Reduction of perineal trauma and improved perineal comfort during and after childbirth: the Perineal Warm Pack Trial

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Certificate of Authorship/Originality

I certify that the work in this thesis has not previously been submitted for a degree, nor has it been submitted as part of the requirements for a degree, except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition I certify that all information sources and literature used are indicated in the thesis.

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"Don't wait for the light to appear at the end of the tunnel–stride down there and light the bloody thing yourself"
(Sara Henderson, 1993)

Dedicated to my partner Malcolm, my rock, and our four beautiful children: Lydia, Luke, Ethan and Bronte – all of whom were born during the writing of this thesis. It is these beautiful little souls who have taught me the most important lessons in life:
Live today; love today and laugh today.

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I have learnt many things during the researching and writing of this thesis, but the greatest lesson has been that of perseverance. People often remark that obtaining a PhD is a measure of intelligence. In all reality it is more a measure of perseverance. This perseverance is only possible because of a large group of supportive people around you – those who have blazed the trail before you, those who blaze the trail alongside you and those who have no desire to blaze any trail but love and support you all the way. One does not write a thesis without a great deal of support and assistance, and these people deserve special thanks.

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I am grateful to the National Health and Medical Research Clinical Trials Centre, which attended to the randomisation at no cost. This was a great help and gave us extra assurance as to the rigour of the research. To the wonderful staff of the RPA Neonatal Nursery who kindly took phone calls day and night to randomise women for us, our thanks.

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profession to bring the two together. The Perineal Warm Pack Trial is about the validation of the art through science, turning 'old wives' tales' into midwifery knowledge.
My family has always been so supportive of my achievements and to them go my ultimate thanks. My mother died during the writing of this thesis, so will never get to see me cross the finish line. She knew, however, beyond a shadow of a doubt that I would finish. Being the only one in my family to have ever gone to university has given me more reason to be humble than proud. My mother, in particular, had a wisdom I can only dream of.

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Publications and conference presentations from this research

A number of publications and conference presentations have arisen from this work or have been associated with this work. I have been the first or second author on these papers.

Peer-reviewed publications

Dahlen, H. G., Homer, C. S. E., Cooke, M., Upton, A. M., Nunn, R. A., & Brodrick, B. S. (2007). Perineal outcomes and maternal comfort related to the application of perineal warm packs in the second stage of labor. A randomized controlled trial. *Birth* (Accepted for publication May 9th.)

Dahlen, H. G., Homer, C. S. E., Cooke, M., Upton, A. M., Nunn, R. A., & Brodrick, B. S. (2007). "Soothing the ring of fire:" Australian women and midwives evaluate perineal warm packs used in the second stage of labour. *Midwifery*. (Accepted for publication August 8th 2007.)

Dahlen, H. G., Homer, C. S. E. & Leap, N. (2007). From social to surgical: historical perspectives on perineal care during labour and birth. (Submitted to *Journal of Women's History* September 2007.)

Dahlen, H., Ryan, M., Homer, C., & Cooke, M. (2007). An Australian prospective cohort study of risk factors for severe perineal trauma during childbirth. *Midwifery*, 23 (2), 196–203. (Appendix 1.)

Homer, C., & Dahlen, H. (2007). Obstetric-induced incontinence: A black hole of preventable morbidity? *The Australian and New Zealand Journal of Obstetrics and Gynaecology*, 47, 86–90. (Appendix 2.)

Non-refereed journals

Dahlen, H. (2005). Perfecting the perineum. *Australian Parents*, June/July, 30–32.

Dahlen, H. (2001). A midwife's guide to perineal care and repair: Part Two. *Midwifery Matters*, December.

Dahlen, H. (2001). A midwife's guide to perineal care and repair: Part One. *Midwifery Matters*, September.

Conference presentations

Dahlen, H. G. (2007, July). *Perineal Warm Packs: 'Old Wives' Tales' or evidence-based practice?* Working with risk in midwifery practice. Conference, Sydney, NSW, Australia, (invited speaker).

Dahlen, H. G. (2007, May). *Perineal trauma. Can we prevent it?* Seminar, Perusing the perineum: evidence, experience and education, University of Technology, Sydney, NSW, Australia (invited speaker).

