OKLAHOMA

GUIDELINES FOR TREATMENT OF THE LUMBAR SPINE

Developed and Adopted
by the
Physician Advisory Committee

Adopted by the Administrator
of the
Oklahoma Workers' Compensation Court

Effective August 15, 2009

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INTRODUCTION

BACKGROUND: The Physician Advisory Committee (PAC), a statutorily created advisory body to the Oklahoma Workers' Compensation Court, has been directed by Oklahoma Statute to develop and recommend treatment guidelines for injured Oklahoma workers. The PAC is composed of nine members; three appointed by the Governor, three appointed by the President Pro Tempore of the State Senate, and three appointed by the Speaker of the Oklahoma House of Representatives. By statute, the Governor's appointees must include a doctor of medicine and surgery, a family practitioner in a rural community of the state, and an osteopathic physician; the President Pro Tempore's appointees must include a doctor of medicine and surgery, a doctor of medicine or an osteopathic physician, and a podiatric physician; and the Speaker's appointees must include an osteopathic physician, a doctor of medicine or an osteopathic physician, and a chiropractic physician.

DEVELOPMENT OF THE GUIDELINES: The Committee received input from a wide variety of sources including employers, insurance carriers, and health care providers. Appropriate scientific literature has been reviewed. The Occupational Medicine Practice Guidelines promulgated by the American College of Occupational and Environmental Medicine and the Official Disability Guidelines published by the Work Loss Data institute, and practice parameters of the American Academy of Orthopaedic Surgeons were reviewed. Treatment protocols from Colorado, Washington, Minnesota, California, Rhode Island, and West Virginia were also utilized.

APPLICATION OF THE GUIDELINES: These treatment guidelines should not be construed as including all proper methods of care or excluding other acceptable methods of care which are based upon nationally accepted practice standards.

For injury or illness treated under the Oklahoma Workers' Compensation Act, compliance with these treatment guidelines is mandatory and an employer or insurer for an employer is not required to pay for treatment which is not in compliance with the treatment guidelines, unless prior authorization is received. If prior authorization is refused, independent review may be obtained under court procedures.

Authorization for treatment may not be denied on the sole basis the treatment is not addressed by these guidelines if it is documented to be based upon nationally accepted practice standards.

These guidelines do not affect any determination of liability for an injury under the Oklahoma Workers' Compensation Act, 85 O.S., Section 1, et seq., and are not intended to expand or restrict a health care provider's scope of practice under any other statutes.

I. THERAPEUTIC PROCEDURES – NON-OPERATIVE

A. Background

1. This treatment guideline for the diagnosis and conservative treatment of low back pain is a consensus document based on nationally accepted practice standards and is not a scientific treatise on the subject.

2. It is understood that a certain number of injured employees treated under this guideline will require continued care that may transition to other treatment guidelines.

3. This treatment guideline is meant to cover the majority of tests and treatments for injured workers with low back pain. However, it is expected that up to 10% of cases may fall outside these treatment guidelines and require review on a case-by-case basis.

4. Although the primary purpose of this document is advisory and educational, these guidelines are enforceable under Title 85, Section 201.1 (B) (5). The Physician Advisory Committee recognizes that acceptable medical practice may include deviations from these treatment guidelines as individual cases dictate. Therefore, these guidelines are not relevant as evidence of a provider's legal standard of care.

5. It is anticipated that these Guidelines will only be applicable for no more than six months following the injury.

6. The natural history of low back pain is such that within three months of the injury, 90% of all injured workers should no longer require active medical treatment.

B General Principles

1. Treatment Parameter Duration. Time frames for specific interventions begin once specific treatment has been initiated and not on the date of injury.

2. Active interventions. Active interventions (therapeutic exercise and/or functional treatment) are emphasized over passive modalities, especially as treatment progresses. Generally, passive interventions are viewed as a means to facilitate the transition to an active rehabilitation program.

3. Positive Patient Response. These results are defined primarily as functional gains that can be objectively measured, such as positional tolerances, range of motion, strength, endurance, activities of daily living (ADL), cognition, psychological behavior, and efficiency/velocity measurements. Subjective reports of pain and function should be considered and given relative weight when the pain has an anatomic and/or physiological basis. All findings must be based on objective medical evidence.

4. Re-evaluate Response to Treatment at least every 3-4 weeks. If a given treatment is not producing the desired effect within three to four weeks, the treatment should either be modified or discontinued. If a rational intervention fails to produce the desired effect, the diagnosis of the condition under treatment should be re-considered.

5. Surgical Interventions. Surgical Interventions for low back pain are covered in a companion treatment guideline.

6. Six-month time frame. As many studies have documented, the prognosis of an injured employee returning to work drops precipitously after the employee has been temporarily totally disabled for more than six months. The emphasis within these Guidelines is to move patients along a continuum of care and return to work before the six-month mark, whenever possible. It is important to note that these time frames may not be pertinent for injuries that do not involve work-time loss or are not occupationally-related.

