

## Congress of Neurological Surgeons Systematic Review and Evidence-Based Guideline for the Management of Patients With Positional Plagiocephaly: The Role of Physical Therapy

Rutgers University has made this article freely available. Please share how this access benefits you.  
Your story matters. <https://rucore.libraries.rutgers.edu/rutgers-lib/50862/story/>

This work is an **ACCEPTED MANUSCRIPT (AM)**

This is the author's manuscript for a work that has been accepted for publication. Changes resulting from the publishing process, such as copyediting, final layout, and pagination, may not be reflected in this document. The publisher takes permanent responsibility for the work. Content and layout follow publisher's submission requirements.

Citation for this version and the definitive version are shown below.

**Citation to Publisher Version:** Baird, Lissa C., Klimo, Paul, Flannery, Ann Marie, Bauer, David F., Beier, Alexandra, Durham, Susan, Lin, Alexander Y., McClung-Smith, Catherine, Mitchell, Laura, Nikas, Dimitrios, Tamber, Mandeep S., Tyagi, Rachana & Mazzola, Catherine. (2016). Congress of Neurological Surgeons Systematic Review and Evidence-Based Guideline for the Management of Patients With Positional Plagiocephaly: The Role of Physical Therapy. *Neurosurgery* 79(5), E630-E631. <http://dx.doi.org/10.1227/NEU.0000000000001429>.

**Citation to this Version:** Baird, Lissa C., Klimo, Paul, Flannery, Ann Marie, Bauer, David F., Beier, Alexandra, Durham, Susan, Lin, Alexander Y., McClung-Smith, Catherine, Mitchell, Laura, Nikas, Dimitrios, Tamber, Mandeep S., Tyagi, Rachana & Mazzola, Catherine. (2016). Congress of Neurological Surgeons Systematic Review and Evidence-Based Guideline for the Management of Patients With Positional Plagiocephaly: The Role of Physical Therapy. *Neurosurgery* 79(5), E630-E631. Retrieved from [doi:10.7282/T3V69MV0](https://doi.org/10.7282/T3V69MV0).

**Terms of Use:** Copyright for scholarly resources published in RUcore is retained by the copyright holder. By virtue of its appearance in this open access medium, you are free to use this resource, with proper attribution, in educational and other non-commercial settings. Other uses, such as reproduction or republication, may require the permission of the copyright holder.

*Article begins on next page*

1 **ABSTRACT**

2 **Background:** Evidence-based guidelines are not currently available for the treatment of  
3 positional plagiocephaly and in particular, for the use of physical therapy for treatment.

4 **Objective:** The objective of this systematic review is to answer the question: “Does  
5 physical therapy provide effective treatment for positional plagiocephaly?” Treatment  
6 recommendations are created based on the available evidence.

7 **Methods:** The PubMed and the Cochrane Library were queried using MeSH headings  
8 and key words relevant to the objective of this systematic review. Abstracts were  
9 reviewed, after which studies meeting the inclusion criteria were selected and graded  
10 according to their quality of evidence (Classes I–III). Evidentiary tables were constructed  
11 that summarized pertinent study results, and recommendations were made based on the  
12 quality of the literature (Levels I–III).

13 **Results:** Three studies met criteria for inclusion. Two randomized controlled trials  
14 (Class I and Class II) and one prospective study assessing plagiocephaly as a secondary  
15 outcome measure (Class III) were included.

16 **Conclusions:** Within the limits of this systematic review, physical therapy is significantly  
17 more effective than repositioning education as a treatment for positional plagiocephaly.  
18 There is no significant difference between physical therapy and a positioning pillow as a  
19 treatment for positional plagiocephaly. However, given the American Academy of  
20 Pediatrics’ (AAP) recommendation against soft pillows in cribs to ensure a safe sleeping  
21 environment for infants, physical therapy must be recommended over the use of a  
22 positioning pillow.

23 **Running Title:** Physical therapy for plagiocephaly

24 **Key Words:** infants; physical therapy; physiotherapy; plagiocephaly, non-synostotic;  
25 positional plagiocephaly

26 **INTRODUCTION**

27 Infantile positional plagiocephaly occurs as a result of persistent mechanical  
28 forces on the malleable bones of the neonatal cranium. Asymmetric parietooccipital  
29 flattening with ipsilateral frontal bossing will result in a parallelogram deformity of the  
30 head. Alternatively, central bioccipital flattening with an anterior-posterior foreshortened  
31 head is characteristic of deformational brachycephaly. Both shapes are a manifestation of

32 the same process, and the appearance of an individual child will often be along a  
33 continuum from one type to the other. Facial asymmetry with misalignment of the eyes  
34 and/or ears, and postural congenital torticollis with restricted range of cervical and head  
35 motion may accompany this condition.

