Immediate postabortal insertion of intrauterine devices (Review)

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This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2007, Issue 4

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This record should be cited as:
Grimes DA, Lopez LM, Schulz KF, Stanwood N. Immediate postabortal insertion of intrauterine devices. *Cochrane Database of Systematic Reviews* 2004, Issue 4. Art. No.: CD001777. DOI: 10.1002/14651858.CD001777.pub2.

This version first published online: 18 October 2004 in Issue 4, 2004.
Date of most recent substantive amendment: 03 June 2004

ABSTRACT

Background
Insertion of an intrauterine device (IUD) immediately after an abortion has several potential advantages. The woman is known not to be pregnant, a major concern for clinicians. Many clinicians refuse to insert an IUD in a woman who is not menstruating. After induced abortion, a woman's motivation to use contraception may be high. However, insertion of an IUD immediately after a pregnancy ends carries potential risks. For example, the risk of spontaneous expulsion may be increased due to recent cervical dilation.

Objectives
To assess the safety and efficacy of IUD insertion immediately after spontaneous or induced abortion.

Search strategy
We used MEDLINE, POPLINE, and EMBASE computer searches, supplemented by review articles and contacts with investigators.

Selection criteria
We sought all randomized controlled trials with at least one treatment arm that involved IUD insertion immediately after an induced abortion or after curettage for spontaneous abortion. We identified 12 trials which described random assignment. We excluded three since two revealed unethical research conduct, and one used alternate assignment to treatments.

Data collection and analysis
We evaluated the methodological quality of each report and abstracted the data. We focused on discontinuation rates for accidental pregnancy, perforation, expulsion, and pelvic inflammatory disease. Using RevMan 4.2.8, we computed the weighted average of the rate ratios with the inverse variance method. We computed relative risks (RR) for individual studies.

Main results
From the meta-analysis of the multicenter trials, the TCu 220C proved superior to the Lippes Loop D and the Copper 7 IUDs for immediate postabortal insertion. For accidental (intrauterine) pregnancy, the rate ratio for the TCu 220C versus Lippes Loop was 0.38 (95% Confidence Interval (CI) 0.20 to 0.72). Compared to the Copper 7, the estimate for the TCu 220C was 0.52 (95% CI 0.36 to 0.77). For expulsions, the estimates were 0.51 (95% CI 0.30 to 0.88) and 0.58 (95% CI 0.39 to 0.87).

Only one trial compared immediate versus delayed insertion. Performance of the Copper 7 inserted right after abortion was somewhat inferior to that after delayed insertion. With the addition of copper arms, the Lippes Loop was improved for preventing pregnancy (RR 3.82; 95% CI 1.41 to 10.36) and expulsion (RR 3.37; 95% CI 1.65 to 6.90). The levonorgestrel IUD prevented pregnancy better than the Nova T.

Authors' conclusions
Insertion of an IUD immediately after abortion is both safe and practical. IUD expulsion rates appear higher than after interval insertions.

PLAIN LANGUAGE SUMMARY

Inserting an IUD right after abortion or miscarriage versus a later time

Inserting an intrauterine device (IUD) right after an abortion or miscarriage can be good for many reasons. The woman is not pregnant and may be thinking about birth control. The time and place are convenient for the woman. If asked to delay IUD insertion, many women do not return to get the device. However, the IUD might be more likely to come out on its own if put in right away. This review looked how safe it was to insert an IUD right after abortion. We also looked at whether the IUD stayed in.

We did computer searches for randomized trials of IUDs inserted right after abortion or miscarriage. We also wrote to researchers to find more studies. Trials could compare types of IUDs or times for insertion.

Two large trials looked at inserting the IUD right away. The TCu 220C was better than the Lippes Loop and the Copper 7 for preventing pregnancy and staying in. The IUD was more likely to come out on its own when inserted after a mid-pregnancy abortion than after an earlier one.

Only one trial compared inserting the IUD right away with a later time. The Copper 7 came out slightly more often on its own when inserted right after abortion. With copper arms added to the Lippes Loop, fewer women got pregnant and the IUD stayed in more often. Also, fewer women got pregnant with the levonorgestrel IUD than with the Nova T.

Inserting an IUD right after an abortion or miscarriage is safe and practical.

BACKGROUND

Insertion of an intrauterine device (IUD) immediately after an abortion has several potential advantages. The woman is known not to be pregnant, a major concern for clinicians. For example, many clinicians refuse to insert an IUD in a woman who is not menstruating (Stanback 1997). After induced abortion, a woman's motivation to use contraception may be high. Among women who have limited access to a clinician, abortion care may provide a unique opportunity to address a woman's need for contraception (Mahomed 1997; McLaurin 1993; Wolf 1994). A copper T 380A or levonorgestrel-releasing IUD confers nearly the same contraceptive efficacy as does tubal sterilization (Peterson 1996), yet it is simpler, less expensive, and promptly reversible. In addition, insertion of an IUD immediately after abortion may avoid discomfort related to insertion, and any bleeding from the insertion will be disguised by the expected bleeding after abortion.

However, insertion of an IUD immediately after a pregnancy ends carries potential risks as well. For example, the risk of perforation may be increased due to softening of the myometrium. Spontaneous expulsion of the device may be more common with postabortal insertion than after interval insertion (remote from pregnancy), since the cervical canal has recently been dilated. Another potential concern is infection. Insertion of an IUD after a clandestine or unsafe abortion may increase the risk of upper genital tract infection compared with interval insertion.

OBJECTIVES

This review assesses the safety and efficacy of immediate IUD insertion after induced abortion or curettage for completion of a spontaneous abortion.

CRITERIA FOR CONSIDERING STUDIES FOR THIS REVIEW

Types of studies

This review includes only randomized controlled trials using a least one IUD intervention arm. We included studies of both induced and spontaneous abortion. We excluded two published studies that we judged unethical and one that proved to have non-random allocation of treatments.

Types of participants

Trials included women of any age or gravidity who received an IUD immediately after induced abortion or curettage for spontaneous abortion.

Types of intervention

We included any type of IUD, regardless of its current availability. Most reports were two- or three-arm comparisons of different types of IUDs. The most frequently studied IUDs contained copper: Copper T 200, (TCu 200), Copper T 220C (TCu 220C), Multiload IUD (abbreviated MLCu 250 or MLCu 375), Nova T, and Copper 7. The numbers in IUD names generally indicate the square millimeters of copper surface area exposed to the endometrium. The exception is the Copper 7, for which the number denotes the shape of the device. One trial examined a levonorgestrel-releasing T-shaped intrauterine system (the LNG-IUS

or Mirena). One trial examined immediate versus delayed insertion of the same device, a Copper 7. One trial examined the addition of copper sleeves to a Lippes Loop D, while another study tested the application of a hydrogel to the surface of a Spring Coil.

Types of outcome measures

The principal outcome measures were accidental pregnancy, spontaneous expulsion, uterine perforation, and upper genital tract infection. One trial focused on bleeding patterns with a copper- versus levonorgestrel-releasing IUD.

SEARCH METHODS FOR IDENTIFICATION OF STUDIES

See: methods used in reviews.

We used several comprehensive review articles on this topic for the initial search (PIP 1995; WHO 1987). We then conducted a MEDLINE search back to 1969 using these search terms: postabortal IUD insertions; IUD; IUCD; intrauterine devices; post-abortion; postabortal; abortion induced; abortion, therapeutic; abortion, spontaneous; random; randomized controlled trial; controlled clinical trial; random allocation; clinical trial; and randomized controlled trials.

We then performed a similar search through Ovid, POPLINE, and EMBASE to supplement the MEDLINE search. We used the reference lists of all these sources to look for additional citations. Although we contacted several investigators in the field to seek unpublished trials or published trials we had missed, this revealed no new references. We also searched the Cochrane Central Register of Controlled Trials (CENTRAL) for relevant studies but found no additional studies beyond those already identified.

METHODS OF THE REVIEW

Two authors read the titles and abstracts of all the potential citations, and we obtained photocopies of all the articles that appeared relevant. After a preliminary review of these articles, we developed a data collection form and field tested it as described in the Cochrane Handbook (Higgins 2005). Two authors then independently examined each retrieved article for possible inclusion and graded the methodological quality of each study, with special attention to allocation concealment. Two authors independently abstracted information onto the data collection forms, and we resolved any discrepancies by discussion or consultation with a third author. We attempted to contact several researchers by mail for supplemental information. One author entered the data into RevMan 4.2.8, and another author checked the entries for accuracy.

