External cephalic version for breech presentation at term (Review)

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ABSTRACT

Background
Management of breech presentation is controversial, particularly in regard to manipulation of the position of the fetus by external cephalic version (ECV). ECV may reduce the number of breech presentations and caesarean sections, but there also have been reports of complications with the procedure.

Objectives
The objective of this review was to assess the effects of ECV at or near term on measures of pregnancy outcome. Methods of facilitating ECV, and ECV before term are reviewed separately.

Search strategy
We searched the Cochrane Pregnancy and Childbirth Trials Register (April 2005), Cochrane Central Register of Controlled Trials (*The Cochrane Library,* Issue 1, 2005) and PubMed (1966 to December 2004).

Selection criteria
Randomised trials of ECV at or near term (with or without tocolysis) compared with no attempt at ECV in women with breech presentation.

Data collection and analysis
Both authors assessed eligibility and trial quality, and extracted the data.

Main results
Five studies were included. The pooled data from these studies show a statistically significant and clinically meaningful reduction in non-cephalic birth (five trials, 433 women; relative risk (RR) 0.38, 95% confidence interval (CI) 0.18 to 0.80) and caesarean section (five trials, 433 women; RR 0.55, 95% CI 0.33 to 0.91) when ECV was attempted. There were no significant differences in the incidence of Apgar score ratings below seven at one minute (two trials, 108 women; RR 0.95, 95% 0.47 to 1.89) or five minutes (four trials, 368 women; RR 0.76, 95% 0.32 to 1.77), low umbilical artery pH levels (one trial, 52 women; RR 0.65, 95% 0.17 to 2.44), neonatal admission (one trial, 52 women; RR 0.36, 95% 0.04 to 3.24), perinatal death (five trials, 433 women; RR 0.51, 95% 0.05 to 5.54), nor time from enrolment to delivery (2 trials, 256 women; weighted mead difference -0.25 days, 95% -2.81 to 2.31).

Authors' conclusions
Attempting cephalic version at term reduces the chance of non-cephalic births and caesarean section. There is not enough evidence from randomised trials to assess complications of external cephalic version at term. Large observational studies suggest that complications are rare.

PLAIN LANGUAGE SUMMARY

External cephalic version from 36 weeks reduces the chance of breech presentation at birth and caesarean section

There is less risk to the baby and mother when the baby is head-down at the time of birth. External cephalic version (ECV) is a procedure by which the baby, who is lying bottom first, is manipulated through the mother's abdominal wall to the head-down position. If the baby is not head down after about 36 weeks of pregnancy, ECV reduces the chance that the baby will present as breech at the time of birth, and reduces the chance of caesarean birth.

BACKGROUND

Considerable disagreement surrounds the management of breech presentation, particularly with respect to the place of external cephalic version (ECV). ECV is a procedure in which the baby is manipulated by pressure through the mother's abdominal wall into a cephalic (head-down) position. The interpretation of non-randomised trials is confounded by the fact that breech presentation per se appears to be a marker for poor perinatal outcome. For example, the incidence of minor childhood handicap following breech presentation has been found to be high (19.4%) and similar for those delivered following trial of labour and those following an elective caesarean section (Danielian 1996).

Breech presentation may be caused by an underlying fetal or maternal abnormality, or may be an apparently chance occurrence, or related to an otherwise benign variant such as cornual placental position (the placenta in a lateral position near the top of the uterus). In the latter instances, breech presentation places a healthy fetus and mother at increased risk of a complicated vaginal delivery or caesarean section. It is not surprising that, over the years, the possibility of manipulating the baby from the breech to the cephalic presentation has intrigued obstetric caregivers.

ECV before term (usually before 34 weeks gestation) came into routine obstetric practice on the basis of the self-evident immediate effectiveness of the procedure as well as reassuring results from several non-randomised trials, and in spite of the negative results of the only randomised trial reported prior to 1980 (Brosset 1956). The popularity of ECV before term waned after the mid-1970s, partly because of reports of a substantial perinatal mortality associated with the procedure (Bradley-Watson 1975), and the increasing perception of caesarean section as a safer option than ECV or breech delivery.

Prior to the mid-1970s, ECV was usually attempted before term because of the belief that the procedure would seldom be successful at term. Subsequent studies showed that with the use of tocolysis (medication to relax the uterus), ECV could be achieved in a substantial proportion of women with breech presentation at term. ECV at term differs in many fundamental ways from that performed before term. These include the fact that the fetus is mature and may be delivered more readily in the event of complications, and that spontaneous version without ECV attempt, or reversion after successful ECV, are less common at term. ECV at term is therefore evaluated as a separate procedure (*see* 'External cephalic version for breech presentation before term' (Hofmeyr 1996)). This review includes studies in which the intention was to include pregnant women at or near term (ie from 36 weeks gestation).

External cephalic version at term has been shown to be feasible in two small uncontrolled trials in women with previous caesarean section (Flamm 1991; Schachter 1994), and in two in women in labour (Ferguson 1985; Fortunato 1988). No randomised trials of these interventions have to our knowledge been reported.

External cephalic version may be of particular importance in resource-poor situations in which women may be unable to reach health services during labour, and caesarean sections are unavailable or unsafe (Hofmeyr 2004a).

Several authors have investigated which factors are associated with an increased chance of successful external cephalic version (Boucher 2003; Fortunato 1988; Guyer 2001; Lau 1997; Le Bret 2004). Factors which have been found to predict failure of ECV attempt include engagement of the presenting part, difficulty in palpating the fetal head and a tense uterus on palpation (Lau 1997), and increased amniotic fluid volume (Boucher 2003). However, a prediction model based on clinical parameters was found to be insufficiently accurate to be useful in predicting the outcome of ECV attempts (Chan 2004).