36 A rise in the prevalence of positional plagiocephaly occurred after widespread  
37 implementation of the American Academy of Pediatrics' (AAP) "Back to Sleep"  
38 recommendation that healthy term infants be positioned on their sides or backs during  
39 sleep.<sup>1</sup> While the optimal timing and modality of intervention has yet to be clearly  
40 established, primary treatments for plagiocephaly are non-operative, and include  
41 observation, counter-positioning, physical therapy, and orthotic devices.

42 The purpose of this systematic review is to address the question: Does physical  
43 therapy provide effective treatment for positional plagiocephaly.

#### 44 **METHODS**

45 The Congress of Neurological Surgeons (CNS) and the Section on Pediatric  
46 Neurosurgery initiated a systematic review of the literature and evidence-based guideline  
47 relevant to the management of positional plagiocephaly.

#### 48 **Literature Search**

49 The task force collaborated with medical librarians to search PubMed and the  
50 Cochrane Library for the period from 1966 to October 2014 using the MeSH subject  
51 headings and PubMed search strategies. Manual searches of bibliographies were also  
52 conducted. The search returned 47 unique articles. Thirty-four were excluded based on a  
53 review of the abstract. Thirteen full text papers were reviewed. Three articles satisfied  
54 the inclusion criteria for inclusion.

#### 55 **RECOMMENDATIONS**

56 1. Physical therapy is recommended over repositioning education alone for  
57 reducing prevalence of infantile positional plagiocephaly in infants 7 weeks of  
58 age.

59 Strength of recommendation: Level I (high clinical certainty)

60 2. Physical therapy is as effective for the treatment of positional plagiocephaly  
61 and recommended over the use of a positioning pillow in order to ensure a safe

62 sleeping environment and comply with AAP recommendations. Strength of  
63 recommendation: Level II (moderate clinical certainty)

## 64 **CONCLUSION**

65 This systemic review demonstrates physical therapy to be an effective treatment  
66 option for positional plagiocephaly. Class II evidence suggests physical therapy (PT) to  
67 be a superior treatment modality to repositioning in cases of severe plagiocephaly, and an  
68 equivalent treatment modality to a positioning pillow. *The AAP's recommends against*  
69 *the use of soft positioning pillows in the sleeping environment of an infant, therefore*  
70 *the plagiocephaly guidelines committee recommends using physical therapy over*  
71 *positioning devices.* Class III evidence suggests that PT performed by a professional  
72 physical therapist can lead to more results over a shorter treatment time, and thus be more  
73 appropriate in the setting of severe plagiocephaly.

74 Limited data is available to fully assess the efficacy of physical therapy as a  
75 primary treatment for positional plagiocephaly. The ideal timing for initiation of therapy,  
76 duration of treatment and type of physical therapy stretches and/or exercises cannot be  
77 determined from the available literature. Additional prospective studies evaluating the  
78 timing of initiation of physical therapy, duration of treatment, and specific type of  
79 physical therapy are needed.

## 80 **ACKNOWLEDGEMENTS**

81 The guidelines task force acknowledges the CNS Guidelines Committee for their  
82 contributions throughout the development of the guideline, the AANS/CNS Joint  
83 Guidelines Committee for their review, comments, and suggestions throughout peer  
84 review, and Pamela Shaw, MSLIS, MS, and Mary Bodach, MLIS, for assistance with the  
85 literature searches. Also, the guidelines task force acknowledges the following individual  
86 peer reviewers for their contributions: Sepideh Amin-Hanjani, MD; Maya Babu, MD;  
87 Kimon Bekelis, MD; Faiz Ahmad, MD; Daniel Resnick, MD; Patricia Raksin, MD;  
88 Jeffrey Olson, MD; Krystal Tomei, MD.

## 89 **REFERENCES**

- 90 1. Task Force on Sudden Infant Death S, Moon RY. SIDS and other sleep-related  
91 infant deaths: expansion of recommendations for a safe infant sleeping  
92 environment. *Pediatrics*. Nov 2011;128(5):e1341-1367.