When this review was first conducted, RevMan did not provide for the aggregation of survival (life-table) data. Since this is now possible with the inverse variance method (Higgins 2005), we have re-done the meta-analysis. We abstracted the life-table rates and standard errors for analysis. Only two trials (WHO 1983a; WHO 1983b) were aggregated for meta-analysis, since both used the same interventions and definitions of outcomes. The comparisons were among the TCu 220, the Lippes Loop, and the Copper 7. Events were discontinuations due to pregnancy, perforation, expulsion, total medical events, and pelvic inflammatory disease (PID), which was a subset of total medical events.

For each comparison, the natural logarithm of the rate ratio was calculated from the rates provided in the reports (Higgins 2005). The standard error (SE) for each ratio was calculated as $\sqrt{([SE_1(L)]^2 + [SE_2(L)]^2)}$, where L = natural logarithm of the standard error (s.e.) for the original rate (Fleiss 1981). The log of the rate ratio and its standard error were entered into RevMan 4.2.8. We used the generic inverse variance method to compute a weighted average for each rate ratio. These outcomes included intrauterine pregnancy, expulsion, and total medical events. For the discontinuations due to perforation and PID, the rate ratios were not estimable due to having zero events in at least one of the studies (WHO 1983a; WHO 1983b). In those cases, the relative risk was computed as described below for individual studies.

Most studies could not be aggregated into a meta-analysis due to having different interventions. We estimated the relative risk (RR) and 95% Confidence Interval (CI) for these trials using the number of events as the numerator and person-time (generally woman-years) as the denominator. We also entered the life-table rates into 'Other data' tables when no other data were available for analysis.

DESCRIPTION OF STUDIES

We identified 12 relevant published trials. Two trials revealed unethical conduct on the part of the investigators (Chowdhury 1979; Goldsmith 1972). Both trials had a sham IUD insertion arm without the informed consent of the participants. One trial (Querido 1985) proved not to be randomized. The researchers used alternate assignment of patients, so we excluded this trial from subsequent analysis. Nine trials remained after excluding these three trials. The most valuable evidence came from two large, international randomized controlled trials performed by the World Health Organization (WHO 1983a; WHO 1983b). One study (WHO 1983b) examined insertions of the Lippes Loop, Copper TCu 220C, and the Copper 7 immediately after spontaneous abortion. The other trial (WHO 1983a) studied the same three devices after induced abortion.

One trial examined immediate versus delayed insertion of the Copper 7 device (Gillett 1980). Four trials were two-arm comparisons of different IUDs. Three of these studied the Nova T

(McCarthy 1985; Nielsen 1984; Luukkainen 1987). The comparison IUDs included the levonorgestrel intrauterine system (IUS) (Luukkainen 1987), the Copper T 200 (Nielsen 1984), and the Multiload 250 (McCarthy 1985). One trial compared the Multiload 375 versus Multiload 250 (Lim 1985).

Two trials examined modifications of an IUD. In one, copper sleeves were added to a Lippes Loop D (Randic 1991). In the other, topical hydrogel was applied to a Spring Coil (Randic 1983).

METHODOLOGICAL QUALITY

The WHO trials (WHO 1983a; WHO 1983b) were of good quality. Both featured a computer-generated random sequence and sealed envelopes for allocation concealment. Communication with the researchers indicated that the envelopes were sequentially numbered and opaque. However, both WHO trials (WHO 1983a; WHO 1983b) excluded from analysis patients who had problems within 48 hours of insertion. While the total numbers were small (12 and 1, respectively), these exclusions were improper and led to an underestimation of discontinuation rates. Several reports did not describe adequately the methods of randomization or allocation concealment. Communication with researchers (Gillett 1980; Lim 1985McCarthy 1985; Suvisaari from Luukkainen 1987) confirmed that computer-generated randomization had been done, with allocation concealment by sealed envelopes. Whether the envelopes were opaque and sequentially numbered is unknown.

Two trials had a sham IUD insertion arm without the knowledge of the women involved. Chowdhury 1979 stated that "Although all of the women thought that they had insertion of device, in fact one group received Lippes loop (Group B), one group Cu T (Group C), and the other group did not receive any device (Group A) in immediate post-abortal period." The researchers did not disclose when or if they informed the 100 participants in Group A that they had a sham insertion. Similarly, Goldsmith 1972 randomized 584 women to receive either a Lippes Loop or a sham insertion. The design was double blind, and the blinding ended after 30 days of observation, when the women without contraception were provided an IUD. In an addendum to the published report, the researchers acknowledged that women in the sham insertion group "were exposed to a risk of pregnancy albeit an extremely small one." They reasoned that this "risk was more than justified." In both studies, women lost to follow up may have incorrectly assumed they were using an IUD when they were not. We excluded both trials from this review.

RESULTS

In the two WHO trials that compared three different IUDs (WHO 1983a; WHO 1983b), the TCu 220C proved to be superior to the Lippes Loop D and the Copper 7. The Lippes Loop and Copper 7 did not differ significantly. When data from both trials were combined, the weighted average of the rate ratios for accidental (intrauterine) pregnancy with the TCu 220C compared with the Lippes Loop D was 0.38 (95% CI 0.20 to 0.72). Compared with the Copper 7, the effect was 0.52 (95% CI 0.36 to 0.77). Expulsions were also significantly less frequent with the TCu 220C than with either of the other two IUDs. The estimate for the TCu 200C compared to the Lippes Loop was 0.51 (95% CI 0.30 to 0.88), and compared to the Copper 7 it was 0.58 (95% CI 0.39 to 0.87). Uterine perforations were uncommon; four were reported (WHO 1983a; WHO 1983b). Pelvic inflammatory disease was also rare with IUD use after both induced and spontaneous abortion. Cumulative discontinuation rates for PID after induced abortion ranged from 2 to 8 per 1000 woman-years of IUD use (WHO 1983a). The corresponding figures after spontaneous abortion ranged from 0 to 4 per 1000 woman-years of use (WHO 1983b).

Furthermore, the WHO trials reported that IUDs inserted after second-trimester abortions had higher expulsion rates than did IUDs inserted after earlier abortions. In the WHO trial of induced abortion (WHO 1983a), this difference was statistically significant for all three IUDs. For example, after abortions at less than 13 weeks' gestation, the cumulative net probability of expulsion at 120 days was 1.9 for the TCu 220C, 4.8 for the Lippes Loop, and 4.5 for the Copper 7. The corresponding figures after abortions at 13 to 20 weeks' gestation were 19.5, 48.8, and 21.3, respectively. Although this trend was also evident after spontaneous abortion, not all of the differences reached statistical significance (WHO 1983b). Neither the type of induced abortion procedure (sharp versus suction curettage) nor the use of oxytocic drugs significantly influenced outcomes.

Only one trial compared immediate and delayed insertion (Gillett 1980). Immediate insertion of the Copper 7 was associated with a higher risk of expulsion than was insertion delayed for three to five weeks (Gillett 1980). Although large, this difference did not reach statistical significance (RR 5.69; 95% CI 0.75 to 43.08). No other significant differences emerged. However, 42% of women assigned to delayed insertion did not return for IUD insertion.

The Nova T offered somewhat less protection against pregnancy than did the MLCu 250 (McCarthy 1985). The RR of a failure with the Nova T was 6.45 (95% CI 0.78 to 53.51) compared with the MLCu 250. Other differences between these two IUDs were not significant either. The trial comparing the MLCu 250 and MLCu 375 (Lim 1985) found no significant differences between them.

In contrast, the Nova T was superior to the Copper T 200 in contraceptive efficacy, but the difference was not quite significant (RR 0.23; 95% CI 0.05 to 1.05) (Nielsen 1984). Expulsions were also somewhat higher for the Nova T (RR 1.81; 95% CI 0.92 to 3.57). No other important differences emerged between these two devices.

From the European trial comparing the Nova T and levonorgestrel-releasing device (Luukkainen 1987), two subgroup analyses were published by Suvisaari et al (1996) and Pakarinen et al (2003). Due to the limited data available, the results are presented descriptively. The Finnish study of bleeding patterns with postabortal IUD insertions reported large differences between the copper and levonorgestrel-containing (LNG) devices (Suvisaari et al, 1996). The Nova T was associated with significantly more total days of bleeding and episodes of bleeding. On the other hand, amenorrhea was significantly more common with the progestin-bearing device. Pakarinen et al (2003) analyzed 438 immediate postabortal insertions, with 305 women randomized to the LNG system and 133 to the Nova T. Over five years of use, pregnancies were significantly less common with the LNG device than with the Nova T; the gross discontinuation rate was 0.8 versus 9.5 per 100 women ($P < 0.001$). Five-year cumulative discontinuation rates for hormonal reasons were higher with the LNG device (15.9 versus 3.9 per 100 women; $P < 0.01$). Earlier, the researchers reported that expulsions at 12 months were more frequent with postabortal insertions than with interval insertions (Luukkainen 1987). For the Nova T, the expulsion rates were 3.0 for interval and 8.3 for postabortal insertion. For the levonorgestrel system, the rates were 2.8 and 6.8, respectively.