The preferences of women with breech presentation regarding their care appear to have changed in recent years. In an Israeli study in 1995, 54% were willing to consider ECV and 65% preferred planned caesarean section if the breech presentation persisted, compared with 24% and 97% respectively in 2001 (Yogev 2002). In an Australian study in 2001, 39% of women attending antenatal clinic would choose ECV if needed, and 22% were undecided (Raynes-Greenow 2004).

Complications reported following ECV at term include fracture of the baby's femur (Papp 2004), prolonged tachycardia (rapid heartbeat) of the baby (Nzewi 1999), sinusoidal baby's heart rate pattern (a fluctuating pattern sometimes indicating compromise) (Ferber 1999), and fetal-maternal haemorrhage (bleeding from the baby's to the mother's circulation in the placenta) (Shankar 2004). The rate of caesarean section during labour has been found to be greater following successful ECV than in spontaneous cephalic presentation: 20% versus 6.3%, relative risk (RR) 3.2 (Ben-Haroush 2002); 27.6% versus 12.5%, RR 2.04; 95% confidence interval 1.43 to 2.91 (Chan 2004b); odds ratio 2.04 for nulliparous women, 4.30 for multiparous (Vezina 2004). This is not surprising, given that women with persistent breech presentation in the

first instance are a high-risk group. Cord blood gases at delivery were no different (Chan 2004c). Because of the risk of alloimmunisation, anti-D prophylaxis is recommended for non-sensitised D-negative women following ECV attempt (Fung Kee Fung 2003).

However, reported series of cases have reported very low complication rates with ECV (Boucher 2003; Impey 1999; Impey 2005). A review of 44 studies of ECV (7377 participants) from 1990 to 2002 found the most frequently reported complication to be transient abnormal baby's heart rate patterns (5.7%). Less frequent complications were persisting pathological baby's heart rate patterns (0.37%); vaginal bleeding (0.47%); placental abruption (0.12%); emergency caesarean section (0.43%); and perinatal mortality (0.16%) (Collaris 2004). Because of the risk of alloimmunisation, anti-D prophylaxis is recommended for non-sensitised D-negative women following ECV attempt (Fung Kee Fung 2003).

Contra-indications to ECV include: Multiple pregnancy; severe abnormality, unsatisfactory condition or death of the baby; caesarean section necessary irrespective of the presentation (eg major placenta praevia); and ruptured membranes. Relative contraindications include previous caesarean section, poor growth of the baby, and bleeding from the uterus.

The question of whether ECV might increase the risk of mother-to-child transmission of viral infections such as HIV is important and, in the absence of direct evidence, we have reviewed the relevant biological evidence and concluded that, unlike fetal-maternal transfusion (bleeding from the baby's to the mother's circulation in the placenta), maternal-fetal transfusion is extremely rare, and unlikely to be precipitated by ECV (Holmes 2004). It is also reassuring that in a randomised trial of fundal pressure to expel the baby during caesarean section, no evidence of maternal-fetal transfusion was found (Owens 2003).

Several authors have reported success rates for external cephalic version at term in routine clinical practice in the region of 40% to 50%: 53% (Hughes 1997); 39% (Williams 1999); 55% (Guyer 2001); 45% (Devendra 2002); 43% (Lojacono 2003); 51% (Skupski 2003); 42% to 65% (depending on amniotic fluid volume (Boucher 2003)); and 51% (Le Bret 2004).

Readers are referred to previous reviews of the topic (Hofmeyr 1989; Hofmeyr 1991; Hofmeyr 1992; Hofmeyr 1993; Zhang 1993). *See* also related Cochrane systematic reviews: 'External cephalic version for breech presentation before term', 'Cephalic version by postural management for breech presentation' and 'Interventions to help external cephalic version for breech presentation at term' (Hofmeyr 1996; Hofmeyr 2000; Hofmeyr 2004b).

OBJECTIVES

To assess, using the best available evidence, the effects of external cephalic version at or near term for breech presentation on: presentation at and method of delivery; and perinatal and maternal morbidity and mortality.

CRITERIA FOR CONSIDERING STUDIES FOR THIS REVIEW

Types of studies

Clinical trials comparing the effects of external cephalic version (ECV) at or near term, with or without tocolysis, with a control group (no ECV attempt), on clinically meaningful outcomes; 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

Pregnant women with babies in the breech presentation at or near term and no contraindications to ECV.

Types of intervention

ECV attempt at term, with or without the use of tocolysis, compared with no ECV attempt.

Types of outcome measures

Perinatal outcomes including non-cephalic presentation at delivery, method of delivery and perinatal and maternal morbidity and mortality.

Outcomes included if clinically meaningful; reasonable measures taken to minimise observer bias; missing data insufficient to materially influence conclusions; data available for analysis according to original allocation, irrespective of protocol violations; data available in format suitable for analysis.

SEARCH METHODS FOR IDENTIFICATION OF STUDIES

See: methods used in reviews.

We searched the Cochrane Pregnancy and Childbirth Group Trials Register by contacting the Trials Search Co-ordinator (April 2005).

The Cochrane Pregnancy and Childbirth Group's Trials Register is maintained by the Trials Search Co-ordinator and contains trials identified from:
1. quarterly searches of the Cochrane Central Register of Controlled Trials (CENTRAL);
2. monthly searches of MEDLINE;
3. handsearches of 30 journals and the proceedings of major conferences;
4. weekly current awareness search of a further 37 journals.