Dahlen, H. G. (2006, August). 'Soothing the ring of fire.' Paper (published in proceedings) presented at the *Australian Society for Psychosocial Obstetrics and Gynaecology (ASPOG) 33nd Annual scientific meeting* Sydney, NSW, Australia (invited speaker).

Dahlen, H. G. (2006, March). *The Perineal Warm Pack Trial.* Paper presented at The Nepean Midwives' Conference, Hawkesbury, NSW, Australia (invited speaker).

Dahlen, H. G. (2005, July). *The Perineal Warm Pack Trial.* Paper (published in proceedings) presented at the 27th Congress of the International Confederation of Midwives, Brisbane, Queensland, Australia.

Dahlen, H. G. (2002, April) (presented by C. Adams and J. Matthews). *Giving third degrees the third degree.* Paper (published in proceedings) presented at the 26th Congress of the International Confederation of Midwives, Vienna, Austria.

Dahlen, H. G. (2001, September). *Giving third degrees the third degree.* Paper (published in proceedings) presented at the Australian College of Midwives Inc.12th Biennial National Conference, Brisbane, Queensland, Australia

Abbreviations and glossary

Abbreviations

RPA	Royal Prince Alfred Hospital
KGV	King George V Hospital
TCH	The Canterbury Hospital
CALD	Culturally and Linguistically Diverse
NICU	Neonatal Intensive Care Unit
NHMRC	National Health and Medical Research Centre
NSW	New South Wales is the state in Australia in which this study took place

Glossary

Antenatal period	Period of time before birth occurs (the pregnancy)
Antenatal card	A pregnancy record card given to every pregnant woman that she carries with her at all times. Health workers document care given, pathology and ultrasound reports on the card as well as in the antenatal record kept by the hospital.
Area Health Service	A unit of health system administration in NSW. There are eight Area Health Services in NSW and they are each accountable to the NSW Health Department for the management of public hospitals and community health services in the areas.
Asian	China, Vietnam, Hong Kong, Indonesia,

	Japan, Laos, Cambodia, Taiwan, North Korea, South Korea, Thailand, Philippines, Burma and Malaysia.
Birth weight	The first weight of the newborn, obtained as soon as possible after birth.
Elective caesarean	A caesarean section performed before the onset of labour.
Emergency caesarean	A caesarean section performed after the onset of labour.
Epidural anaesthesia	Injection of an anaesthetic agent outside the dura matter, which covers the spinal canal, causing loss of sensation to the lower part of the body.
Episiotomy	A surgical incision of the perineum and vagina to enlarge the vulval orifice.
Ethnic Obstetric Liaison Officers	Usually midwives employed from designated ethnic and cultural backgrounds to provide care, education and support for women from the same background.
Forceps delivery	A hard metal instrument used to grasp the baby's head and deliver the baby vaginally.
Gestation age	The duration of pregnancy in completed weeks from the first day of the last normal menstrual period.

Level Six Maternity Service	In NSW each maternity service has a designated Level (1–6). This thesis included Level Four and Six services. A Level Six maternity service provides a range of services from low risk to the most complex cases. They have 24-hour onsite access to specialist obstetricians and anaesthetists.
Level Four Maternity Service	Level Four maternity service cares for women and babies of low to moderate risk, transferring to a Level Six maternity service all women in preterm labour with pregnancies less than 33 weeks gestation or with complex heath problems such as heart disease. They have a 24-hour onsite obstetric registrar and anaesthetic registrar.
Level Three Neonatal Intensive Care	In NSW Levels (1–3) are given to neonatal intensive care units. A Level Three Neonatal Intensive Care unit is the highest level of neonatal care involving 24-hour onsite specialist neonatology support.
Multipara (adjective multiparous)	A woman who has had two or more pregnancies resulting in viable offspring.
NHMRC Clinical Trials Centre	A clinical research organisation that undertakes large multicentre clinical trials and takes part in national and international collaborative trial groups and contributes expertise to trials run by others.
Nullipara (adjective nulliparous)	A woman who has not produced a viable offspring.

