



Complete Summary

GUIDELINE TITLE

Guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 11: interbody techniques for lumbar fusion.

BIBLIOGRAPHIC SOURCE(S)

Resnick DK, Choudhri TF, Dailey AT, Groff MW, Khoo L, Matz PG, Mummaneni P, Watters WC 3rd, Wang J, Walters BC, Hadley MN, American Association of Neurological Surgeons/Congress of Neurological Surgeons. Guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 11: interbody techniques for lumbar fusion. J Neurosurg Spine 2005 Jun;2(6):692-9. [37 references] [PubMed](#)

GUIDELINE STATUS

This is the current release of the guideline.

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SCOPE

DISEASE/CONDITION(S)

Degenerative disease of the lumbar spine

GUIDELINE CATEGORY

Assessment of Therapeutic Effectiveness
Management
Technology Assessment

CLINICAL SPECIALTY

Internal Medicine
Neurological Surgery
Orthopedic Surgery
Physical Medicine and Rehabilitation

INTENDED USERS

Health Plans
Managed Care Organizations
Physicians

GUIDELINE OBJECTIVE(S)

To examine the literature reporting experience with interbody fusion techniques and their relative safety and efficacy compared with posterolateral fusion techniques for the treatment of patients with low-back pain

TARGET POPULATION

Patients with low-back pain due to degenerative disease of the lumbar spine

INTERVENTIONS AND PRACTICES CONSIDERED

1. Posterolateral fusion (PLF)
2. Interbody fusion (anterior lumbar interbody fusion [ALIF], posterior LIF [PLIF], and transforaminal LIF [TLIF])

Note: See "Major Recommendations" for specific indications for each technique.

MAJOR OUTCOMES CONSIDERED

- Effectiveness of interbody fusion techniques in terms of back and leg pain relief, fusion rate, length of hospital stay, reoperation rate, return to work, and patient satisfaction
- Safety of interbody fusion techniques in terms of complication rates

METHODOLOGY

METHODS USED TO COLLECT/SELECT 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

A computerized search of the National Library of Medicine database of the literature published from 1966 to June 2003 was performed. A search using the subject heading "spinal fusion, lumbar, treatment outcome, low-back pain" yielded 1030 citations. Clinical series reported in English-language journals

dealing with adult patients who had undergone fusion with instrumentation for degenerative lumbar disease were selected (333 references). Relevant articles pertaining to the comparison of interbody fusion techniques with other surgical techniques or nonsurgically treated controls were selected and are summarized in the evidentiary table in the original guideline document. A number of case series provide supporting data and are referenced in the bibliography of the original guideline.

NUMBER OF SOURCE DOCUMENTS

17 articles pertaining to the comparison of interbody fusion techniques with other surgical techniques or nonsurgically treated controls were selected.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Classes of Evidence

Class I Evidence from one or more well-designed, randomized controlled clinical trials, including overviews of such trials

Class II Evidence from one or more well-designed comparative clinical studies, such as nonrandomized cohort studies, case-control studies, and other comparable studies, including less well-designed randomized controlled trials

Class III Evidence from case series, comparative studies with historical controls, case reports, and expert opinion as well as significantly flawed randomized controlled trials

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

The group culled through literally thousands of references to identify the most scientifically robust citations available concerning each individual topic. Not every reference identified is cited. In general, if high-quality (Class I or II) medical evidence was available on a particular topic, poorer-quality evidence was only briefly summarized and rarely included in the evidentiary tables. If no high-quality evidence existed, or if there was significant disagreement between similarly classified evidence sources, then the Class III and supporting medical evidence were discussed in greater detail. If multiple reports were available that provided similar information, a few were chosen as illustrative examples.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

In January 2003, a group was formed at the request of the leadership of the Congress of Neurological Surgeons (CNS) by the executive committee of the American Association of Neurological Surgeons/CNS Joint Section on Disorders of the Spine and Peripheral Nerves to perform an evidence-based review of the literature on lumbar fusion procedures for degenerative disease of the lumbar spine and to formulate treatment recommendations based on this review. In March 2003, this group was convened. Invitations were extended to approximately 12 orthopedic and neurosurgical spine surgeons active in the Joint Section or in the North American Spine Society to ensure participation of nonneurosurgical spine surgeons. The recommendations that were developed represent the product of the work of the group, with input from the Guidelines Committee of the American Association of Neurological Surgeons/CNS and the Clinical Guidelines Committee of North American Spine Society.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Grades of Recommendation