Details of the search strategies for CENTRAL and MEDLINE, the list of handsearched journals and conference proceedings, and the list of journals reviewed via the current awareness service can be found in the 'Search strategies for identification of studies' section within the editorial information about the Cochrane Pregnancy and Childbirth Group.

Trials identified through the searching activities described above are given a code (or codes) depending on the topic. The codes are linked to review topics. The Trials Search Co-ordinator searches the register for each review using these codes rather than keywords.

In addition, we searched the CENTRAL (*The Cochrane Library*, Issue 1, 2005) and PubMed (1966 to November 2004) with the terms 'external cephalic version or ECV'. We did not apply any language restrictions.

METHODS OF THE REVIEW

We evaluated trials under consideration 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'.

Assessment of methodological quality of included studies
We assessed the validity of each study using the criteria outlined in the Cochrane Reviewers' Handbook (Alderson 2004). Each study was assessed for quality of allocation of concealment, completeness to follow up and blinding in the assessment of outcome.

(1) Selection bias (randomisation and allocation concealment)
We assigned a quality score for each trial, using the following criteria:
(A) adequate concealment of allocation, such as telephone randomisation, consecutively numbered sealed opaque envelopes;
(B) unclear whether adequate concealment of allocation;
(C) inadequate concealment of allocation, such as open list of random number tables, sealed envelopes.

(2) Performance bias (blinding of participants, researchers and outcome assessment)
(A) Blinding of participants and caregiver was not possible due to the type of intervention being assessed;
(B) blinding of outcome assessment (yes/no/unclear).

(3) Attrition bias (loss to follow up)
We assessed completeness to follow up using the following criteria:
(A) less than 5% of participants excluded;
(B) 5% to 10% of participants excluded;
(C) more than 10% and less than 20% of participants excluded;
(D) more than 20% of participants excluded.

We extracted data from the sources and entered them onto the Review Manager software (RevMan 2003), checked for accuracy, and analysed as above using RevMan 2003. For dichotomous data, we calculated relative risks and 95% confidence intervals. Continuous data were pooled using weighted mean differences and 95% confidence intervals. Results were pooled using a fixed-effect model or, if heterogeneity was significant, and random-effects model.

DESCRIPTION OF STUDIES

See 'Characteristics of included studies'.

METHODOLOGICAL QUALITY

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

In three trials, randomly ordered sealed envelopes or cards were used for allocation, but only one (Mahomed 1991) specified that the cards were sequentially numbered. Van Dorsten 1981 and Brocks 1984 used 'random' allocation without specifying the mechanism. Concealment of allocation is thus not optimal.

The exclusion of three women after enrolment in the Van Dorsten 1981 study, is unlikely to have affected the results materially.

Brocks 1984 studied 65 women who agreed to randomisation and a further 65 who either specifically requested or refused external cephalic version (ECV) attempt. Because factors which may have a bearing on the outcome of pregnancy may influence the decision to accept ECV, we have limited this review to an analysis of the 65 randomised cases.

Van De Pavert 1990 attempted ECV without tocolysis in 21/25 of the study group, and with tocolysis in 16/20 initial failures. Thus 8/25 (32%) received no ECV attempt (4) or incomplete ECV protocol (4). ECV was attempted on request in 5/27 of the control group, tocolysis being used in the three which were successful. While the analysis was appropriate according to intention-to-treat, the rate of non-compliance with the allocated treatment reduces the power of the study to detect differences resulting from ECV attempt.

RESULTS

Because of significant heterogeneity, results for the first two outcomes were pooled using the random-effects model. For all other data the fixed-effects model was used. The pooled data from these studies show a statistically significant and clinically meaningful reduction in non-cephalic birth (five trials, 433 women; relative risk (RR) 0.38, 95% confidence interval (CI) 0.18 to 0.80) and

caesarean section (five trials, 433 women; RR 0.55, 95% CI 0.33 to 0.91) when ECV was attempted. Data were not available from all the trials for the remaining outcomes. There were no significant differences in the incidence of Apgar score ratings below seven at one minute (two trials, 108 women; RR 0.95, 95% 0.47 to 1.89) or five minutes (four trials, 368 women; RR 0.76, 95% 32 to 1.77), low umbilical artery pH levels (one trial, 52 women RR 0.65; 0.17 to 2.44), neonatal admission (one trial, 52 women; RR 0.36, 95% 0.04 to 3.24), perinatal death (five trials, 433 women; RR 0.51, 95% 0.05 to 5.54), nor time from enrolment to delivery (2 trials, 256 women; weighted mean difference -0.25 days, 95% -2.81 to 2.31).

DISCUSSION

The absolute numbers of non-cephalic births and caesarean sections vary considerably between trials. This probably reflects differences in study populations and caesarean section policies. The direction of effects are, however, consistent, with the exception of the rates of caesarean section in the study of Van De Pavert 1990. Considerable crossover between groups in the latter study may have reduced the power of the study to show differences related to external cephalic version (ECV). The study authors suggest that against a background of low caesarean section rates for breech presentation, the negative experience of failed ECV may render the woman or doctors more likely to opt for caesarean section.

It has been suggested that ECV may be more successful (and spontaneous version more common) in black African than caucasian women, possibly because of the tendency for the presenting part to remain high until the onset of labour (Hofmeyr 1986). Ethnicity was not a pre-defined sub-group analysis for this review. However, post-hoc sensitivity analysis excluding the two studies in black African women (Hofmeyr 1983; Mahomed 1991) eliminated the significant heterogeneity, with the following relative risks (fixed-effects model): non-cephalic presentation at birth: 0.61 (0.51 to 0.73); caesarean section: 0.65 (0.44 to 0.97).