Addition of copper sleeves significantly improved the efficacy of the Lippes Loop D (RR 3.82; 95% CI 1.41 to 10.36) (Randic 1991). This modification also significantly reduced the likelihood of expulsion or displacement (RR 3.37; 95% CI 1.65 to 6.90). In contrast, addition of a hydrogel (Randic 1983) to the surface of a Spring Coil IUD did not improve tolerance of this device.

DISCUSSION

Insertion of an IUD at the time of abortion has several benefits compared with later insertion. After an unintended pregnancy, a woman may be highly motivated to avoid a recurrence (Mahomed 1997; McLaurin 1993; Wolf 1994). IUD insertion after abortion ensures effective contraception by the time ovulation resumes, and it eliminates the need for another visit for IUD insertion. Concerns about uterine perforation and PID, however, have limited postabortal IUD insertions.

Randomized controlled trials comparing different IUDs found immediate postabortal insertion to be safe and effective. Perforations were rare with all devices, despite pregnancy-related changes in the myometrium. Postabortal IUD insertion appears to carry a perforation risk similar to that of interval insertions (Sivin 1981). PID was also uncommon. Although populations may not be directly comparable, PID rates in these trials appear similar to those reported with interval insertions (Farley 1992; Sinei 1990; Walsh 1998). Pregnancy rates were low, although some significant differences emerged between devices. For example, the levonorgestrel-releasing device was significantly more effective than the Nova T. Of note, only one trial compared immediate and delayed insertion of the same IUD.

Given this limitation, outcomes with interval IUD insertions may be useful for comparison. In an international trial (WHO 1994), 3655 healthy parous women were randomly allocated to receive either a Multiload 375 or a TCu 380A. The gross cumulative discontinuation rates with the Multiload 375 at one year were 1.2% for pregnancy and 3.6% for expulsion; 89% were continuing with the device. At three years, these figures were 2.9%, 6.4%, and 78%, respectively. The corresponding figures for the TCu 380A at one year were 0.8% for pregnancy and 3.8% for expulsion; 88% were continuing with the device. At three years, these figures were 1.6%, 5.2%, and 78%, respectively.

The configuration of the IUD influenced the risk of spontaneous expulsion. IUDs shaped like a 'T' fared better than did alternative IUDs, such as the Lippes Loop or Copper 7. However, evidence is inadequate to determine which currently available IUD is best for immediate postabortal insertion. Rates of expulsion were higher after second-trimester abortion than after earlier abortion. Based on this observation, the WHO researchers (WHO 1983a) recommended against IUD insertion immediately after second-trimester abortion. In this setting, delaying the IUD insertion for some weeks may be advisable.

However, the high drop-out rate in the study of delayed insertion (Gillett 1980) underscores a major public health point: many women who desire an IUD do not return if the insertion is delayed. The increased risk of spontaneous expulsion with immediate postabortal insertion (Gillett 1980) needs to be balanced against the high rate of loss to follow up. While some women who were lost to follow up may have adopted other contraceptive methods, an unknown proportion remained unprotected against unintended pregnancy.

While addition of copper sleeves to the Lippes Loop D improved the contraceptive efficacy of the device, this modification is not commercially available. The explanation for the benefit seen in terms of expulsions and displacements is unclear, although the researchers speculate that it may relate to an effect of copper on uterine motility. Further research with topical applications of hydrogel appears unwarranted.

AUTHORS' CONCLUSIONS

Implications for practice

Immediate insertion of an IUD after abortion is both safe and effective. This was true for both induced and reported 'spontaneous' abortions, many of which may have been induced under clandestine circumstances (WHO 1983b).

Guidelines and package labeling that argue against postabortal insertions lack a scientific foundation. With immediate postabortal insertions, contraceptive efficacy is high, and PID and perforations are rare. While the risk of spontaneous expulsion of an IUD appears to be greater in this setting than with interval insertions, this potential disadvantage may be outweighed by provision of highly effective contraception with one procedure. The one-month follow-up visit (after the next menses) may be especially important for identifying unsuspected complete or partial expulsions. IUD insertion immediately after second-trimester abortion carries a higher risk of spontaneous expulsion than insertion after first-trimester abortion.

Implications for research

Most of the trial reports were of suboptimal quality, and communication with researchers was needed for supplementary information. Few reports had a sample size calculation, and several had little power to detect differences. Two trials revealed grossly unethical behavior (Chowdhury 1979; Goldsmith 1972). Some IUDs reviewed here are no longer widely used.

Most trials compared different IUDs for immediate postabortal insertion. Hence, these trials cannot address the comparative safety and efficacy of immediate insertion versus insertion at a later time. Only one trial (Gillett 1980) provided this direct comparison; this trial studied an IUD no longer in use and was limited by a small sample size. Future trials should directly compare the comparative safety and efficacy of the same IUD inserted immediately after abortion versus insertion some weeks later. We are aware of one study underway that is evaluating IUD insertion, under ultrasound guidance, immediately after midtrimester abortion by dilation and evacuation.

POTENTIAL CONFLICT OF INTEREST

Dr. Grimes has consulted with or served on a speakers bureau for Schmid, ALZA, Ortho-McNeil, GynoPharma, G.D. Searle, Organon, and FEI Women's Health, all of which have marketed IUDs. He served as a court-appointed expert to the Claimant's Committee in the A. H. Robins (distributor of the Dalkon Shield) bankruptcy proceedings.

ACKNOWLEDGEMENTS

Carol Manion of Family Health International assisted with the literature search.

SOURCES OF SUPPORT

External sources of support

- U.S. Agency for International Development USA
- National Institute of Child Health and Human Development USA

Internal sources of support

- No sources of support supplied

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* *Indicates the major publication for the study*

TABLES

Characteristics of included studies

Study	Gillett 1980
Methods	Randomized controlled trial without masking. Method of randomization listed only as "balanced." Communication with authors indicated a computer-generated randomization sequence and allocation concealment by use of sealed envelopes.
Participants	259 women at 3 sites in Canada having vacuum aspiration abortion. The gestational ages were not described.
Interventions	Copper 7 inserted immediately versus Copper 7 inserted 3-5 weeks after the abortion.
Outcomes	Primary outcome measures included pregnancy, expulsion, and removal for bleeding/pain, or other medical reason.
Notes	43 women allocated to delayed insertion failed to return for IUD insertion. The report provided no a priori hypothesis or sample size and power calculation. Denominators for rates were woman-days of use.
Allocation concealment	A – Adequate

Study	Lim 1985
Methods	Randomized controlled trial without masking. The report does not describe the method of randomization, but the authors used presealed envelopes for allocation concealment. Communication with authors indicated use of computer-generated randomization sequence.
Participants	549 women aged 18-40 years in Singapore who were having induced abortions
Interventions	Multiload 250 or Multiload 375
Outcomes	Principal outcome measures included pregnancy, expulsions, removal for bleeding/pain, and other medical reasons.
Notes	The report had no a priori hypothesis or sample size and power calculation. Denominators for rates were woman-months of use.
Allocation concealment	A – Adequate

Study	Luukkainen 1987
Methods	Randomized controlled international trial without masking among women after induced abortion at less than 12 weeks' gestation
Participants	438 women in Finland, Sweden, Denmark, Norway, and Hungary. Participants were 18-38 years old, healthy and had to have had at least one pregnancy. Exclusion criteria included history of ectopic pregnancy, current breastfeeding, recent injectable contraception, anemia, and acute cervicitis or vaginitis.
Interventions	Mirena levonorgestrel intrauterine system versus Nova T copper IUD.
Outcomes	Principal outcomes included pregnancy, expulsion, bleeding problems, pain, salpingitis, amenorrhea, hormonal problems, and overall discontinuation.
Notes	This report was from a large trial. Some of the same Finnish participants are included in Pakarinen 2003. A subgroup analysis appears in Suvisaari 1996. Sample size calculation provided for overall trial. Computer-generated randomization and allocation concealment by sequentially-numbered, sealed, opaque envelopes.
Allocation concealment	A – Adequate

Characteristics of included studies (*Continued*)

