Abdominal decompression in normal pregnancy

Hofmeyr GJ, Kulier R


A substantive amendment to this systematic review was last made on 08 November 1997. Cochrane reviews are regularly checked and updated if necessary.

**Background:** Abdominal decompression was developed as a means of pain relief during labour. It has also been used for complications of pregnancy, and in healthy pregnant women in an attempt to improve fetal wellbeing and intellectual development.

**Objectives:** The objective of this review was to assess the effects of prophylactic abdominal decompression on admission for pre-eclampsia, fetal growth, perinatal morbidity and mortality and childhood development.

**Search strategy:** The Cochrane Pregnancy and Childbirth Group trials register and the Cochrane Controlled Trials Register were searched. Date of last search: October 2001.

**Selection criteria:** Randomised trials comparing abdominal decompression with dummy decompression or no treatment in healthy pregnant women.

**Data collection and analysis:** Eligibility and trial quality were assessed by one reviewer.

**Main results:** Three studies were included. There was no difference between the abdominal decompression groups and the control groups for low birth weight (relative risk 0.69, 95% confidence interval 0.27 to 1.77) and perinatal mortality (relative risk 2.47, 95% confidence interval 0.77 to 7.92). There were no differences in admission for pre-eclampsia,
Apgar score and childhood development.

**Reviewers' conclusions:** There is no evidence to support the use of abdominal decompression in normal pregnancies. Future research should be directed towards the use of abdominal decompression during labour, and during complicated pregnancies.

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**Background**

Abdominal decompression was developed initially as a method of enhancing the forward movement of the uterus during labour contractions with a view to relieving pain. Unanticipated apparent beneficial effects on fetal wellbeing led to its investigation for this purpose. A rigid dome is placed about the abdomen and covered with an airtight suit. The space around the abdomen is decompressed to -50 to -100 mmHg for 15-30 seconds out of each minute for 30 minutes once to thrice daily, or with uterine contractions during labour. This is thought to 'pump' blood through the intervillous space.

Prophylactic abdominal decompression came into clinical use in the early 1960s on the basis of the results of several poorly controlled studies. These appeared to show that it improved fetal wellbeing and intellectual development.

Two prospective studies followed in which attempts were made to compare the outcome in women subjected to abdominal decompression with comparable control groups.

Additional reference (Hofmeyr 1989).

**Objectives**

To determine, from the best available evidence, the effects on admission for pre-eclampsia, fetal growth, perinatal morbidity and mortality and childhood development of prophylactic abdominal decompression.

**Criteria for considering studies for this review**

**Types of studies**

Clinical trials comparing prophylactic abdominal decompression with dummy decompression or no treatment; random allocation to treatment and control groups, with adequate allocation concealment; violations of allocated management and exclusions after allocation not sufficient to materially affect...
outcomes.

Types of participants

Healthy pregnant women.

Types of intervention

Abdominal decompression antenatally or during labour, versus no or dummy decompression.

Types of outcome measures

Pre-eclampsia, fetal growth, perinatal morbidity and mortality and childhood development. Outcomes included if clinically meaningful; reasonable measures taken to minimise observer bias; data available for analysis according to original allocation, irrespective of protocol violations; data available in format suitable for analysis.

Search strategy for identification of studies

See: Collaborative Review Group search strategy

This review has drawn on the search strategy developed for the Pregnancy and Childbirth Group as a whole.

Relevant trials were identified in the Group's Specialised Register of Controlled Trials. See Review Group's details for more information.

Periodic searches of the Cochrane Controlled Trials Register have also been performed. Date of last search: October 2001.

Methods of the review

Trials under consideration were evaluated for methodological quality and appropriateness for inclusion according to the prestated selection criteria, without consideration of their results. Individual outcome data were included in the analysis if they met the prestated criteria in 'Types of outcome measures'. Included trial data were processed as described in Clarke 1999.

Data were extracted from the sources and entered onto the Review Manager (RevMan) computer software
(Update Software, Oxford, UK), checked for accuracy, and analysed as above using the RevMan software. For dichotomous data, relative risks and 95% confidence intervals were calculated, and in the absence of heterogeneity, results were pooled using a fixed effects model. Continuous data were pooled using weighted mean differences and 95% confidence intervals.