The recent trend to routine caesarean section for persistent breech presentation may result in a greater impact of ECV on caesarean section rates than was apparent in the studies reviewed.

The trials reviewed do not give information on women's views.

AUTHORS' CONCLUSIONS

Implications for practice

The studies in this review provide convincing evidence that the chance of breech birth and caesarean section may be substantially reduced by attempting external cephalic version (ECV) at or near term. The numbers studied are too small to give an accurate assessment of the risks of ECV, though data from observation studies are reassuring. There is sound reason for the clinical use of ECV at term, with the appropriate precautions, in any woman in whom the value of an improved chance of a cephalic birth outweighs the risk of the procedure.

Implications for research

Future research should be directed towards refining the selection of women suitable for ECV attempt at term. For example, previous caesarean section has been regarded as a contraindication to ECV. In an uncontrolled series ECV was found to be successful in 82% of 56 women with one or two previous caesarean sections (Flamm 1991).

The place of ECV during labour requires further study. This procedure was reported to be successful in 11 (73%) out of 15 women in labour considered unsuitable for vaginal breech delivery. Caesarean section was avoided in 10 (67%) of the women (Ferguson 1985).

Further research is needed to define more accurately the effect of ECV on perinatal outcome, and the place of ECV in non-longitudinal lies.

Future studies should include an assessment of women's views.

POTENTIAL CONFLICT OF INTEREST

The contact author is an author of one of the papers reviewed.

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REFERENCES

References to studies included in this review

Brocks 1984 *{published data only}*

Brocks V, Philipsen T, Secher NJ. A randomized trial of external cephalic version with tocolysis in late pregnancy. *British Journal of Obstetrics and Gynaecology* 1984;**91**:653–6.

Hofmeyr 1983 *{published data only}*

Hofmeyr GJ. Effect of external cephalic version in late pregnancy on breech presentation and caesarean section rate: a controlled trial. *British Journal of Obstetrics and Gynaecology* 1983;**90**:392–9.

Mahomed 1991 *{published data only}*

Mahomed K, Seeras R, Coulson R. External cephalic version at term. A randomised controlled trial using tocolysis. *British Journal of Obstetrics and Gynaecology* 1991;**98**:8–13.

Van De Pavert 1990 *{published data only}*

Van de Pavert R, Gravenhorst JB, Keirse MJNC. Value of external version in breech presentation at term. *Nederlands Tijdschrift voor Geneeskunde* 1990;**134**:2245–8.

Van Dorsten 1981 *{published data only}*

Van Dorsten JP, Schifrin BS, Wallace RL. Randomized control trial of external cephalic version with tocolysis in late pregnancy. *American Journal of Obstetrics and Gynecology* 1981;**141**:417–24.

References to studies excluded from this review

Besio 1994

Besio M, Coto M. Evaluation of the external cephalic version in the management of dystocia (published erratum appears in Revista Chilena de Obstetricia y Ginecologia 1995;60(2):145). *Revista Chilena de Obstetricia y Ginecologia* 1994;**59**:422–7.

Stine 1985

Stine LE, Phelan JP, Wallace R, Eglinton GS, Van Dorsten JP, Schifrin BS. Update on external cephalic version performed at term. *Obstetrics & Gynecology* 1985;**65**:642–6.

Van Veelen 1989

Van Veelen AJ, Van Cappellen AW, Flu PK, Straub MJPF, Wallenburg HCS. Effect of external cephalic version in late pregnancy on presentation at delivery: a randomized controlled trial. *British Journal of Obstetrics and Gynaecology* 1989;**96**:916–21.

Additional references

Alderson 2004

Alderson P, Green S, Higgins JPT, editors. Cochrane Reviewers' Handbook 4.2.2 [updated December 2003]. In: The Cochrane Library, Issue 1, 2004. Chichester, UK: John Wiley & Sons, Ltd.

Ben-Haroush 2002

Ben-Haroush A, Perri T, Bar J, Yogev Y, Bar-Hava I, Hod M, et al. Mode of delivery following successful external cephalic version. *American Journal of Perinatology* 2002;**19**:355–60.

Boucher 2003

Boucher M, Bujold E, Marquette GP, Vezina Y. The relationship between amniotic fluid index and successful external cephalic version: a 14-year experience. *American Journal of Obstetrics and Gynecology* 2003;**189**:751–4.

Bradley-Watson 1975

Bradley-Watson PJ. The decreasing value of external cephalic version in modern obstetric practice. *American Journal of Obstetrics and Gynecology* 1975;**123**:237–40.

Brosset 1956

Brosset A. The value of prophylactic external version in cases of breech presentation. *Acta Obstetricia et Gynecologica Scandinavica* 1956;**35**: 555–62.

Chan 2004

Chan LY, Leung TY, Fok WY, Chan LW, Lau TK. Prediction of successful vaginal delivery in women undergoing external cephalic version at term for breech presentation. *European Journal of Obstetrics & Gynecology and Reproductive Biology* 2004;**116**:39–42.

Chan 2004b

Chan LY, Tang JL, Tsoi KF, Fok WY, Chan LW, Lau TK. Intrapartum cesarean delivery after successful external cephalic version: a meta-analysis. *Obstetrics & Gynecology* 2004;**104**:155–60.

Chan 2004c

Chan LY, Leung TY, Fok WY, Chan LW, Lau TK. Cord blood acid-base status at delivery after successful external cephalic version. *Acta Obstetricia et Gynecologica Scandinavica* 2004;**83**:436–9.