Study	**McCarthy 1985**
Methods	Randomized controlled trial at one hospital among women having induced abortion. Report does not describe the method of randomization or allocation concealment. Communication with authors indicated computer-generated randomization sequence and use of sealed, opaque envelopes for allocation concealment.
Participants	400 women in Singapore between the ages of 16 and 40 years. Demographic information was not provided. The report does not describe the abortion procedures.
Interventions	Nova T or Multiload Cu250
Outcomes	Principal outcomes included pregnancy, expulsion, pain/bleeding, and other medical reasons. Only the first two outcomes are included because of their objective nature.
Notes	The report did not contain an a priori hypothesis or sample size and power calculation.
Allocation concealment	A – Adequate

Study	**Nielsen 1984**
Methods	Randomized controlled trial without masking among women after first-trimester induced abortion. Report does not describe method of randomization or allocation concealment.
Participants	331 women in Denmark and Finland. More than 96% of participants had abortions at <= 12 weeks' gestation. Report did not provide demographic information about participants.
Interventions	Nova T or Copper T 200
Outcomes	Principal outcomes included pregnancy; expulsion; and medical removals for bleeding and pain, infection, and other.
Notes	Report provided no a priori hypothesis or sample size and power calculations. Denominators for rates were woman-months of use. Report provided both gross and net continuation rates to 36 months. This report is a subgroup analysis of a larger trial.
Allocation concealment	B – Unclear

Study	**Randic 1983**
Methods	Randomized controlled trial with masking. Computer-generated random number sequence, and allocation concealment by labels in sealed, opaque, sequentially-numbered envelopes opened at the time of insertion.
Participants	464 women in Rijeka, Yugoslavia, immediately after induced first-trimester abortion by dilation and curettage.
Interventions	Hydron-coated Spring Coil versus Spring Coil. Hydron is a biocompatible hydrogel intended to decrease adverse endometrial reponse and improve tolerance of IUDs.
Outcomes	Principal outcomes included pregnancy, expulsion, removals for bleeding/pain, and continuation.
Notes	Raw data not provided, only rates.
Allocation concealment	A – Adequate

Study	**Randic 1991**
Methods	Randomized controlled trial with masking. Computer-generated random number sequence, and "allocation card" opened prior to IUD insertion.
Participants	400 women in Rijeka, Yugoslavia, immediately after medical abortion of first-trimester pregnancy.
Interventions	Lippes Loop D or Lippes Loop D with additon of copper sleeves containing 200 square millimeters of copper.
Outcomes	Principal outcomes included pregnancy, expulsion/displacement, and removals for bleeding/pain or other medical reasons.
Notes	The report provided no a priori hypothesis or sample size calculation, although the latter is moot given the significant differences found. Denominators for rates were woman-months of use. Details of allocation concealment missing from report were obtained from investigator.

Allocation concealment	A – Adequate

Study	**WHO 1983a**
Methods	Randomized controlled trial without masking conducted at 8 centers. Randomization performed by computer-generated table of numbers and random permuted blocks. Communication with authors indicated allocation concealment by use of sealed, opaque, sequentially-numbered envelopes with a method indicator card. Twelve participants who had problems within 48 hr of insertion were excluded from analysis.
Participants	2340 women who had an elective induced abortion at the participating centers. Study sites included Cuba, Yugoslavia, Unitee Kingdom, Zambia, India, Korea, Singapore, and Hungary. Suction or sharp curettage was used for most of the abortions; prostaglandin use was rare. About 96% of the abortions took place at <=12 weeks' gestation.
Interventions	One of three different devices was inserted immediately after the abortion: T Cu 220C, Lippes Loop D, or Copper 7. Prophylactic antibiotics were not used.
Outcomes	Pregnancy (includes ectopic pregnancies in this review), uterine perforation, expulsion, total medical removals (further broken down into pelvic inflammatory disease, pain alone, bleeding alone, pain/bleeding, and other).
Notes	Report provided no a priori hypothesis or sample size and power calculation. Non-medical removals (such as desire for pregnancy) and other discontinuations are not included in this review. Denominators for rates were woman-months of use.
Allocation concealment	A – Adequate

Study	**WHO 1983b**
Methods	Randomized controlled trial without masking. Randomization by computer-generated random number table. Allocation concealment by sealed envelopes. One participant who had a problem within 48 hr of insertion was excluded from analysis.
Participants	1060 women at 6 hospitals (in Egypt, United Kingdom, Zambia, Philippines, Chile, and Singapore) who were admitted for care of spontaneous abortions. Nearly all had sharp curettage for completion; suction curettage was rare. From 18% to 25% of the participants were 13-20 weeks pregnant at the time of spontaneous abortion.
Interventions	Participants were randomly assigned to one of three different IUDs: T Cu 220C, Lippes Loop D, or Copper 7. Prophylactic antibiotics were not used.
Outcomes	Pregnancy (none of which was ectopic), uterine perforation, expulsion, and total medical removals (further broken down as pelvic inflammatory disease, pain alone, bleeding alone, pain/bleeding, and other).
Notes	The report provides no a priori hypothesis or sample size and power calculation. Given the high proportion of abortions after 12 weeks and that legal abortion is unavailable or inaccessible in several of these countries, many of these "spontaneous" abortions were likely induced, possibly by unsafe methods. Thus, the risk of infection may be increased in this population. Sealed envelopes were not stated to be opaque and sequentially-numbered. Non-medical and other reasons for discontinuation (such a desire for pregnancy) are not included in this review. Denominators for rates were woman-months of use.
Allocation concealment	D – Not used

Characteristics of excluded studies

Study	**Reason for exclusion**
Chowdhury 1979	Violation of informed consent: sham IUD insertion arm
Goldsmith 1972	Violation of informed consent: sham IUD insertion arm

Characteristics of excluded studies (*Continued*)

Querido 1985	Although reported to be randomized assignment, methods reveal alternate allocation. Allocation concealment not possible.

ANALYSES

Comparison 01. TCu 220C versus Lippes Loop: Discontinuations at 750 days after immediate insertion

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Logarithms of rate ratios for discontinuation due to intrauterine pregnancy	2		Weighted average (Fixed) 95% CI	0.38 [0.20, 0.72]
02 Logarithms of rate ratios for discontinuation due to expulsion	2		Weighted average (Fixed) 95% CI	0.51 [0.30, 0.88]
03 Logarithms of rate ratios for discontinuation due to total medical removals	2		Weighted average (Fixed) 95% CI	0.80 [0.26, 2.49]
04 Discontinuation due to perforation	2	34488	Relative Risk (Fixed) 95% CI	0.92 [0.13, 6.60]
05 Discontinuation due to pelvic inflammatory disease	2	34488	Relative Risk (Fixed) 95% CI	1.17 [0.29, 4.71]

Comparison 02. Lippes Loop versus Copper 7: Discontinuations at 750 days after immediate insertion

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Logarithms of rate ratios for discontinuation due to intrauterine pregnancy	2		Weighted average (Fixed) 95% CI	1.08 [0.84, 1.39]
02 Logarithms of rate ratios for discontinuation due to expulsion	2		Weighted average (Fixed) 95% CI	1.14 [0.63, 2.07]
03 Logarithms of rate ratios for discontinuation due to total medical removals	2		Weighted average (Fixed) 95% CI	1.26 [0.39, 4.09]
04 Discontinuation due to perforation	2	32962	Relative Risk (Fixed) 95% CI	0.68 [0.12, 3.97]
05 Discontinuation due to pelvic inflammatory disease	2	32962	Relative Risk (Fixed) 95% CI	0.41 [0.12, 1.42]

Comparison 03. TCu 220C versus Copper 7: Discontinuations at 750 days after immediate insertion

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Logarithms of rate ratios for discontinuation due to intrauterine pregnancy	2		Weighted average (Fixed) 95% CI	0.52 [0.36, 0.77]
02 Logarithms of rate ratios for discontinuation due to expulsion	2		Weighted average (Fixed) 95% CI	0.58 [0.39, 0.87]

03 Logarithms of rate ratios for discontinuation due to total medical removals	2		Weighted average (Fixed) 95% CI	1.01 [0.35, 2.87]
04 Discontinuation due to perforation	2	34586	Relative Risk (Fixed) 95% CI	0.44 [0.04, 4.83]
05 Discontinuation due to pelvic inflammatory disease	2	34586	Relative Risk (Fixed) 95% CI	0.46 [0.14, 1.50]

Comparison 04. Immediate versus delayed insertion of Copper 7: Discontinuations at one year

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Discontinuation due to pregnancy	1	34762	Relative Risk (Fixed) 95% CI	1.90 [0.09, 39.51]
02 Discontinuation due to expulsion	1	34762	Relative Risk (Fixed) 95% CI	5.69 [0.75, 43.08]
03 Discontinuation due to pelvic inflammatory disease	1	34762	Relative Risk (Fixed) 95% CI	2.66 [0.14, 51.41]