Description of studies

See: Tables of studies

See table of 'Characteristics of included studies'.

Methodological quality

See: Table of included studies

See table of 'Characteristics of included studies', particularly the 'Methods' and 'Notes' sections.

Liddicoat 1968 allocated women using random numbers administered by an independent person to receive antenatal decompression or to attend routine physiotherapy classes. Evaluation of the offspring was carried out blind to the allocation of each child. The drop-out rate was high (from 45 per cent at nine months to 56 per cent by three years of age). However, significant selective dropout bias seems unlikely because there is no reason to suspect an imbalance in the drop-out population, and the mean IQ of mothers remaining in the study remained comparable in both groups.

Hofmeyr 1990 reviewed the original hospital notes of women in the study of Liddicoat 1968 to report on the perinatal data. Although 23% of results was unobtainable, there is again no reason to suspect that the composition of the groups was changed by the losses to follow-up.

Coxon 1973 employed random selection and was able to blind the women and attendants to the allocation of each woman. However, the author's assumption that the 'placebo' treatment, consisting of abdominal decompression at minus 20 mmHg rather than minus 70 mmHg, would have little or no effect, is not necessarily valid.

Results

Mathews and Loeffler found a slightly and statistically insignificantly greater increase in scalp blood pH
after 20 contractions with abdominal decompression during labour than without (mean values +0.05 versus +0.01) (Mathews 1968).

Data from the remaining studies reveal no difference between the antenatal abdominal decompression and control groups for the following parameters: admission for pre-eclampsia, low birthweight, and Apgar score below four at one minute. The perinatal mortality was not reduced. Indeed, there was a small excess of deaths in the decompression group, but this may be a chance occurrence. Childhood development measures were not statistically different.

Discussion

Those outcomes assessed in more than one trial yielded compatible results.

Reviewers' conclusions

Implications for practice

These studies provide convincing evidence that antenatal abdominal decompression used in uncomplicated pregnancies does not improve any of the outcomes measured. There is thus no support for the clinical use of antenatal abdominal decompression as a prophylactic procedure.

Intrapartum abdominal decompression has not been evaluated sufficiently for its use to be recommended or rejected.

Implications for research

Two quite unexpected observations merit further investigation as they may provide clues to the existence of psychosocial interactions or physiological mechanisms not specific to abdominal decompression. The first is that in the study of Liddicoat 1968, significantly more of the children in the abdominal decompression group were noted after three years to be undisciplined or aggressive (14/89 versus 2/90). The possibility that family expectations of superior intelligence gained from this or other childbirth techniques, may influence family dynamics and thus infant behaviour merits further investigation. The second interesting observation is that in the study of Coxon 1973, placental weights in the high decompression group were significantly less than in the low decompression group (627 [9] versus 653 [9] grams [SEM]). This observation may have a bearing on mechanisms which determine placental mass.

Further investigation of abdominal decompression as such, should be directed towards its use in certain complications of pregnancy and during labour, not during uncomplicated pregnancies.
**Acknowledgements**

Rene Liddicoate for additional information about her trial; Dr R Drubin for access to the files of women enrolled in the Liddicoate trial.

**Potential conflict of interest**

The contact reviewer is author of one of the trials reviewed.

**References**

References to studies included in this review

**Coxon 1973** (*published data only*)


**Hofmeyr 1990** (*published data only*)


**Liddicoat 1968** (*published data only*)


* indicates the major publication for the study

References to studies excluded from this review

**Mathews 1968**

**Additional references**

**Clarke 1999**


**Hofmeyr 1989**


**Cover sheet**

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<th>Reviewer(s)</th>
<th>Hofmeyr GJ, Kulier R</th>
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<td><strong>Contribution of Reviewer(s)</strong></td>
<td>GJH prepared the original version of the review. RK checked and modified the review. GJH and RK are responsible for maintaining the review.</td>
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<td><strong>Issue protocol first published</strong></td>
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<td><strong>Date reviewers' conclusions section amended</strong></td>
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### Sources of support