Collaris 2004

Collaris RJ, Oei SG. External cephalic version: a safe procedure? A systematic review of version-related risks. *Acta Obstetricia et Gynecologica Scandinavica* 2004;**83**:511–8.

Danielian 1996

Danielian PJ, Wang J, Hall MH. Long term outcome by method of delivery of fetuses in breech presentation at term: population based follow up. *BMJ* 1996;**312**:1451–3.

Devendra 2002

Devendra K. Introducing routine external cephalic version for the management of the malpresenting fetus near term. *Medical Journal of Malaysia* 2002;**57**:454–9.

Ferber 1999

Ferber A, Peleg D, Bar-Hava I, Orvieto R, Ben-Rafael Z. Optimal fetal outcome despite persistent sinusoidal pattern after external cephalic version. *Journal of Obstetrics and Gynaecology* 1999;**19**:314–5.

Ferguson 1985

Ferguson JE, Dyson DC. Intrapartum external cephalic version. *American Journal of Obstetrics and Gynecology* 1985;**152**:297–8.

Flamm 1991

Flamm BL, Fried MW, Lonky NM, Giles WS. External cephalic version after previous cesarean section. *American Journal of Obstetrics and Gynecology* 1991;**165**:370–2.

Fortunato 1988
Fortunato SJ, Mercer LJ, Guzick DS. External cephalic version with tocolysis: factors associated with success. *Obstetrics & Gynecology* 1988;**72**:59–62.

Fung Kee Fung 2003
Fung Kee Fung K, Eason E, Crane J, Armson A, De La Ronde S, Farine D, et al. Prevention of Rh alloimmunization. *Journal of Obstetrics and Gynaecology Canada: JOGC* 2003;**25**:765–73.

Guyer 2001
Guyer CH, Heard MJ. A prospective audit of external cephalic version at term: are ultrasound parameters predictive of outcome?. *Journal of Obstetrics and Gynaecology* 2001;**21**:580–2.

Hofmeyr 1986
Hofmeyr GJ, Sadan O, Myer IG, Gallal KC, Simko G. External cephalic version and spontaneous version rates: ethnic and other determinants. *British Journal of Obstetrics and Gynaecology* 1986;**93**: 13–16.

Hofmeyr 1989
Hofmeyr GJ. Breech presentation and abnormal lie in late pregnancy. In: ChalmersI, EnkinMW, KeirseMJNC editor(s). *Effective care in pregnancy and childbirth*. Oxford: Oxford University Press, 1989: 653–65.

Hofmeyr 1991
Hofmeyr GJ. External cephalic version at term: how high are the stakes?. *British Journal of Obstetrics and Gynaecology* 1991;**98**:1–3.

Hofmeyr 1992
Hofmeyr GJ. Breech presentation and shoulder dystocia in childbirth. *Current Opinion in Obstetrics and Gynecology* 1992;**4**:807–12.

Hofmeyr 1993
Hofmeyr GJ. External cephalic version at term. *Fetal Maternal Medicine Review* 1993;**5**:213–22.

Hofmeyr 1996
Hofmeyr GJ. External cephalic version for breech presentation before term. *The Cochrane Database of Systematic Reviews* 1996, Issue 1. Art. No.: CD000084. DOI:10.1002/14651858.CD000084.pub2.

Hofmeyr 2000
Hofmeyr GJ, Kulier R. Cephalic version by postural management for breech presentation. *The Cochrane Database of Systematic Reviews* 2000, Issue 3. Art. No.: CD000051. DOI: 10.1002/14651858.CD000051.

Hofmeyr 2004a
Hofmeyr GJ. Obstructed labor: using better technologies to reduce mortality. *International Journal of Gynaecology & Obstetrics* 2004;**85 Suppl 1**:S62–72.

Hofmeyr 2004b
Hofmeyr GJ, Gyte G. Interventions to help external cephalic version for breech presentation at term. *The Cochrane Database of Systematic Reviews* 2004, Issue 1. Art. No.: CD000184. DOI: 10.1002/14651858.CD000184.pub2.

Holmes 2004
Holmes W, Hofmeyr GJ. Management of breech presentation in areas with high prevalence of HIV infection. *International Journal of Gynaecology & Obstetrics* 2004;**87**:272–6.

Hughes 1997
Hughes GW. Establishing an external cephalic version clinic: outcome of the first year. *Journal of Obstetrics and Gynaecology* 1997;**17**: 127–31.

Impey 1999
Impey L, Lissoni D. Outcome of external cephalic version after 36 weeks' gestation without tocolysis. *Journal of Maternal-Fetal Medicine* 1999;**8(5)**:203–7.

Impey 2005
Impey L, Pandit M. Tocolysis for repeat external cephalic version in breech presentation at term: a randomised, double-blinded, placebo-controlled trial. *BJOG: an International Journal of Obstetrics & Gynaecology* 2005;**112(5)**:627–31.

Lau 1997
Lau TK, Lo KWK, Wan D, Rogers MS. Predictors of successful external cephalic version at term: a prospective study. *British Journal of Obstetrics and Gynaecology* 1997;**104**:798–802.

Le Bret 2004
Le Bret T, Grange G, Goffinet F, Cabrol D. External cephalic version: experience about 237 versions at Port-Royal maternity. *Journal de Gynecologie, Obstetrique et Biologie de la Reproduction (Paris)* 2004; **33**:297–303.

Lojacono 2003
Lojacono A, Donarini G, Valcamonico A, Soregaroli M, Frusca T. External cephalic version for breech presentation at term: an effective procedure to reduce the caesarean section rate. *Minerva Ginecologica* 2003;**55**:519–24.

