

Guideline Title: Appropriateness of Physical and Sporting Activity for those with Scoliosis

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Developer organization name: American Chiropractic Board of Sports Physicians™ (ACBSP™)

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Criteria for Inclusion of Clinical Practice Guidelines in NGC • This clinical practice guideline contains systematically developed statements that include recommendations, strategies, or information that assists physicians and/or other health care practitioners and patients in making decisions about appropriate health care for specific clinical circumstances. • This clinical practice guideline was produced under the auspices of the American Chiropractic Board of Sports Physicians, a clinical specialty association. • A systematic literature search and review of existing scientific evidence published in peer reviewed journals was performed during the guideline development. • The full text guideline is available for no charge and is in the English language. The systematic review from which this guideline was derived is also available in both pdf and HTML format for free public access at [www.journalchiromed.com](http://www.journalchiromed.com) and is published in the English language. • The guideline is current and the most recent version produced. • The guideline was developed within the past year.

COMPLETE SUMMARY Guideline Title: Appropriateness of Physical and Sporting Activity for those with Scoliosis

Bibliographic Sources Green BN, Johnson CD, Moreau W. Is physical activity contraindicated for individuals with scoliosis? A systematic literature review. *Journal of Chiropractic Medicine* 2009;8:25-37.

Guideline Status: This is a new guideline.

FDA Warning/Regulatory Alert: We believe that there are no alerts pertinent to this guideline.

Disease/Conditions: Scoliosis

Guideline Category Evaluation, Management, Prevention, Rehabilitation, Risk Assessment/Prognosis

Clinical Specialty Cardiology, Chiropractic, Endocrinology, Family Practice, Neurological Surgery, Neurology, Nursing, Orthopedic Surgery, Pediatrics, Physical Medicine and Rehabilitation, Sports Medicine

Intended Users Allied Health Personnel; Chiropractors; Health Care Providers; Nurses; Patients; Physical Therapists; Physician Assistants; Physicians; Students

Guideline Objective(s) To summarize the American Chiropractic Board of Sports Physicians' recommendations regarding the appropriateness of physical and sporting activity for people with scoliosis

Target Population Athletes and active people with scoliosis

Interventions and Practices Considered Patient education regarding appropriate recreational and competitive physical activity and exercise for those who have scoliosis.

Note: Recommendations pertaining to the effectiveness or efficacy of therapeutic exercise in the management of pain or deformity associated with scoliosis were not included. This guideline pertains to physical activity appropriateness and safety for those with scoliosis.

Major Outcomes Considered • Whether there are any instances when exercise or physical activities would be contraindicated for those with scoliosis • Whether there are any instances when modifications to specific physical activities should be considered for safety

METHODOLOGY Methods Used to Collect/Select the Evidence Hand-searches of Published Literature (Primary Sources), Hand-searches of Published Literature (Secondary Sources), Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence PubMed and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) were searched using EBSCOhost Web; the Index to Chiropractic Literature (ICL) was searched directly at its site ([www.chiroindex.org](http://www.chiroindex.org)). Searches for all databases were from their starting dates through July 2008, and they were conducted during the month of August 2008. The search strategy combined the term scoliosis with a variety of terms relevant to the topic of study (sport; sports; athletic injuries; athletic participation; sport performance; public health; exercise). We sought out additional articles referenced in the articles retrieved. The National Guidelines Clearinghouse was searched for existing guidelines pertinent to physical activity participation for people with scoliosis. Scoliosis was the only search term, and all available guidelines were reviewed for relevance. We also investigated Web sites of organizations/agencies with a potential interest in scoliosis. These Web sites were selected by searching an Internet browser using the term scoliosis. All 18 organizations returned by the search were searched for position/white papers about scoliosis and physical activity (available in the systematic review as Table 2).