Comparison 05. Nova T versus MLCu 250: Discontinuations at 24 months after immediate insertion

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Discontinuation due to pregnancy	1	6497	Relative Risk (Fixed) 95% CI	6.45 [0.78, 53.51]
02 Discontinuation due to explusion	1	6497	Relative Risk (Fixed) 95% CI	1.25 [0.58, 2.71]

Comparison 06. MLCu 250 versus MLCu 375: Discontinuations at 24 months after immediate insertion

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Discontinuation due to pregnancy	1	9890	Relative Risk (Fixed) 95% CI	0.74 [0.20, 2.74]
02 Discontinuation due to expulsion	1	9890	Relative Risk (Fixed) 95% CI	1.61 [0.47, 5.50]

Comparison 07. Nova T versus Copper T 200: Discontinuations at 36 months after immediate insertion

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Discontinuations due to pregnancy	1	6784	Relative Risk (Fixed) 95% CI	0.23 [0.05, 1.05]
02 Discontinuations due to expulsion	1	6784	Relative Risk (Fixed) 95% CI	1.81 [0.92, 3.57]
03 Discontinuations due to infection	1	6784	Relative Risk (Fixed) 95% CI	1.53 [0.63, 3.75]

Comparison 08. Nova T versus levenorgestrel IUS: Discontinuations

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Discontinuation rates (12-month) per 100 women due to pregnancy after immediate insertion			Other data	No numeric data
02 Discontinuation rates (12-month) per 100 women due to expulsion after immediate insertion			Other data	No numeric data
03 Discontinuation rates (12-month) per 100 women due to amenorrhea after immediate insertion			Other data	No numeric data
04 Discontinuation rates (12-month) per 100 women due to hormonal reasons after immediate insertion			Other data	No numeric data
05 Discontinuation rates (12-month) per 100 women due to expulsion: Interval versus postabortal insertion			Other data	No numeric data
06 Discontinuation rates (5-year) per 100 women due to pregnancy after immediate insertion			Other data	No numeric data
07 Discontinuation rates (5-year) per 100 women due to expulsion after immediate insertion			Other data	No numeric data
08 Discontinuation rates (5-year) per 100 women due to hormonal reasons after immediate insertion			Other data	No numeric data

Comparison 09. Lippes Loop (plain) versus Lippes Loop with copper: Discontinuations at 10 years after immediate insertion

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Discontinuations due to pregnancy	1	24685	Relative Risk (Fixed) 95% CI	3.82 [1.41, 10.36]
02 Discontinuations due to expulsion	1	24685	Relative Risk (Fixed) 95% CI	3.37 [1.65, 6.90]

Comparison 10. Spring Coil (plain) versus Spring Coil with hydrogel: Discontinuations at 24 months after immediate insertion

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Discontinuation rates per 100 women due to pregnancy			Other data	No numeric data
02 Discontinuation rates per 100 women due to expulsion			Other data	No numeric data

INDEX TERMS

Medical Subject Headings (MeSH)

*Abortion, Induced; *Abortion, Spontaneous; *Intrauterine Devices; Randomized Controlled Trials; Time Factors

MeSH check words

Female; Humans; Pregnancy

COVER SHEET

Title	Immediate postabortal insertion of intrauterine devices
Authors	Grimes DA, Lopez LM, Schulz KF, Stanwood N
Contribution of author(s)	Drs Grimes and Schulz developed the protocol, performed the literature search, and abstracted the data. All authors contributed to writing the review. Dr Lopez calculated the data for the inverse variance method and entered the tables, drafted the plain language summary, and updated the text for current style issues.
Issue protocol first published	1999/2
Review first published	2000/2
Date of most recent amendment	29 November 2005
Date of most recent SUBSTANTIVE amendment	03 June 2004
What's New	This review was updated in June, 2004. One new trial (Pakarinen 2003) was found and included. November 2005 - We conducted the meta-analysis of the life-table analyses using the inverse variance method. We also entered data into tables for the relative risks. We revised the text to reflect the new methods and numbers as well as current style issues. In addition, we added the plain language summary in lieu of the former synopsis.
Date new studies sought but none found	23 April 2002
Date new studies found but not yet included/excluded	Information not supplied by author
Date new studies found and included/excluded	07 April 2004
Date authors' conclusions section amended	03 June 2004
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DOI 10.1002/14651858.CD001777.pub2

Cochrane Library number CD001777

Editorial group Cochrane Fertility Regulation Group

Editorial group code HM-FERTILREG

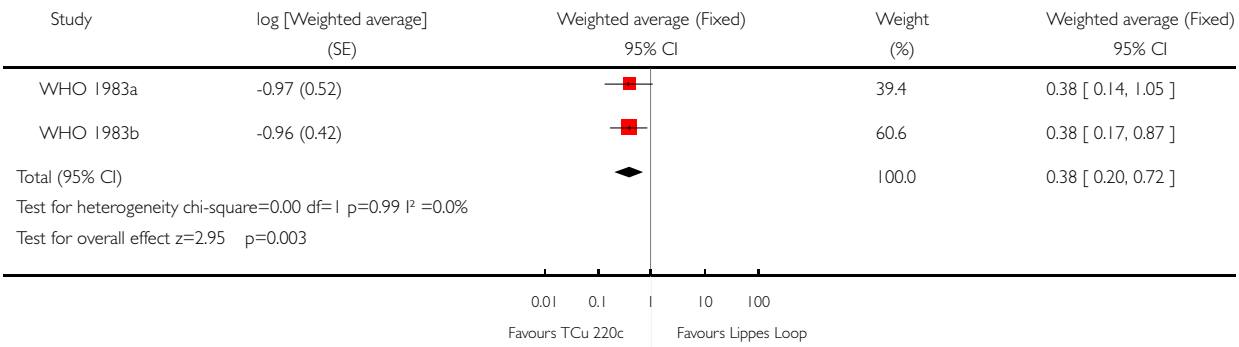
GRAPHS AND OTHER TABLES

Analysis 01.01. Comparison 01 TCu 220C versus Lippes Loop: Discontinuations at 750 days after immediate insertion, Outcome 01 Logarithms of rate ratios for discontinuation due to intrauterine pregnancy

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 01 TCu 220C versus Lippes Loop: Discontinuations at 750 days after immediate insertion

Outcome: 01 Logarithms of rate ratios for discontinuation due to intrauterine pregnancy

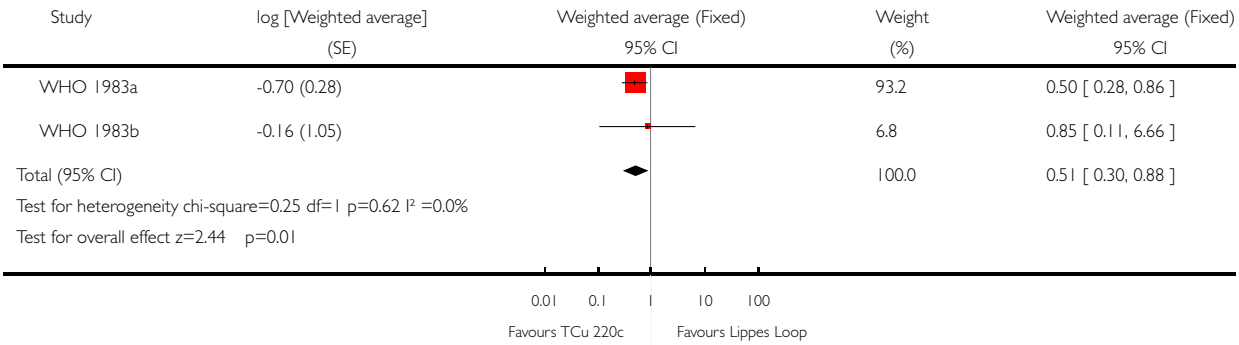


Analysis 01.02. Comparison 01 TCu 220C versus Lippes Loop: Discontinuations at 750 days after immediate insertion, Outcome 02 Logarithms of rate ratios for discontinuation due to expulsion

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 01 TCu 220C versus Lippes Loop: Discontinuations at 750 days after immediate insertion