Nzewi 1999
Nzewi N, Clerk P, Bowen-Simpkins C. Prolonged fetal tachycardia-an unusual complication of external cephalic version. *Journal of Obstetrics and Gynaecology* 1999;**19**:427–8.

Owens 2003
Owens M, Bhullar A, Carlan SJ, O'Brien WF, Hirano K. Effect of fundal pressure on maternal to fetal microtransfusion at the time of cesarean delivery. *Journal of Obstetrics and Gynaecology Research* 2003; **29**:152–6.

Papp 2004
Papp S, Dhaliwal G, Davies G, Borschneck D. Fetal femur fracture and external cephalic version. *Obstetrics & Gynecology* 2004;**104**: 1154–6.

Raynes-Greenow 2004
Raynes-Greenow CH, Roberts CL, Barratt A, Brodrick B, Peat B. Pregnant women's preferences and knowledge of term breech management, in an Australian setting. *Midwifery* 2004;**20**:181–7.

RevMan 2003
The Cochrane Collaboration. Review Manager (RevMan). 4.2 for Windows. Oxford, England: The Cochrane Collaboration, 2003.

Schachter 1994
Schachter M, Kogan S, Blickstein I. External cephalic version after previous cesarean section - a clinical dilemma. *International Journal of Gynecology & Obstetrics* 1994;**45**:17–20.

Shankar 2004
Shankar M, Gough GW, Chakravarti S, Vellacott ID. Massive feto-maternal haemorrhage with good perinatal outcome following failed

external cephalic version. *Fetal Diagnosis and Therapy* 2004;**19**:68–71.

Skupski 2003
Skupski DW, Harrison-Restelli C, Dupont RB. External cephalic version: an approach with few complications. *Gynecologic and Obstetric Investigation* 2003;**56**:83–8.

Vezina 2004
Vezina Y, Bujold E, Varin J, Marquette GP, Boucher M. Cesarean delivery after successful external cephalic version of breech presentation at term: a comparative study. *American Journal of Obstetrics and Gynecology* 2004;**190**:763–8.

Williams 1999
Williams J, Bjornsson S, Cameron AD, Mathers A, Yahya Jill SZS, Pell P. Prospective study of external cephalic version in Glasgow: patient selection, outcome and factors associated with outcome. *Journal of Obstetrics and Gynaecology* 1999;**19**:598–601.

Yogev 2002
Yogev Y, Horowitz E, Ben-Haroush A, Chen R, Kaplan B. Changing attitudes toward mode of delivery and external cephalic version in breech presentations. *International Journal of Gynaecology & Obstetrics* 2002;**79**:221–4.

Zhang 1993
Zhang J, Bowes WA, Fortney JA. Efficacy of external cephalic version: a review. *Obstetrics & Gynecology* 1993;**82**:306–12.

References to other published versions of this review

Hofmeyr 1995
Hofmeyr GJ. External cephalic version at term. [revised 04 October 1993]. In: Enkin MW, Keirse MJNC, Renfrew MJ, Neilson JP, Crowther C (eds.) Pregnancy and Childbirth Module. In: The Cochrane Pregnancy and Childbirth Database [database on disk and CDROM]. The Cochrane Collaboration; Issue 2, Oxford: Update Software; 1995.

TABLES

Characteristics of included studies

Study	Brocks 1984
Methods	65 women who agreed to enter the trial "randomly allocated" to ECV or control group.
Participants	Inclusion criteria: singleton breech presentation on ultrasound in 37th week. Agree to enter study. Exclusion criteria: contraindication to ECV.
Interventions	Single ECV attempt following ritodrine 15 ug/minute for 15 minutes. ECV repeated successfully in two women in whom reversion to breech occurred. Compared with no ECV attempt.
Outcomes	Presentation at delivery; method of delivery.
Notes	A further 65 women who had ECV or no ECV according to request not included in this review as not randomised. Neonatal outcomes given according to presentation rather than allocation and therefore not included in the review.
Allocation concealment	C – Inadequate

Characteristics of included studies (*Continued*)

Study	**Hofmeyr 1983**
Methods	Participants allocated by randomly ordered, concealed cards.
Participants	Inclusion criteria: singleton breech presentation on ultrasound examination at 36 or more weeks' gestation; consent to participate. Exclusion criteria: contraindication to ECV.
Interventions	ECV attempt initially without tocolysis. If unsuccessful (7 cases), attempt repeated following hexoprenaline 10 ug by slow IVI injection. Compared with no ECV attempt.
Outcomes	Presentation at delivery; method of delivery; Apgar score < 7 at 1 and 5 minutes; perinatal mortality.
Notes	
Allocation concealment	C – Inadequate

Study	**Mahomed 1991**
Methods	Allocation by consecutively numbered sealed opaque envelopes, randomised in blocks of 6.
Participants	Inclusion criteria: singleton breech presentation at 37 weeks or more; consent to participate. Exclusion criteria: contraindication to ECV; non-reactive nonstress test.
Interventions	ECV attempt following hexoprenaline 10 ug intravenously over 1 minute, compared with no ECV attempt.
Outcomes	Presentation at delivery; caesarean section rate; 5 minute Apgar score < 7 and < 5; perinatal mortality; enrolment-labour interval; gestation at delivery.
Notes	Factors affecting ECV success rate evaluated in the 103 women in the trial together with another 104 non-trial ECV attempts. In the latter group one stillbirth occurred 17 days after successful ECV. The baby was born with the cord tightly around the neck.
Allocation concealment	A – Adequate