Articles (all languages and all research designs) assessing or discussing the appropriateness of physical activity for people with all types of scoliosis were included. Articles published in languages other than English were translated to English using a software translator (Google Language Tools; Google Inc, Mountain View, CA). Only studies from peer reviewed scholarly journals were included. Articles from trade magazines and nonscholarly sources were excluded, as were letters to the editor and articles not specific to the use or recommendations of physical activity participation for people with scoliosis. Reports of therapeutic exercises (eg, stretching, strengthening) used as a treatment to correct the curvature of scoliosis were excluded because of their intentional use as a therapeutic intervention, rather than as a means to merely exercise or maintain physical activity. Abstracts of conference proceedings were not included because of the high rate of conference presentations that are never published. Web sites of private health care practitioners, private individuals, and group practices were excluded.

Number of Source Documents Eight hundred ninety-eight initial citations were found during the literature search. After applying the exclusion criteria, 65 potential studies were identified. Based upon consensus, 11 articles were acceptable for review and formed the basis for this guideline. No guidelines found in the National Guidelines Clearinghouse addressed physical activity/athletic participation for people with scoliosis and none of the 18 organization Websites reviewed contained a position statement regarding the appropriateness of physical activity for people with scoliosis.

Methods Used to Assess the Quality and Strength of the Evidence Expert Consensus, Expert Consensus (Committee), Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence The Oxford Centre for Evidence-based Medicine levels of evidence rating scheme was used. In this system, evidence is rated for quality from levels 1 (best quality)

to 5 (lowest quality) primarily on the research design. The levels of evidence for therapy, prevention, etiology, or harm studies are as follows:

Level Study(ies)  
1a Systematic review with homogeneity of randomized clinical trials  
1b Individual randomized clinical trial with narrow confidence interval  
1c All or none studies  
2a Systematic review with homogeneity of cohort studies  
2b Individual cohort study (including low quality randomized clinical trial)  
2c Outcomes research; ecological studies  
3a Systematic review with homogeneity of case-control studies

3b Individual case-control study  
4 Case series and poor quality cohort and case-control studies  
5 Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles"

From: Phillips B, Ball C, Sackett D, Badenoch D, Straus S, Haynes B, Dawes M. Oxford Centre for Evidence-based Medicine levels of evidence. Oxford: Centre for Evidence-based Medicine; 2001 [cited 2008 Apr 1]. Available from: <http://www.cebm.net/index.aspx?o=1025>.

Methods Used to Analyze the Evidence Systematic Review with evidence tables

Description of Methods Used to Analyze the Evidence Included studies were rated for quality using the Oxford Centre for Evidence-based Medicine levels of evidence rating scheme.

Methods Used to Formulate the Recommendations Expert Consensus

Description of the Methods used to Formulate the Recommendations The Level of Evidence and recommendations from the reviewed studies that pertained to sport and exercise activity and scoliosis were tracked in a spreadsheet and analyzed for similarity or contradictions. Areas of congruence were used to make recommendations for this guideline and areas of dissimilarity were identified as areas in need of further investigation before recommendations can be made. The materials and recommendations were reviewed by the committee and consensus was obtained.

Rating Scheme for the Strength of the Recommendations The Oxford Centre for Evidence-based Medicine grades of recommendation were used. This grading system is used in conjunction with the levels of evidence scheme described above. The strength of recommendations are made by considering the quality of the evidence obtained. The scale of strength of recommendations is as follows:

Grade Quality of Evidence A consistent level 1 studies B consistent level 2 or 3 studies or extrapolations from level 1 studies C level 4 studies or extrapolations from level 2 or 3 studies D level 5 evidence or troublingly inconsistent or inconclusive studies of any level

From: Phillips B, Ball C, Sackett D, Badenoch D, Straus S, Haynes B, Dawes M. Oxford Centre for Evidence-based Medicine levels of evidence. Oxford: Centre for Evidence-based Medicine; 2001 [cited 2008 Apr 1]. Available from: <http://www.cebm.net/index.aspx?o=1025>.

