle, C. (2006) Pregnancy and childbirth: Perineal care [Electronic version]. *BMJ Clinical Evidence*.

Knobloch, B. E. (1987). A comparison of cold and warm sitz baths for relief of episiotomy pain [Electronic version]. *University of Florida College of Nursing*.

Laws, P., Grayson, N., & Sullivan, E. A. (2006). Australia's mothers and babies 2004. *Australian Institute of Health & Welfare Perinatal Statistics Unit*. Retrieved September 8, 2007, from www.npsu.unsw.edu.au

Mason, L., Glenn, S., Walton, I., & Hughes, C. (2000). The instruction in pelvic floor exercises provided to women during pregnancy or following delivery. *Midwifery*, 17, 55-64.

Mason, L., Glenn, S., Walton, I., & Hughes, C. (2001). Women's reluctance to seek help for stress incontinence during pregnancy and childbirth. *Midwifery*, 17, 212-221.

Nicholl, M. C., & Cattell, M. A. (2006). Getting evidence into obstetric and midwifery practice: reducing perineal trauma. *Australian Health Review*, 30(4).

Nilsen, A. V., & Reinart, L. M. (2007). Perineal techniques during the second stage of labour for reducing perineal trauma (Protocol). *Cochrane Database of Systematic Reviews*, 3. Retrieved August 25, 2007, from <http://www.thecochranelibrary.com>

Peter, A. A., Janssen, P. A., Grange, C. S., & Douglas, M. J. (2001). Ibuprofen versus acetaminophen with codeine for the relief of perineal pain after childbirth: a randomized controlled trial. *Canadian Medical Association Journal*, 165(9), 1203-1209.

Reilly, A. T., Freeman, R. M., Waterfield, M. R., Waterfield, A. E., Steggle, P., & Pedlar, F. (2002). Prevention of postpartum stress incontinence in primigravidae with increased bladder neck mobility: a randomised controlled trial of antenatal pelvic floor exercises. *British Journal of Obstetrics and Gynaecology*, 109, 68 -77.

Searles, J. A. & Pring, D. W. (1998). Effective analgesia following perineal injury during childbirth: a placebo controlled trial of prophylactic rectal diclofenac. *British Journal of Obstetrics*, 105, 627-631.

Schneider, Z., Elliott, D., LoBiondo-Wood, G., & Haber, J. (2003). *Nursing Research. Methods, Critical Appraisal and Utilisation* (2nd ed.). Elsevier: Australia

Stamp, G., Kruzins, G., & Crowther, C. (2001). Perineal massage in labour and prevention of perineal trauma: randomised controlled trial *British Medical Journal*, 322(7297), 1277-1280.

Steen, M., Cooper, K., Marchant, P., Griffiths-Jones, M., & Walker, J. (2000). A randomised controlled trial to compare the effectiveness of icepacks and Epifoam with cooling maternity gel pads at alleviating postnatal perineal trauma. *Midwifery* 16(1), 48-55

The Royal Women's Hospital. (2006). Third and fourth degree tears: management of. *The Royal Women's Hospital clinical practice guidelines*. Retrieved August 6, 2007, from www.thewomens.org.au

Williams, A., Herron-Marx, S., & Hicks, C. (2007). The prevalence of enduring postnatal perineal morbidity and its relationship to perineal trauma. *Journal of Clinical Nursing*, 16(3).