Study	**Van De Pavert 1990**
Methods	Randomisation by sealed envelope.
Participants	Inclusion criteria: singleton breech presentation at more than 36 weeks' gestation; agree to participate. Exclusion criteria: contraindication to ECV.
Interventions	ECV without tocolysis, followed by ECV attempt with ritodrine infusion, compared with no ECV attempt.
Outcomes	Presentation at delivery; caesarean section rate.
Notes	4 in the ECV group refused ECV attempt, while 5 in the control group had ECV attempt on request. Analysis was according to intention-to-treat.
Allocation concealment	C – Inadequate

Study	**Van Dorsten 1981**
Methods	Allocation by random number table.
Participants	Inclusion criteria: low-risk pregnant women; breech presentation at 37 to 39 weeks' gestation; normal ultrasound examination; reactive nonstress test. Exclusion criteria: medical conditions; hypertension; premature labour; premature rupture of membranes; suspected impaired fetal growth; previous uterine surgery; multiple gestation; third trimester bleeding.
Interventions	ECV attempt following terbutaline sulphate infusion at 5 ug per minute for 10 to 15 minutes, compared with no ECV attempt.
Outcomes	Presentation at delivery; caesarean section rate; Apgar score < 7 at 1 and 5 minutes; enrolment-delivery interval; birthweight; meconium during labour or at delivery.
Notes	There were 3 exclusions after selection because of oligohydramnios, placenta praevia and non-reactive non-stress test.

Allocation concealment	C – Inadequate

IVI: intravenous
ug: microgram
ECV: external cephalic version

Characteristics of excluded studies

Study	Reason for exclusion
Besio 1994	Controlled trial of ECV at term, not randomised. Cephalic presentation at term in 32/45 versus 4/45 in the control group. Caesarean sections 22/45 versus 39/45 respectively.
Stine 1985	Non-randomised follow-on study after completion of the Van Dorsten randomised trial. ECV was successful in 108/148 women. Six were lost to follow up and seven reverted to abnormal lies. Of the remaining 95, 23 underwent caesarean section. One unexplained intrauterine death occurred 3 weeks after successful ECV. One maternal death occurred at caesarean section 4 days after successful ECV, from amnionitis, septicaemia, intravascular coagulation and amniotic fluid embolus.
Van Veelen 1989	Excluded because ECV attempts commenced at 33 weeks, and continued up to term. See review 'External cephalic version for ECV before term'.

ECV: external cephalic version

ANALYSES

Comparison 01. External cephalic version at term

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Non-cephalic births	5	433	Relative Risk (Random) 95% CI	0.38 [0.18, 0.80]
02 Caesarean section	5	433	Relative Risk (Random) 95% CI	0.55 [0.33, 0.91]
03 Apgar score < 7 at 1 minute	2	108	Relative Risk (Fixed) 95% CI	0.95 [0.47, 1.89]
04 Apgar score < 7 at 5 minutes	4	368	Relative Risk (Fixed) 95% CI	0.76 [0.32, 1.77]
05 Umbilical vein pH < 7.20	1	52	Relative Risk (Fixed) 95% CI	0.65 [0.17, 2.44]
06 Neonatal admission	1	52	Relative Risk (Fixed) 95% CI	0.36 [0.04, 3.24]
07 Perinatal death	5	433	Relative Risk (Fixed) 95% CI	0.51 [0.05, 5.54]
08 Enrolment-delivery interval	2	256	Weighted Mean Difference (Fixed) 95% CI	-0.25 [-2.81, 2.31]

INDEX TERMS

Medical Subject Headings (MeSH)

*Breech Presentation; *Version, Fetal

MeSH check words

Female; Humans; Pregnancy

COVER SHEET

Title	External cephalic version for breech presentation at term
Authors	Hofmeyr GJ, Kulier R
Contribution of author(s)	GJ Hofmeyr prepared the original version and maintains the review. R Kulier revised and quality-checked the review.

Issue protocol first published	1996/2
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Date of most recent amendment	22 February 2006
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What's New	April 2005 Revised to be consistent with revision of review 'External cephalic version for breech presentation before term'. Trial van Veelen 1989 reassigned to the latter review. Search updated. No new trials identified. December 2004 Literature search revised. No new data identified.
Date new studies sought but none found	18 April 2005
Date new studies found but not yet included/excluded	Information not supplied by author
Date new studies found and included/excluded	Information not supplied by author
Date authors' conclusions section amended	Information not supplied by author
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GRAPHS AND OTHER TABLES

Analysis 01.01. Comparison 01 External cephalic version at term, Outcome 01 Non-cephalic births

Review: External cephalic version for breech presentation at term

Comparison: 01 External cephalic version at term

Outcome: 01 Non-cephalic births

Study	Treatment n/N	Control n/N	Relative Risk (Random) 95% CI	Weight (%)	Relative Risk (Random) 95% CI
Brocks 1984	17/31	29/34		23.4	0.64 [0.45, 0.91]
Hofmeyr 1983	1/30	20/30		9.2	0.05 [0.01, 0.35]
Mahomed 1991	18/103	87/105		22.8	0.21 [0.14, 0.32]
Van De Pavert 1990	16/25	20/27		23.3	0.86 [0.60, 1.25]
Van Dorsten 1981	8/25	19/23		21.3	0.39 [0.21, 0.71]
Total (95% CI)	214	219		100.0	0.38 [0.18, 0.80]

Total events: 60 (Treatment), 175 (Control)