Obstetric registrar	Doctor undergoing obstetric training in order to qualify as an obstetrician.
Parity	The total number of live births before the pregnancy or birth under consideration.
Perineal body	A triangular shaped wedge of tissue based on the perineum, separating the lower one third of the posterior vaginal wall from the anal canal.
Postpartum	Occurring after childbirth.
Primigravida	A woman pregnant for the first time.
Primipara (adjective primiparous)	A woman who has had one pregnancy that resulted in viable offspring.
Primiparity	The state of being a Primipara.
Second stage of labour	Time from full dilation of the cervix to the birth of the baby.
Severe perineal trauma	Includes both third and fourth-degree perineal trauma.
Sydney South Western Area Health Service	The Area Health Service in which this research was conducted.
Tertiary referral hospital	Hospital that provides the highest level of care, specialisation and functions as a university teaching hospital. The same as a Level Six Maternity Service.
Vacuum extraction	A form of instrumental delivery in which the baby is delivered vaginally with the aid of a shallow rubber cup fixed to the baby's head, using suction.

Definition of perineal trauma

Degree	Trauma
First	Injury to the skin only.
Second	Injury to the perineum involving perineal muscles but not involving the anal sphincter.
Third	Injury to the perineum involving the anal sphincter complex (classifications of 3a, 3b, 3c not used).
Fourth	Injury to perineum involving the anal sphincter complex and anal epithelium.

RCOG (2004)

Definition of terms used to describe perineal trauma in this thesis

Minor perineal trauma	Minor perineal trauma is defined for the purpose of this thesis as intact, first-degree, vaginal or labial tear
Major perineal trauma	Major perineal trauma is defined for the purpose of this thesis as second, third- and fourth-degree tear and episiotomy
Severe Perineal trauma	Includes both third- and fourth-degree perineal trauma

Abstract

The Perineal Warm Pack Trial investigated the effects of applying warm packs to the perineum during the late second stage of labour on perineal trauma and maternal comfort. A randomised controlled method was used. In the late second stage of labour, primiparous[1] women (n = 717) giving birth were randomly allocated to having warm packs (n = 360) applied to their perineum or standard care (n = 357). Analysis was on an intention-to-treat basis. The primary outcome measure was the requirement for perineal suturing and the secondary outcome measure was maternal comfort.

There was no statistically significant difference in the number of women who required suturing following birth. There were significantly fewer third-and fourth-degree tears in the warm pack group. However, the study was underpowered to assess the uncommon outcome of severe perineal trauma. Women in the warm pack group had significantly lower perineal pain scores when giving birth, on day one and day two following the birth. At twelve weeks, women in the warm pack group were significantly less likely to have urinary incontinence compared to the women in the standard care group.

Warm packs were highly acceptable to both women and midwives as a means to relieve pain during the late second stage of labour. Almost the same number of women (79.7%) and midwives (80.4%) felt that the warm packs reduced perineal pain during the birth. Both women and midwives were positive about using warm packs in the future. The majority of women (85.7%) said they would like to use perineal warm packs again for their next birth and similarly would recommend them to friends (86.1%). Likewise, 91% of midwives were positive about using the warm packs, with 92.6% considering using them in the future as part of care in the second stage of labour.

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[1] The term primiparous will be used to refer to first-time mothers who are about to give birth and who have given birth (definition: a woman who has had one pregnancy that resulted in viable offspring) when describing women in the Perineal Warm Pack Trial, to avoid confusion that could occur when moving between the terms nulliparous and primiparous.

Both women and health professionals place a high value on minimising perineal trauma during childbirth and the potential associated morbidity. Perineal warm packs are widely used in the belief that they reduce perineal trauma and increase comfort during the late second stage of labour. This study demonstrated that the application of perineal warm packs in the late second stage does not reduce the likelihood of primiparous women requiring perineal suturing but significantly reduces perineal pain during the birth and on day one and two following the birth. Urinary incontinence also appears reduced at twelve weeks postpartum, though it is unclear as to the reason for this. The practice of applying perineal warm packs in the late second stage was highly acceptable to mothers and midwives in helping to relieve perineal pain and increase comfort and should be incorporated into second-stage pain relief options available to women during childbirth.