Conservative interventions for positional plagiocephaly: a systematic review
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CRD summary
This review assessed the use of conservative interventions for the treatment of infants with positional plagiocephaly. The authors reliably concluded that, although counter positioning with or without physiotherapy or helmet therapy appeared to consistently reduce skull deformity, it was not possible to draw conclusions about the relative effectiveness of the interventions given the poor methodology of the studies.

Authors' objectives
To determine the effectiveness of conservative interventions for the treatment of infants with positional plagiocephaly.

Searching
Thirteen electronic databases were searched from January 1983 to December 2003; the search terms were reported. Detailed search strategies are available from the authors. In addition, the reference lists of articles were checked for further studies. Only studies (abstracts or full papers) published in English were eligible for inclusion.

Study selection
Study designs of evaluations included in the review
Quantitative studies were eligible for inclusion in the review.

Specific interventions included in the review
Studies that assessed conservative interventions for the treatment of positional plagiocephaly were eligible for inclusion. The included interventions were varying positioning methods with or without physiotherapy or surgery; dynamic orthotic cranioplasty; and assistive devices such as those made out of foam or orthotic helmets, which were worn at night or all of the time. Where relevant, the comparators were no treatment or alternative treatment methods.

Participants included in the review
Children under 1 year of age with positional plagiocephaly were included in the review. Two studies included in the review assessed children who were under 2 years old and 1.5 years old respectively. Where stated, positional plagiocephaly was usually diagnosed by radiography, or in a few studies by clinical examination. The degree of severity (where stated) was mild or moderate to severe.

Outcomes assessed in the review
The authors did not define inclusion criteria in terms of the outcomes. Varying outcomes were reported in the included studies, such as cranial vault asymmetry, transcranial difference and parents’ perceptions of their child's skull deformity.

How were decisions on the relevance of primary studies made?
Two reviewers reached consensus on which studies should be included in the review.

Assessment of study quality
Study validity was assessed using 16 questions from the ‘Critical Review Form-quantitative studies’ which were scored as either 1 (completely fulfilled the criterion) or 0 (did not fulfil the criterion). Each study was assigned a score of between 0 and 16 (excellent quality). The authors did not state how many reviewers performed the assessment.

Data extraction
Two reviewers independently extracted the data, and any disagreements were resolved through discussion and consensus.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative.

**How were differences between studies investigated?**
Some differences between the studies were evident from the data tables and were discussed in the text of the review. The studies were also grouped according to design.

**Results of the review**
Sixteen studies (n=3,196) were included in the review: 12 case series (n=2,382) and 4 non-randomised comparative studies (n=814). The sample sizes ranged from 66 to 447.

Overall, the quality of the studies was moderate to poor. Scores ranged from 3 to 10, with 6 studies scoring 8 or more out of 16; the average score was 7 (standard deviation 2.3). The four comparative studies were of slightly poorer quality than the case series.

Methodological problems included no validated or reliable outcome measure, no statistical justification of sample sizes, and no informed consent; 6 studies had affiliations with orthotic companies. The studies also suffered from poor reporting of the methods, interventions, outcome measures, loss to follow up and population characteristics.

All 12 case series reported that skull deformities were reduced with positional plagiocephaly; particularly in children with mild deformities (1 study). This finding was consistent despite varying age, method of diagnosis, severity of plagiocephaly, response rate and outcome measure used. Two moderate-quality comparative studies concluded that helmets were more effective than counter positioning or non-helmet treatment. However, 2 lower-quality comparative studies and a moderate-quality case series concluded that counter positioning was as effective as helmet therapy.

**Authors' conclusions**
It was not possible to draw conclusions about the relative effectiveness of the interventions given the poor methodology of the studies. However, counter positioning with or without physiotherapy or helmet therapy appeared to consistently reduce skull deformity.

**CRD commentary**
This review assessed a clear research question that included a wide range of outcomes. There was an extensive search of a large number of electronic databases, although this might not have retrieved all of the relevant studies as only published studies written in English were eligible for inclusion in the review. The authors did not state how many reviewers performed the quality assessment, but the study selection and data extraction processes were performed by more than one reviewer, thereby reducing the risk of bias and error. The reviewers assessed and considered extensively the validity of the studies in their synthesis. Differences and similarities between the studies were also considered, and the authors’ decision to use a narrative synthesis in recognition of the varying outcomes, interventions and populations used is valid. Overall, considering the methodological flaws of the included studies, the authors’ cautious conclusions and recommendations for further research appear reliable.

**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 is needed to determine the most ‘valid and reliable measures for quantifying skull symmetry’. Outcome measures should also reflect both clinical opinion and parents’ perception of the cosmetic appearance of their child’s skull. Further studies are required to compare the effectiveness of counter positioning with or without physiotherapy and helmet therapy.

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.