Outcome: 02 Logarithms of rate ratios for discontinuation due to expulsion

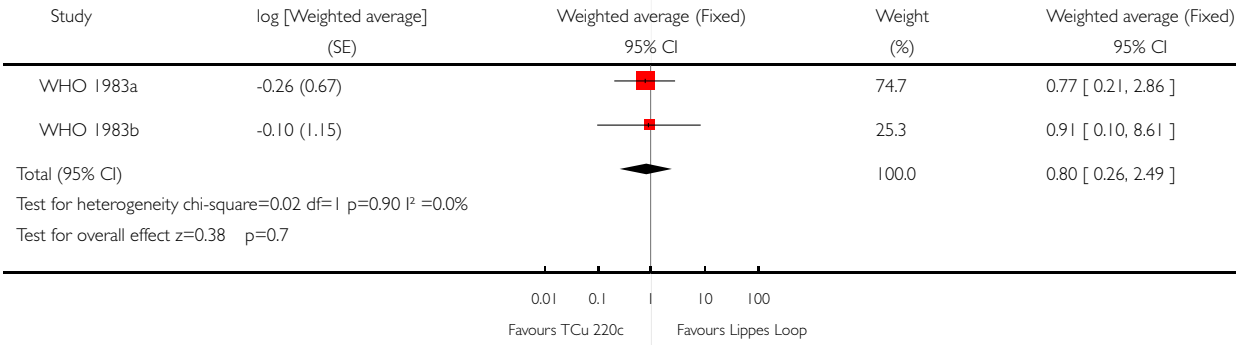


Analysis 01.03. Comparison 01 TCu 220C versus Lippes Loop: Discontinuations at 750 days after immediate insertion, Outcome 03 Logarithms of rate ratios for discontinuation due to total medical removals

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 01 TCu 220C versus Lippes Loop: Discontinuations at 750 days after immediate insertion

Outcome: 03 Logarithms of rate ratios for discontinuation due to total medical removals



Analysis 01.04. Comparison 01 TCu 220C versus Lippes Loop: Discontinuations at 750 days after immediate insertion, Outcome 04 Discontinuation due to perforation

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 01 TCu 220C versus Lippes Loop: Discontinuations at 750 days after immediate insertion

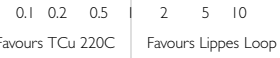
Outcome: 04 Discontinuation due to perforation

Study	TCu 220C n/N	Lippes Loop n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
WHO 1983a	1/12501	0/11196		25.5	2.69 [0.11, 65.95]
WHO 1983b	0/5555	1/5236		74.5	0.31 [0.01, 7.71]
Total (95% CI)	18056	16432		100.0	0.92 [0.13, 6.60]

Total events: 1 (TCu 220C), 1 (Lippes Loop)

Test for heterogeneity chi-square=0.86 df=1 p=0.35 I^2 =0.0%

Test for overall effect z=0.08 p=0.9



Analysis 01.05. Comparison 01 TCu 220C versus Lippes Loop: Discontinuations at 750 days after immediate insertion, Outcome 05 Discontinuation due to pelvic inflammatory disease

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 01 TCu 220C versus Lippes Loop: Discontinuations at 750 days after immediate insertion

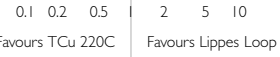
Outcome: 05 Discontinuation due to pelvic inflammatory disease

Study	TCu 220C n/N	Lippes Loop n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
WHO 1983a	2/12501	3/11196		86.0	0.60 [0.10, 3.57]
WHO 1983b	2/5555	0/5236		14.0	4.71 [0.23, 98.14]
Total (95% CI)	18056	16432		100.0	1.17 [0.29, 4.71]

Total events: 4 (TCu 220C), 3 (Lippes Loop)

Test for heterogeneity chi-square=1.35 df=1 p=0.24 I^2 =26.1%

Test for overall effect z=0.22 p=0.8



Analysis 02.01. Comparison 02 Lippes Loop versus Copper 7: Discontinuations at 750 days after immediate insertion, Outcome 01 Logarithms of rate ratios for discontinuation due to intrauterine pregnancy

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 02 Lippes Loop versus Copper 7: Discontinuations at 750 days after immediate insertion

Outcome: 01 Logarithms of rate ratios for discontinuation due to intrauterine pregnancy

Study	log [Weighted average] (SE)	Weighted average (Fixed) 95% CI	Weight (%)	Weighted average (Fixed) 95% CI
WHO 1983a	0.05 (0.13)		91.6	1.05 [0.81, 1.37]
WHO 1983b	0.35 (0.44)		8.4	1.42 [0.60, 3.40]
Total (95% CI)			100.0	1.08 [0.84, 1.39]
Test for heterogeneity chi-square=0.42 df=1 p=0.52 I^2 =0.0%				
Test for overall effect z=0.61 p=0.5				

Favours Lippes Loop Favours Copper 7

Analysis 02.02. Comparison 02 Lippes Loop versus Copper 7: Discontinuations at 750 days after immediate insertion, Outcome 02 Logarithms of rate ratios for discontinuation due to expulsion

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 02 Lippes Loop versus Copper 7: Discontinuations at 750 days after immediate insertion

Outcome: 02 Logarithms of rate ratios for discontinuation due to expulsion

Study	log [Weighted average] (SE)	Weighted average (Fixed) 95% CI	Weight (%)	Weighted average (Fixed) 95% CI
WHO 1983a	0.14 (0.32)		91.0	1.15 [0.61, 2.15]
WHO 1983b	0.07 (1.02)		9.0	1.07 [0.15, 7.82]
Total (95% CI)			100.0	1.14 [0.63, 2.07]
Test for heterogeneity chi-square=0.00 df=1 p=0.95 I^2 =0.0%				
Test for overall effect z=0.43 p=0.7				

Favours Lippes Loop Favours Copper 7

Analysis 02.03. Comparison 02 Lippes Loop versus Copper 7: Discontinuations at 750 days after immediate insertion, Outcome 03 Logarithms of rate ratios for discontinuation due to total medical removals

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 02 Lippes Loop versus Copper 7: Discontinuations at 750 days after immediate insertion

Outcome: 03 Logarithms of rate ratios for discontinuation due to total medical removals

Study	log [Weighted average] (SE)	Weighted average (Fixed) 95% CI	Weight (%)	Weighted average (Fixed) 95% CI
WHO 1983a	0.19 (0.71)		72.4	1.21 [0.30, 4.86]
WHO 1983b	0.32 (1.15)		27.6	1.38 [0.15, 13.07]
Total (95% CI)			100.0	1.26 [0.39, 4.09]
Test for heterogeneity chi-square=0.01 df=1 p=0.92 I^2 =0.0%				
Test for overall effect z=0.38 p=0.7				

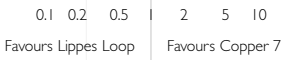
Analysis 02.04. Comparison 02 Lippes Loop versus Copper 7: Discontinuations at 750 days after immediate insertion, Outcome 04 Discontinuation due to perforation

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 02 Lippes Loop versus Copper 7: Discontinuations at 750 days after immediate insertion

Outcome: 04 Discontinuation due to perforation

Study	Lippes Loop n/N	Copper 7 n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
WHO 1983a	0/11196	2/10948		83.9	0.20 [0.01, 4.07]
WHO 1983b	1/5236	0/5582		16.1	3.20 [0.13, 78.49]
Total (95% CI)	16432	16530		100.0	0.68 [0.12, 3.97]
Total events: 1 (Lippes Loop), 2 (Copper 7)					
Test for heterogeneity chi-square=1.55 df=1 p=0.21 I^2 =35.3%					
Test for overall effect z=0.43 p=0.7					



Analysis 02.05. Comparison 02 Lippes Loop versus Copper 7: Discontinuations at 750 days after immediate insertion, Outcome 05 Discontinuation due to pelvic inflammatory disease

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 02 Lippes Loop versus Copper 7: Discontinuations at 750 days after immediate insertion

Outcome: 05 Discontinuation due to pelvic inflammatory disease

Study	Lippes Loop n/N	Copper 7 n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
WHO 1983a	3/11196	7/10948		83.0	0.42 [0.11, 1.62]
WHO 1983b	0/5236	1/5582		17.0	0.36 [0.01, 8.72]
Total (95% CI)	16432	16530		100.0	0.41 [0.12, 1.42]

Total events: 3 (Lippes Loop), 8 (Copper 7)

Test for heterogeneity chi-square=0.01 df=1 p=0.93 I^2 =0.0%

Test for overall effect z=1.41 p=0.2

Analysis 03.01. Comparison 03 TCu 220C versus Copper 7: Discontinuations at 750 days after immediate insertion, Outcome 01 Logarithms of rate ratios for discontinuation due to intrauterine pregnancy

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 03 TCu 220C versus Copper 7: Discontinuations at 750 days after immediate insertion

Outcome: 01 Logarithms of rate ratios for discontinuation due to intrauterine pregnancy

Study	log [Weighted average] (SE)	Weighted average (Fixed) 95% CI	Weight (%)	Weighted average (Fixed) 95% CI
WHO 1983a	-0.92 (0.52)		14.1	0.40 [0.14, 1.11]
WHO 1983b	-0.61 (0.21)		85.9	0.55 [0.36, 0.82]
Total (95% CI)			100.0	0.52 [0.36, 0.77]

