Staples vs subcuticular sutures for skin closure at cesarean delivery: a metaanalysis of randomized controlled trials  
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CRD summary
The authors concluded that there was a possible benefit with subcuticular sutures compared to skin staples for skin closure in women who underwent caesarean section delivery. This tentative conclusion reflects the evidence presented but its reliability is unclear due to the absence of a clearly reported review process to enable judgement about the robustness of the review.

Authors' objectives
To compare the effects of staples versus subcuticular sutures for skin closure in women who underwent caesarean section delivery.

Searching
PubMed and Cochrane databases were searched to September 2010 articles in English. Search terms were reported. Online trial registries, conference abstracts from the Society for Maternal-Fetal Medicine (2001 to 2009) and reference lists of relevant studies were scanned for further articles of interest.

Study selection
Eligible studies were randomised controlled trials that compared staples versus subcuticular sutures for skin closure in women who underwent caesarean section delivery. The primary outcome of interest was incidence of wound separation (dehiscence) and a composite wound complication rate (including dehiscence, wound infection, seroma and haematoma requiring surgery). Studies that compared staples or sutures to other closure techniques were excluded. Secondary outcomes of interest were patient satisfaction, operating time and postoperative pain. Studies had to include at least one clinical endpoint.

Body mass index, other patient characteristics and the definition of wound separation were not well reported. Various suture materials were included; most were reported to be absorbable. Time to staple removal varied from day of discharge to seven days. Some patients received antibiotic prophylaxis. A mixture of objective and subjective measurement techniques were used for wound assessment.

The authors did not state how many reviewers carried out the study selection.

Assessment of study quality
Trial quality was assessed using the Jadad scale of randomisation, blinding and reporting of drop-outs and exclusions to a maximum score.

The authors did not state how many reviewers carried out the quality assessment.

Data extraction
Data were extracted to enable calculation of odds ratios (OR) for categorical variables or mean differences for continuous variables, along with 95% confidence intervals (CI). Intention-to-treat data were used where possible.

The authors did not state how many reviewers carried out the data extraction.

Methods of synthesis
A random-effects meta-analysis (DerSimonian and Laird) was used to obtain pooled odds ratios and weighted mean differences with corresponding 95% CIs. Statistical heterogeneity was assessed using the Cochran Q-test (p<0.05). Publication bias was evaluated with a funnel plot and by the Horbold-Egger test. Sensitivity analysis was conducted to explore the effect of excluding the largest trial. Subgroup analyses were carried out to investigate the influences of different outcome measures, body mass index and type of suture material.
Results of the review
Five trials were included in the review (877 women). All trials were reported to be moderate quality (Jadad scores 2 or 3 out of 5). Individually-scored criteria were not presented. Four trials included a power calculation. Follow-up ranged from two weeks to six months.

Wound complications were significantly more frequent in the group that received staples (OR 2.12, 95% CI 1.29 to 3.48; five trials). There was no evidence of statistical heterogeneity or publication bias. Removal of the largest trial with the highest complication rates showed no significant difference between the skin closure techniques.

Wound separation (dehiscence) was significantly more frequent in the group that received staples (OR 4.07, 95% CI 2.07 to 8.00; four trials). There was no evidence of statistical heterogeneity or publication bias. Removal of the largest trial continued to demonstrate a much higher separation rate in the group that received staples but statistical significance was lost.

Staple closure significantly reduced overall operating time (WMD -5.05 minutes, 95% CI -9.33 to -0.76; four trials; significant heterogeneity). Insufficient data were available to assess postoperative pain or patient satisfaction. Further analysis was reported in the paper.

Authors' conclusions
There was a possible benefit with subcuticular sutures compared to skin staples for skin closure in women who underwent caesarean section delivery.

CRD commentary
The review question was clear. Inclusion criteria were defined clearly for study design, intervention, participants and outcomes. The search strategy covered a range of relevant sources and included unpublished material. The restriction to articles in English meant that studies might have been missed and language bias could not be ruled out. The review process was not well-reported; consequently it was not possible to determine whether efforts were made to minimise error and bias. An appropriate quality assessment tool was applied to the included trials but little detail was provided (other than a summary of the range of scores) upon which to verify the interpretation of overall quality. Some study details were provided. Statistical heterogeneity was assessed. There appeared to be some discrepancies between tables, figures and text. The chosen method of synthesis seemed appropriate.

The authors' tentative conclusion reflects the evidence presented. Some methodological concerns in the review process make the reliability of this conclusion unclear.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that further research should evaluate the optimal skin closure technique taking known risk factors for wound complications (such as body mass index and timing of antibiotic administration) into account. Use of objective outcome measures and exploration of different suture materials and some of the newer closure techniques available were recommended.

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