**External sources of support to the review**

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- Department of Obstetrics and Gynaecology, Geneva University Hospital SWITZERLAND

### Synopsis

Synopsis pending

### Keywords

Female; Human; *Lower Body Negative Pressure; Pregnancy; Pregnancy Complications [*prevention & control]

### Tables & Graphs
- **MetaView graphs**
  The figures and graphs in Cochrane Reviews display the Peto Odds Ratio and the Weighted Mean Difference by default. These are not always the methods used by reviewers when combining data in their review. You should check the text of the review for a description of the statistical methods used.
- **List of comparisons**
- **Table of included studies**
- **Table of excluded studies**
- **Table of ongoing studies**

**List of comparisons**

**Fig 01 PROPHYLACTIC ABDOMINAL DECOMPRESSION IN PREGNANCY**

- 01.01.00 Admission for pre-eclampsia
- 01.02.00 Low birthweight
- 01.03.00 Apgar score <4 at 1 minute
- 01.04.00 Stillbirth
- 01.05.00 Neonatal death
- 01.06.00 Perinatal mortality

**Tables of other data**

*Tables of other data are not available for this review*

**Additional tables**

*Additional tables are not available for this review*
## Table of included studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Methods</th>
<th>Participants</th>
<th>Interventions</th>
<th>Outcomes</th>
<th>Notes</th>
<th>Allocation concealment</th>
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<tr>
<td><strong>Coxon 1973</strong></td>
<td>Allocation by a system of random numbers. Were able to blind the women and attendants to the allocation of each woman.</td>
<td>Primigravidae with a single fetus.</td>
<td>Abdominal decompression from about 28 weeks of pregnancy for 15 seconds per minute for 30 minutes twice a week, pressure -70 mmHg (n = 200) versus -20 mmHg ('control') (n = 211).</td>
<td>Maximum blood pressure during pregnancy; hospital admission for pre-eclampsia; birthweight; placental weight; perinatal mortality.</td>
<td>United Kingdom.</td>
<td>A</td>
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<tr>
<td><strong>Hofmeyr 1990</strong></td>
<td>Women allocated using random numbers administered by an independent person.</td>
<td>Inclusion criteria: Pregnant women; able to attend regularly at the hospital; pregnancy &lt;30 weeks; no medical illness or obstetric complications.</td>
<td>Antenatal decompression versus attendance at routine antenatal physiotherapy classes.</td>
<td>Gestation at delivery; Caesarean section; assisted delivery; Apgar score &lt;7 at 1 minute; birthweight.</td>
<td>Johannesburg, South Africa. Early 1960s.</td>
<td>Hofmeyr 1990 reviewed the original hospital notes of women in the study of Liddicoat 1968 to report on the perinatal data. Although 23% of results was</td>
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| Liddicoat 1968 | Women allocated using random numbers administered by an independent person. | Inclusion criteria: Pregnant women; able to attend regularly at the hospital; pregnancy <30 weeks; no medical illness or obstetric complications. | Antenatal decompression versus attendance at routine antenatal physiotherapy classes. | Evaluation of the offspring was carried out blind to the allocation of each child. South African Child Development Scale at 1, 4 and 9 months; Merrill-Palmer scale at 3 years. | Johannesburg, South Africa. | A | The drop-out rate was high (from 45 per cent at 9 months to 56 per cent by 3 years of age). However, significant selective dropout bias seems unlikely because there is no reason to suspect an imbalance in the drop-out population, and the mean IQ of mothers remaining in the study remained comparable in both groups. |

**Table of excluded studies**
<table>
<thead>
<tr>
<th>Study</th>
<th>Reason for exclusion</th>
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<tr>
<td>Mathews 1968</td>
<td>Excluded because no clinically relevant outcomes reported. Twenty women in labour were allocated 'at random' to early abdominal decompression, or to delay the initiation of decompression for 20 contractions. No statistically significant differences in fetal scalp blood changes over 20 contractions were found between the two groups.</td>
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**Table of ongoing studies**

A table of ongoing studies is not available for this review