Test for heterogeneity chi-square=0.31 df=1 p=0.58 I^2 =0.0%

Test for overall effect z=3.33 p=0.0009

Analysis 03.02. Comparison 03 TCu 220C versus Copper 7: Discontinuations at 750 days after immediate insertion, Outcome 02 Logarithms of rate ratios for discontinuation due to expulsion

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 03 TCu 220C versus Copper 7: Discontinuations at 750 days after immediate insertion

Outcome: 02 Logarithms of rate ratios for discontinuation due to expulsion

Study	log [Weighted average] (SE)	Weighted average (Fixed) 95% CI	Weight (%)	Weighted average (Fixed) 95% CI
WHO 1983a	-0.56 (0.21)		95.9	0.57 [0.38, 0.86]
WHO 1983b	-0.09 (1.02)		4.1	0.91 [0.12, 6.66]
Total (95% CI)			100.0	0.58 [0.39, 0.87]
Test for heterogeneity chi-square=0.21 df=1 p=0.65 I^2 =0.0%				
Test for overall effect z=2.65 p=0.008				

Analysis 03.03. Comparison 03 TCu 220C versus Copper 7: Discontinuations at 750 days after immediate insertion, Outcome 03 Logarithms of rate ratios for discontinuation due to total medical removals

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 03 TCu 220C versus Copper 7: Discontinuations at 750 days after immediate insertion

Outcome: 03 Logarithms of rate ratios for discontinuation due to total medical removals

Study	log [Weighted average] (SE)	Weighted average (Fixed) 95% CI	Weight (%)	Weighted average (Fixed) 95% CI
WHO 1983a	-0.07 (0.62)		74.1	0.94 [0.28, 3.16]
WHO 1983b	0.22 (1.05)		25.9	1.25 [0.16, 9.79]
Total (95% CI)			100.0	1.01 [0.35, 2.87]
Test for heterogeneity chi-square=0.06 df=1 p=0.81 I^2 =0.0%				
Test for overall effect z=0.02 p=1				

Analysis 03.04. Comparison 03 TCu 220C versus Copper 7: Discontinuations at 750 days after immediate insertion, Outcome 04 Discontinuation due to perforation

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 03 TCu 220C versus Copper 7: Discontinuations at 750 days after immediate insertion

Outcome: 04 Discontinuation due to perforation

Study	TCu 220C n/N	Copper 7 n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
WHO 1983a	1/12501	2/10948		100.0	0.44 [0.04, 4.83]
× WHO 1983b	0/5555	0/5582		0.0	Not estimable
Total (95% CI)	18056	16530		100.0	0.44 [0.04, 4.83]
Total events: 1 (TCu 220C), 2 (Copper 7)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.67 p=0.5					

Analysis 03.05. Comparison 03 TCu 220C versus Copper 7: Discontinuations at 750 days after immediate insertion, Outcome 05 Discontinuation due to pelvic inflammatory disease

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 03 TCu 220C versus Copper 7: Discontinuations at 750 days after immediate insertion

Outcome: 05 Discontinuation due to pelvic inflammatory disease

Study	TCu 220C n/N	Copper 7 n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
WHO 1983a	2/12501	7/10948		88.2	0.25 [0.05, 1.20]
WHO 1983b	2/5555	1/5582		11.8	2.01 [0.18, 22.16]
Total (95% CI)	18056	16530		100.0	0.46 [0.14, 1.50]
Total events: 4 (TCu 220C), 8 (Copper 7)					
Test for heterogeneity chi-square=2.03 df=1 p=0.15 I^2 =50.7%					
Test for overall effect z=1.29 p=0.2					

Analysis 04.01. Comparison 04 Immediate versus delayed insertion of Copper 7: Discontinuations at one year, Outcome 01 Discontinuation due to pregnancy

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 04 Immediate versus delayed insertion of Copper 7: Discontinuations at one year

Outcome: 01 Discontinuation due to pregnancy

Study	Immediate n/N	Delayed n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Gillett 1980	2/25201	0/9561		100.0	1.90 [0.09, 39.51]
Total (95% CI)	25201	9561		100.0	1.90 [0.09, 39.51]
Total events: 2 (Immediate), 0 (Delayed)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.41 p=0.7					

Analysis 04.02. Comparison 04 Immediate versus delayed insertion of Copper 7: Discontinuations at one year, Outcome 02 Discontinuation due to expulsion

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 04 Immediate versus delayed insertion of Copper 7: Discontinuations at one year

Outcome: 02 Discontinuation due to expulsion

Study	Immediate n/N	Delayed n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Gillett 1980	15/25201	1/9561		100.0	5.69 [0.75, 43.08]
Total (95% CI)	25201	9561		100.0	5.69 [0.75, 43.08]
Total events: 15 (Immediate), 1 (Delayed)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.68 p=0.09					

Analysis 04.03. Comparison 04 Immediate versus delayed insertion of Copper 7: Discontinuations at one year, Outcome 03 Discontinuation due to pelvic inflammatory disease

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 04 Immediate versus delayed insertion of Copper 7: Discontinuations at one year

Outcome: 03 Discontinuation due to pelvic inflammatory disease

Study	Immediate n/N	Delayed n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Gillett 1980	3/25201	0/9561		100.0	2.66 [0.14, 51.41]
Total (95% CI)	25201	9561		100.0	2.66 [0.14, 51.41]
Total events: 3 (Immediate), 0 (Delayed)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.65 p=0.5					

Analysis 05.01. Comparison 05 Nova T versus MLCu 250: Discontinuations at 24 months after immediate insertion, Outcome 01 Discontinuation due to pregnancy

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 05 Nova T versus MLCu 250: Discontinuations at 24 months after immediate insertion

Outcome: 01 Discontinuation due to pregnancy

Study	Nova T n/N	MLCu 250 n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
McCarthy 1985	6/3132	1/3365		100.0	6.45 [0.78, 53.51]
Total (95% CI)	3132	3365		100.0	6.45 [0.78, 53.51]
Total events: 6 (Nova T), 1 (MLCu 250)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.73 p=0.08					

Analysis 05.02. Comparison 05 Nova T versus MLCu 250: Discontinuations at 24 months after immediate insertion, Outcome 02 Discontinuation due to explusion

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 05 Nova T versus MLCu 250: Discontinuations at 24 months after immediate insertion

Outcome: 02 Discontinuation due to explusion

Study	Nova T n/N	MLCu 250 n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
McCarthy 1985	14/3132	12/3365		100.0	1.25 [0.58, 2.71]
Total (95% CI)	3132	3365		100.0	1.25 [0.58, 2.71]
Total events: 14 (Nova T), 12 (MLCu 250)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.58 p=0.6					

Analysis 06.01. Comparison 06 MLCu 250 versus MLCu 375: Discontinuations at 24 months after immediate insertion, Outcome 01 Discontinuation due to pregnancy

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 06 MLCu 250 versus MLCu 375: Discontinuations at 24 months after immediate insertion

Outcome: 01 Discontinuation due to pregnancy

Study	MLCu 205 n/N	MLCu 375 n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Lim 1985	4/5150	5/4740		100.0	0.74 [0.20, 2.74]
Total (95% CI)	5150	4740		100.0	0.74 [0.20, 2.74]
Total events: 4 (MLCu 205), 5 (MLCu 375)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.46 p=0.6					

Analysis 06.02. Comparison 06 MLCu 250 versus MLCu 375: Discontinuations at 24 months after immediate insertion, Outcome 02 Discontinuation due to expulsion

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 06 MLCu 250 versus MLCu 375: Discontinuations at 24 months after immediate insertion

Outcome: 02 Discontinuation due to expulsion

Study	MLCu 205 n/N	MLCu 375 n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Lim 1985	7/5150	4/4740		100.0	1.61 [0.47, 5.50]
Total (95% CI)	5150	4740		100.0	1.61 [0.47, 5.50]
Total events: 7 (MLCu 205), 4 (MLCu 375)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.76 p=0.4					

Analysis 07.01. Comparison 07 Nova T versus Copper T 200: Discontinuations at 36 months after immediate insertion, Outcome 01 Discontinuations due to pregnancy

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 07 Nova T versus Copper T 200: Discontinuations at 36 months after immediate insertion