Standards Recommendations of the strongest type, based on Class I evidence reflecting a high degree of clinical certainty

Guidelines Recommendations based on Class II evidence reflecting a moderate degree of clinical certainty

Options Recommendations based on Class III evidence reflecting unclear clinical certainty

COST ANALYSIS

Lumbar fusion may be associated with a high short-term cost, especially if instrumentation is placed; however, there appear to be long-term economic benefits associated with lumbar fusion including resumption of employment. To describe the economic impact of lumbar fusion for degenerative disease adequately, it is important to define the patient population treated with fusion and to compare efficacy as well as the costs of other treatment alternatives. Any such analysis should include both short- and long-term costs and benefits.

See "Part 3: assessment of economic outcome" in the "Availability of Companion Documents" field for the complete analysis.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The committee presents data that have been reviewed by the major organizations representing neurological surgery and orthopedic surgery. The Board of Directors of the American Association of Neurological Surgeons (AANS) and the Congress of Neurological Surgeons (CNS) Executive Committee have reviewed these Lumbar Fusion Guidelines and formally voted their approval. In addition, input and approval was received and greatly appreciated from the AANS/CNS Guidelines committee.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The grades of recommendations (standards, guidelines, and options) and classes of evidence (I–III) are defined at the end of the "Major Recommendations" field.

Standards. There is insufficient evidence to recommend a treatment standard.

Guidelines. In the context of a single-level stand-alone anterior lumbar interbody fusion (ALIF) or ALIF with posterior instrumentation, the addition of a posterolateral fusion (PLF) is not recommended as it increases operating room time and blood loss without influencing the likelihood of fusion or the functional outcome.

Options. 1) It is recommended that both PLF and interbody fusion (posterolateral lumbar interbody fusion [PLIF], transformal LIF [TLIF], or ALIF) techniques be considered as treatment options for patients with low-back pain due to degenerative disc disease (DDD) at one or two levels. 2) Placement of an interbody graft is recommended as a treatment option to improve fusion rates and functional outcome in patients undergoing surgery for low-back pain due to DDD at one or two levels. The surgeon is cautioned that the marginal improvement in fusion rates and functional outcome with these techniques is associated with increased complication rates, particularly when combined approaches (that is, 360 degrees) are used. 3) The use of multiple approaches (anterior and posterior) to accomplish lumbar fusion is not recommended as a routine option for the treatment of patients with low-back pain without deformity.

Summary

The majority of reviewed medical evidence suggests that interbody techniques are associated with higher fusion rates compared with PLF when applied to patients with low-back pain due to DDD limited to one or two levels. The evidence is generally of poor quality and retrospective in nature. Conflicting evidence exists supporting the role of interbody graft placement for improvement of functional outcomes; however, there is no Class I or II evidence to suggest that the use of an interbody graft is associated with worse outcomes, and Class II evidence exists to suggest that outcomes are improved. Complication rates of interbody graft placement, particularly of circumferential procedures, are higher in most series. Many complications, however, are associated with pedicle screw fixation and not with interbody graft placement per se. In the context of a single-level stand-alone ALIF or ALIF with posterior instrumentation, there does not appear to be a substantial benefit to the addition of a PLF. The addition of a PLF to a construct

that already includes an interbody graft is, however, associated with increased costs and complications. Therefore, although the addition of supplemental fixation (a 270 degree fusion) may be necessary for biomechanical reasons, it may not be appropriate to subject the patient to the morbidity of a full posterior exposure for placement of graft material.

Significant differences in clinical outcomes between the various interbody techniques have not been convincingly demonstrated. No general recommendation can therefore be made regarding the technique that should be used to achieve interbody fusion.