Cost Analysis No cost analysis was performed.

Method of Guideline Validation No cost analysis was performed.

Description of Method of Guideline Validation Comparison with Guidelines from Other Groups, Internal Peer Review

**RECOMMENDATIONS Major Recommendations** The three primary categories for treating the curvature associated with scoliosis are observation, bracing, and surgery. These recommendations follow that classification.

- Brace-treated and surgically treated scoliosis patients have demonstrated that they can physically participate in sports activities at the same level as controls (grade C recommendation [2 level 3b studies]).
- Brace-treated or observation-only scoliosis patients are encouraged to participate in sports and physical activity (grade D recommendation [1 level 3b study<sup>26</sup>; 5 level 5 studies]).
- Nonsurgically treated scoliosis is not a contraindication to sports participation (grade D recommendation [3 level 5 studies]).
- Brace-treated scoliosis patients are encouraged to exercise with their braces on; however, exercise may also be done outside of the brace (grade D recommendation [4 level 5 studies]).
- Sports and exercise may be commenced in the months after surgery for scoliosis correction; however, there is no high-quality evidence guiding return to sport activity. Currently, return to activity is based upon the opinion of the attending surgeon (grade D recommendation [2 level 5 studies]) and expert opinions without explicit critical appraisal (grade D recommendation [5 level 5 studies]). No clear evidence or guideline is offered regarding contact and/or collision sports after surgery.
- A potential association between elite-level competition in particular sports at an early age and an increased prevalence of scoliosis has been reported (grade C recommendation [1 level 3b study; 1 level 4 study; 5 level 5 studies]).

Clinical Algorithm(s) There is no clinical algorithm to accompany this guideline

## EVIDENCE SUPPORTING THE RECOMMENDATIONS References Supporting the Major Recommendations

- Schiller JR, Ebersson CP. Spinal deformity and athletics. *Sports Med Arthrosc* 2008;16(1):26-31.
- Omev ML, Micheli LJ, Gerbino 2nd PG. Idiopathic scoliosis and spondylolysis in the female athlete. Tips for treatment. *Clin Orthop Relat Res* 2000(372):74-84.
- Liljenqvist U, Witt KA, Bullmann V, Steinbeck J, Volker K. Recommendations on sport activities for patients with idiopathic scoliosis. *Sportverletz Sportschaden* 2006;20(1):3642.
- Rubery PT, Bradford DS. Athletic activity after spine surgery in children and adolescents: results of a survey. *Spine* 2002;27(4):423-7.
- Wood KB. Spinal deformity in the adolescent athlete. *Clin Sports Med* 2002;21(1):77-92.
- Parsch D, Gartner V, Brocai DR, Carstens C, Schmitt H. Sports activity of patients with idiopathic scoliosis at long-term follow-up. *Clin J Sport Med* 2002;12(2):95-8.
- Meyer C, Haumont T, Gauchard GC, Leheup B, Lascombes P, Perrin PP. The practice of physical and sporting activity in teenagers with idiopathic scoliosis is related to the curve type. *Scand J Med Sci Sports* 2008.
- Danielsson AJ, Romberg K, Nachemson AL. Spinal range of motion, muscle endurance, and back pain and function at least 20 years after fusion or brace treatment for adolescent idiopathic scoliosis: a case-control study. *Spine* 2006;31(3):275-83.
- Baker RJ, Patel D. Lower back pain in the athlete: common conditions and treatment. *Prim Care* 2005;32(1):201-29.
- von Stempel A, Scholz M, Daentzer M. Sports capacity of patients with scoliosis. *Sportverletz Sportschaden* 1993;7(2):58-62.

- Fuchs PD, Bertrand S, Iwinski H, Pellet J. Traumatic C6-C7 dislocation in a 14 year old with posterior spinal fusion for idiopathic scoliosis. J Trauma 2001;51(5):1004-7.