Outcome: 01 Discontinuations due to pregnancy

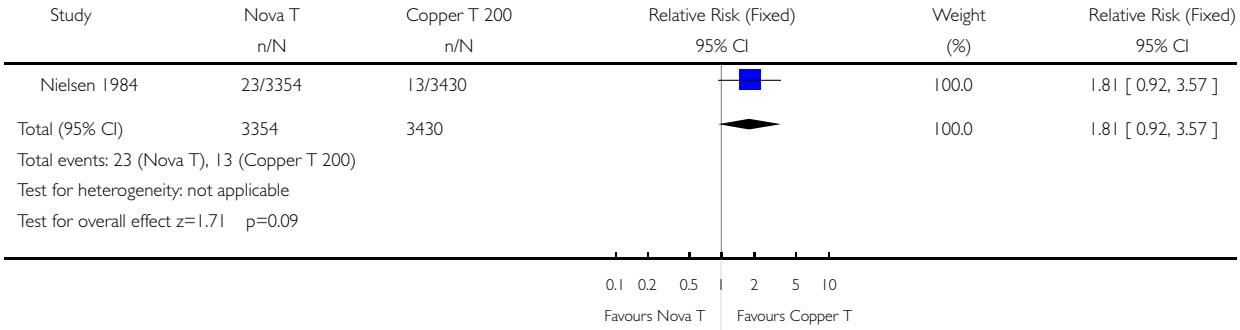
Study	Nova T n/N	Copper T 200 n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Nielsen 1984	2/3354	9/3430		100.0	0.23 [0.05, 1.05]
Total (95% CI)	3354	3430		100.0	0.23 [0.05, 1.05]
Total events: 2 (Nova T), 9 (Copper T 200)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.90 p=0.06					

Analysis 07.02. Comparison 07 Nova T versus Copper T 200: Discontinuations at 36 months after immediate insertion, Outcome 02 Discontinuations due to expulsion

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 07 Nova T versus Copper T 200: Discontinuations at 36 months after immediate insertion

Outcome: 02 Discontinuations due to expulsion

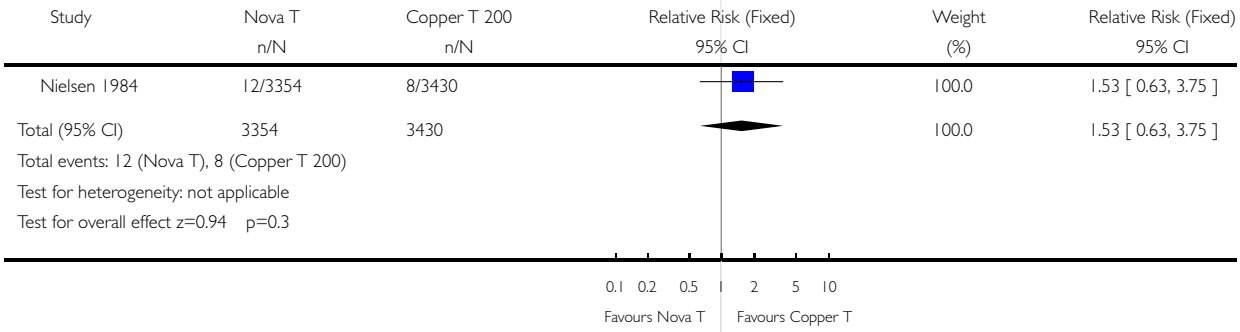


Analysis 07.03. Comparison 07 Nova T versus Copper T 200: Discontinuations at 36 months after immediate insertion, Outcome 03 Discontinuations due to infection

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 07 Nova T versus Copper T 200: Discontinuations at 36 months after immediate insertion

Outcome: 03 Discontinuations due to infection



Analysis 08.01. Comparison 08 Nova T versus levenorgestrel IUS: Discontinuations, Outcome 01 Discontinuation rates (12-month) per 100 women due to pregnancy after immediate insertion

Discontinuation rates (12-month) per 100 women due to pregnancy after immediate insertion

Study	Nova T	Lng-IUD
Luukkainen 1987	1.0	0.1

Analysis 08.02. Comparison 08 Nova T versus levenorgestrel IUS: Discontinuations, Outcome 02 Discontinuation rates (12-month) per 100 women due to expulsion after immediate insertion

Discontinuation rates (12-month) per 100 women due to expulsion after immediate insertion

Study	Nova T	Lng-IUD
Luukkainen 1987	3.9	3.7

Analysis 08.03. Comparison 08 Nova T versus levenorgestrel IUS: Discontinuations, Outcome 03 Discontinuation rates (12-month) per 100 women due to amenorrhea after immediate insertion

Discontinuation rates (12-month) per 100 women due to amenorrhea after immediate insertion

Study	Nova T	Lng-IUD
Luukkainen 1987	0	1.6

Analysis 08.04. Comparison 08 Nova T versus levenorgestrel IUS: Discontinuations, Outcome 04 Discontinuation rates (12-month) per 100 women due to hormonal reasons after immediate insertion

Discontinuation rates (12-month) per 100 women due to hormonal reasons after immediate insertion

Study	Nova T	Lng-IUD
Luukkainen 1987	0.1	2.7

Analysis 08.05. Comparison 08 Nova T versus levenorgestrel IUS: Discontinuations, Outcome 05 Discontinuation rates (12-month) per 100 women due to expulsion: Interval versus postabortal insertion

Discontinuation rates (12-month) per 100 women due to expulsion: Interval versus postabortal insertion

Study	Nova T: interval	Nova T: postabortal	Lng IUS: interval	Lng IUS: postabortal
Luukkainen 1987	3.0	8.3	2.8	6.8

Analysis 08.06. Comparison 08 Nova T versus levenorgestrel IUS: Discontinuations, Outcome 06 Discontinuation rates (5-year) per 100 women due to pregnancy after immediate insertion

Discontinuation rates (5-year) per 100 women due to pregnancy after immediate insertion

Study	Nova T	Mirena
Luukkainen 1987	9.5	0.8

Analysis 08.07. Comparison 08 Nova T versus levenorgestrel IUS: Discontinuations, Outcome 07 Discontinuation rates (5-year) per 100 women due to expulsion after immediate insertion

Discontinuation rates (5-year) per 100 women due to expulsion after immediate insertion

Study	Nova T	Mirena
Luukkainen 1987	15.4	10.5

Analysis 08.08. Comparison 08 Nova T versus levenorgestrel IUS: Discontinuations, Outcome 08 Discontinuation rates (5-year) per 100 women due to hormonal reasons after immediate insertion

Discontinuation rates (5-year) per 100 women due to hormonal reasons after immediate insertion

Study	Nova T	Mirena
Luukkainen 1987	3.9	15.9

Analysis 09.01. Comparison 09 Lippes Loop (plain) versus Lippes Loop with copper: Discontinuations at 10 years after immediate insertion, Outcome 01 Discontinuations due to pregnancy

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 09 Lippes Loop (plain) versus Lippes Loop with copper: Discontinuations at 10 years after immediate insertion

Outcome: 01 Discontinuations due to pregnancy

Study	Plain n/N	Copper n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Randic 1991	17/11620	5/13065		100.0	3.82 [1.41, 10.36]
Total (95% CI)	11620	13065		100.0	3.82 [1.41, 10.36]
Total events: 17 (Plain), 5 (Copper)					
Test for heterogeneity: not applicable					
Test for overall effect z=2.64 p=0.008					

Analysis 09.02. Comparison 09 Lippes Loop (plain) versus Lippes Loop with copper: Discontinuations at 10 years after immediate insertion, Outcome 02 Discontinuations due to expulsion

Review: Immediate postabortal insertion of intrauterine devices

Comparison: 09 Lippes Loop (plain) versus Lippes Loop with copper: Discontinuations at 10 years after immediate insertion

Outcome: 02 Discontinuations due to expulsion

Study	Plain n/N	Copper n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Randic 1991	30/11620	10/13065		100.0	3.37 [1.65, 6.90]
Total (95% CI)	11620	13065		100.0	3.37 [1.65, 6.90]
Total events: 30 (Plain), 10 (Copper)					
Test for heterogeneity: not applicable					
Test for overall effect z=3.33 p=0.0009					

Analysis 10.01. Comparison 10 Spring Coil (plain) versus Spring Coil with hydrogel: Discontinuations at 24 months after immediate insertion, Outcome 01 Discontinuation rates per 100 women due to pregnancy

Discontinuation rates per 100 women due to pregnancy

Study	Plain	Hydron-coated
Randic 1983	1.6	1.9

Analysis 10.02. Comparison 10 Spring Coil (plain) versus Spring Coil with hydrogel: Discontinuations at 24 months after immediate insertion, Outcome 02 Discontinuation rates per 100 women due to expulsion

Discontinuation rates per 100 women due to expulsion

Study	Plain	Hydron-coated
Randic 1983	4.1	4.5