Definitions:

Grades of Recommendation

Standards Recommendations of the strongest type, based on Class I evidence reflecting a high degree of clinical certainty

Guidelines Recommendations based on Class II evidence reflecting a moderate degree of clinical certainty

Options Recommendations based on Class III evidence reflecting unclear clinical certainty

Classes of Evidence

Class I Evidence from one or more well-designed, randomized controlled clinical trials, including overviews of such trials

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Class III Evidence from case series, comparative studies with historical controls, case reports, and expert opinion as well as significantly flawed randomized controlled trials

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate use of interbody techniques for lumbar fusion in patients with degenerative disease of the lumbar spine

POTENTIAL HARMS

- Complication rates of interbody graft placement, particularly of circumferential procedures, are higher compared with posterolateral fusion (PLF) in most series. Complications include: reoperations for instrumentation removal, donor site pain, pressure sores, and screw malposition. Many complications, however, are associated with pedicle screw fixation and not with interbody graft placement per se.
- The addition of PLF to a construct that already includes an interbody graft is associated with increased costs and complications.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- Significant differences in clinical outcomes between the various interbody techniques have not been convincingly demonstrated. No general recommendation can therefore be made regarding the technique that should be used to achieve interbody fusion.
- The strength of an evidence-based document is only as strong as the foundation on which it is built. This comprehensive document chronicles the state of scientific information in 2005. Many of the published reviews presented flawed results due to poorly defined outcome measures, inadequate numbers of patients, and comparison of dissimilar treatment groups. These studies of "apples and oranges" gleaned little scientific information; therefore, for the purpose of this review, the authors have discarded Class III studies whenever stronger scientific evidence was available. The result is that most of the published studies on lumbar fusion were not included on this document. When Class I or II scientific evidence was available, standards and guidelines were formulated; however, in most cases, the scientific data were only adequate to support recommendations for treatment options. The aforementioned results do not detract from the importance of this document; rather, the need for the neurosurgical community to design and complete prospective randomized controlled studies to answer the many lingering clinical questions with rigorous scientific power can clearly be seen. As more data continue to be accumulated, revisions of this document will be needed.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Resnick DK, Choudhri TF, Dailey AT, Groff MW, Khoo L, Matz PG, Mummaneni P, Watters WC 3rd, Wang J, Walters BC, Hadley MN, American Association of Neurological Surgeons/Congress of Neurological Surgeons. Guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 11: interbody techniques for lumbar fusion. J Neurosurg Spine 2005 Jun;2(6):692-9. [37 references] [PubMed](#)

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2005 Jun

GUIDELINE DEVELOPER(S)

American Association of Neurological Surgeons - Medical Specialty Society
Congress of Neurological Surgeons - Professional Association

SOURCE(S) OF FUNDING

This project was funded entirely by a grant from AANS/CNS Section on Disorders of the Spine. No funding was received from any commercial entity to support the production or publication of these guidelines.

GUIDELINE COMMITTEE

Guidelines Committee of the American Association of Neurological Surgeons/Congress of Neurological Surgeons (CNS)

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Primary Authors: Daniel K. Resnick, MD; Tanvir F. Choudhri, MD; Andrew T. Dailey, MD; Michael W. Groff, MD; Larry Khoo, MD; Paul G. Matz, MD; Praveen Mummaneni, MD; William C. Watters III, MD; Jeffery Wang, MD; Beverly C. Walters, MD, MPH; Mark N. Hadley, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

ENDORSER(S)

North American Spine Society - Medical Specialty Society

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Web site](#).

Print copies: Available from Daniel K. Resnick, M.D., Department of Neurological Surgery, University of Wisconsin Medical School, K4/834 Clinical Science Center, 600 Highland Avenue, Madison, Wisconsin 53792; Email: Resnick@neurosurg.wisc.edu.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Introduction to the guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. 2005 Jun. 1 p. Available in Portable Document Format (PDF) from the [AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Web site](#).
- Guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 1: introduction and methodology. 2005 Jun. 2 p. Available in Portable Document Format (PDF) from the [AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Web site](#).
- Guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 3: assessment of economic outcome. 2005 Jun. 6 p. Available in Portable Document Format (PDF) from the [AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves Web site](#).

Print copies: Available from Daniel K. Resnick, M.D., Department of Neurological Surgery, University of Wisconsin Medical School, K4/834 Clinical Science Center, 600 Highland Avenue, Madison, Wisconsin 53792; Email: Resnick@neurosurg.wisc.edu.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI on January 5, 2007. The information was verified by the guideline developer on January 29, 2007.

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