Test for heterogeneity chi-square=43.24 df=4 p=<0.0001 I^2 =90.7%

Test for overall effect z=2.55 p=0.01

Analysis 01.02. Comparison 01 External cephalic version at term, Outcome 02 Caesarean section

Review: External cephalic version for breech presentation at term

Comparison: 01 External cephalic version at term

Outcome: 02 Caesarean section

Study	Treatment n/N	Control n/N	Relative Risk (Random) 95% CI	Weight (%)	Relative Risk (Random) 95% CI
Brocks 1984	7/31	12/34		19.9	0.64 [0.29, 1.42]
Hofmeyr 1983	6/30	13/30		19.2	0.46 [0.20, 1.05]
Mahomed 1991	13/103	35/105		25.9	0.38 [0.21, 0.67]
Van De Pavert 1990	7/25	3/27		11.8	2.52 [0.73, 8.69]
Van Dorsten 1981	7/25	17/23		23.1	0.38 [0.19, 0.74]
Total (95% CI)	214	219		100.0	0.55 [0.33, 0.91]

Total events: 40 (Treatment), 80 (Control)

Test for heterogeneity chi-square=8.53 df=4 p=0.07 I^2 =53.1%

Test for overall effect z=2.33 p=0.02

Analysis 01.03. Comparison 01 External cephalic version at term, Outcome 03 Apgar score < 7 at 1 minute

Review: External cephalic version for breech presentation at term

Comparison: 01 External cephalic version at term

Outcome: 03 Apgar score < 7 at 1 minute

Study	Treatment n/N	Control n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Hofmeyr 1983	3/30	5/30		40.7	0.60 [0.16, 2.29]
Van Dorsten 1981	9/25	7/23		59.3	1.18 [0.53, 2.66]
Total (95% CI)	55	53		100.0	0.95 [0.47, 1.89]

Total events: 12 (Treatment), 12 (Control)

Test for heterogeneity chi-square=0.74 df=1 p=0.39 I^2 =0.0%

Test for overall effect z=0.16 p=0.9

Analysis 01.04. Comparison 01 External cephalic version at term, Outcome 04 Apgar score < 7 at 5 minutes

Review: External cephalic version for breech presentation at term

Comparison: 01 External cephalic version at term

Outcome: 04 Apgar score < 7 at 5 minutes

Study	Treatment n/N	Control n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
× Hofmeyr 1983	0/30	0/30		0.0	Not estimable
Mahomed 1991	8/103	10/105		87.3	0.82 [0.34, 1.98]
Van De Pavert 1990	0/25	1/27		12.7	0.36 [0.02, 8.43]
× Van Dorsten 1981	0/25	0/23		0.0	Not estimable
Total (95% CI)	183	185		100.0	0.76 [0.32, 1.77]

Total events: 8 (Treatment), 11 (Control)

Test for heterogeneity chi-square=0.24 df=1 p=0.62 I^2 =0.0%

Test for overall effect z=0.64 p=0.5

Analysis 01.05. Comparison 01 External cephalic version at term, Outcome 05 Umbilical vein pH < 7.20

Review: External cephalic version for breech presentation at term

Comparison: 01 External cephalic version at term

Outcome: 05 Umbilical vein pH < 7.20

Study	Treatment n/N	Control n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Van De Pavert 1990	3/25	5/27		100.0	0.65 [0.17, 2.44]
Total (95% CI)	25	27		100.0	0.65 [0.17, 2.44]
Total events: 3 (Treatment), 5 (Control)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.64 p=0.5					

Analysis 01.06. Comparison 01 External cephalic version at term, Outcome 06 Neonatal admission

Review: External cephalic version for breech presentation at term

Comparison: 01 External cephalic version at term

Outcome: 06 Neonatal admission

Study	Treatment n/N	Control n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Van De Pavert 1990	1/25	3/27		100.0	0.36 [0.04, 3.24]
Total (95% CI)	25	27		100.0	0.36 [0.04, 3.24]
Total events: 1 (Treatment), 3 (Control)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.91 p=0.4					

Analysis 01.07. Comparison 01 External cephalic version at term, Outcome 07 Perinatal death

Review: External cephalic version for breech presentation at term

Comparison: 01 External cephalic version at term

Outcome: 07 Perinatal death

Study	Treatment n/N	Control n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
× Brocks 1984	0/31	0/34		0.0	Not estimable
× Hofmeyr 1983	0/30	0/30		0.0	Not estimable
Mahomed 1991	1/103	2/105		100.0	0.51 [0.05, 5.54]
× Van De Pavert 1990	0/25	0/27		0.0	Not estimable
× Van Dorsten 1981	0/25	0/23		0.0	Not estimable
Total (95% CI)	214	219		100.0	0.51 [0.05, 5.54]

Total events: 1 (Treatment), 2 (Control)

Test for heterogeneity: not applicable

Test for overall effect z=0.55 p=0.6

Analysis 01.08. Comparison 01 External cephalic version at term, Outcome 08 Enrolment-delivery interval

Review: External cephalic version for breech presentation at term

Comparison: 01 External cephalic version at term

Outcome: 08 Enrolment-delivery interval

Study	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Mahomed 1991	103	14.00 (11.00)	105	14.00 (9.00)		87.6	0.00 [-2.73, 2.73]
Van Dorsten 1981	25	15.60 (11.50)	23	17.60 (13.90)		12.4	-2.00 [-9.25, 5.25]
Total (95% CI)	128		128			100.0	-0.25 [-2.81, 2.31]

Test for heterogeneity chi-square=0.26 df=1 p=0.61 I^2 =0.0%

Test for overall effect z=0.19 p=0.8