Type of Evidence supporting the Recommendations The type of evidence supporting the recommendations is identified in the "Major Recommendations" field.

**BENEFITS/HARMS OF IMPLEMENTING THE RECOMMENDATIONS** Potential Benefits People with scoliosis should find that these guidelines help them to understand that exercise is encouraged in the available literature and not contraindicated, even for those who have had surgery. Exercise is beneficial for the cardiovascular system, musculoskeletal system, weight control, stress management, decreased risk of osteoporosis, balance, and psychosocial well being. The information is also of use for clinicians to encourage individuals with scoliosis and to let them know that scoliosis is not a reason to avoid exercise.

Potential Harms There is little obvious harm associated with physical activity and scoliosis. Following surgery, the risk for injury is higher than for those undergoing observation or bracing and patients desiring to return to exercise and sport must do so under the direction of their surgeon. Not following specific instructions provided by one's doctor could be harmful. These guidelines are most appropriate for people who have idiopathic scoliosis. For people who have scoliosis as

condition secondary to another concern (eg, spinal degeneration, collagen disorders, Down's syndrome, compression fracture, or certain genetic skeletal disorders) or for patients with multiple surgical procedures, these guidelines, or portions of these guidelines, may not be applicable.

**CONTRAINDICATIONS** These guidelines may be inadvisable for those who have had multiple surgical procedures to correct scoliotic deformity or have other comorbidities that preclude exercise or sport. Before beginning any exercise program or athletic involvement, persons with scoliosis should consult a qualified healthcare professional prior to participation.

**QUALIFYING STATEMENTS** The levels of evidence gleaned from the literature were low. Thus, the major recommendations are supported by observational studies and expert opinion more than rigorous controlled studies. The present guidelines are based on the best evidence available, but further research is needed to provide better guidance in this area.

**IMPLEMENTATION OF THE GUIDELINE** Description of the Implementation Strategy The guideline will be made available on the National Guidelines Clearinghouse website. The systematic review from which the guideline was derived is available for no cost on the Internet ([www.journalchicomed.com](http://www.journalchicomed.com)). Continuing

education and scholarly presentations at conferences and symposia will be used to disseminate the information to relevant interest groups.

Implementation Tools Resources; Slide Presentation

Related Measures in the National Quality Measures Clearinghouse™ There are no relevant measures listed in the National Quality Measures Clearinghouse.

Related Tools in the QualityTools™ Clearinghouse Screening for idiopathic scoliosis in adolescents: recommendation statement  
([http://www.guideline.gov/summary/summary.aspx?ss=15&doc\\_id=5302&nbr=3625](http://www.guideline.gov/summary/summary.aspx?ss=15&doc_id=5302&nbr=3625))

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES IOM Care Need  
Staying healthy.

IOM Domain Patient centeredness; Safety

IDENTIFYING INFORMATION AND AVAILABILITY Bibliographic Sources Green BN, Johnson CD, Moreau W. Is physical activity contraindicated for individuals with scoliosis? A systematic literature review. *Journal of Chiropractic Medicine* 2009;8:25-37.

Adaptation This guideline was not adapted from any other source

Date Released TBD by NGC

Guideline Developer Professional Association (American Chiropractic Board of Sports Physicians)

Guideline Developer Comment N/A

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Financial Disclosures/Conflicts of Interest The members of this committee had no conflicts of interest, financial or otherwise, with any forprofit or non-profit organization to disclose.

Endorser(s) None at this time

Guideline Availability Print copies may be obtained from the American Chiropractic Board of Sports Physicians at 103 South 6th Street, Estherville, IA 51334. This guideline is available for free at: [www.acbsp.com](http://www.acbsp.com). The article upon which this guideline is based is available open access at [www.JournalChiroMed.com](http://www.JournalChiroMed.com)

Availability of Companion Documents None available at this time

Patient Resources None available at this time

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