7. Return-to-work. Work is therapeutic, assuming that the work is not likely to aggravate the basic problem or increase long-term pain. Even if there is residual chronic pain, return to work is not necessarily contraindicated.

8. Delayed Recovery. The Physician Advisory Committee recognizes that 3-10% of all industrially injured patients will not recover within 6-12 weeks of the index injury. Such individuals may require treatment beyond the limits discussed within this document, but such treatment will require clear documentation by the treating physician focusing on objective functional gains afforded by further treatment and its impact on prognosis.

9. Guideline Recommendations and Inclusion of Medical Evidence. All recommendations in this treatment guideline are considered to represent reasonable care in appropriately selected cases, regardless of the level of evidence attached to it. Those procedures considered inappropriate, unreasonable, or unnecessary are designated in the treatment guideline as "not recommended".

10. Care Beyond MMI. Maximum medical improvement (MMI) should be declared by the treating

physician when the patient's condition has plateaued to the point that further medical intervention is unlikely to result in improved functional outcome. However, some patients may require treatment after MMI has been reached in order to maintain their functional state. The recommendations in this treatment guideline are for pre-MMI care and are not intended to limit post-MMI treatment.

C. Initial Diagnostic Evaluation

1. History
2. Physical Examination
3. Routine x-rays of the Lumbar Spine
4. Laboratory Testing

D. Advanced Diagnostic Imaging and Testing Procedures

Limitations: No test shall be repeated more frequently than every six months without prior authorization.

1. Imaging Studies
    a. Dynamic Spinal X-rays
    b. MRI
    c. Gadolinium Enhanced MRI
    d. CT
    d. Intravenous Enhanced CT scan
    e. Radioisotope Bone Scan
    f. Technetium/Indium/Gallium Scanning
    g. Myelography
    h. CT/Myelogram
    i. Electrodiagnostic Studies/Nerve Conduction Velocities
2. Other Tests
    a. Personality/Psychological/Psychosocial Evaluation
    b. Diagnostic Injections
    c. Discography
3. Special Tests
    a. Functional Capacity Evaluation
    b. Vocational Assessment
4. Not Recommended
    a. Thermography
    b. Surface EMG
    c. Current Perception Threshold Evaluation
    d. Somatosensory Evoked Potential
    e. Large-Array Surface Electromyography
    f. Surface EMG in combination with range of motion and/or Functional Capacity Evaluation

E. Therapeutic Procedures

1. Acupuncture
2. Biofeedback
3. Therapeutic Injections
4. Limitation: No more injections during a 6 month period than the number shown following each procedure:
    a. Epidural Injections for radicular pain - 3
    b. Zygoapophyseal Injections - 2
    c. Facet Rhizotomoy - 1
    d. Sacro-iliac joint injection - 3
    e. Trigger Point Injections – 6
    f. Medial branch nerve block for facet injections – 2
    g. Selective nerve root block - 3
5. Not Recommended
    a. Prolotherapy/Sclerotherapy
    b. IDET
4. Medications
    a. Acetaminophen
    b. Muscle Relaxants
    b. Narcotics
    d. Non-steroidal anti-inflammatory medications (NSAIDs)
    e. Oral Steroids
    f. Psychotropic/Anti-anxiety/Anti-depressant/Hypnotic Agents
    g. Tramadol
    h. Topical Drug Delivery sytems
5. Occupational Rehabilitation Programs
    a. Work Conditioning
    b. Work Simulation
    c. Work Hardening
6. Orthotics
    a. Foot Orthoses
    b. Lumbosacral bracing
7. Personality/Psychological/Psychosocial Intervention
    a. Optimum duration: 6 weeks to 3 months
    b. Maximum duration: 3 to 12 months
    c. Counseling is not intended to delay, but to enhance functional recovery. For select patients, longer supervised treatment may be required and if further counseling beyond 3 months is indicated, documentation is required addressing which issues are pre-existing, causative, or

aggravated, as well as a realistic functional prognosis by the treating physician at no less than every 4-6 weeks during treatment.

8. Therapy-Passive (Modalities)

    a. The maximum number for all physical therapy treatments is 18 sessions unless prior approval is obtained.

    b. Non-listed procedures require prior authorization to proceed.

        (1) Electrical Stimulation

        (2) Infrared Therapy

        (3) Iontophoresis

        (4) Manipulation

        (5) Massage

        (6) Joint Mobilization

        (7) Soft Tissue Mobilization

        (8) Superficial Heat and Cold Therapy

        (9) Short-Wave Diathermy

        (10) Manual Traction

        (11) Mechanical Traction

        (12) Transcutaneous Electrical Nerve Stimulation

        (13) Ultrasound

        (14) Whirlpool/Hubbard Tank

9. Active Therapy

    a. The Maximum Duration for all Physical Therapy-type treatments is 18 sessions unless prior approval is obtained.

    b. Non-listed procedures require prior authorization to proceed.

        (1) Aquatic Therapy

        (2) Functional Activities

        (3) Functional Electrical Stimulation

        (4) Lumbar Stabilization

        (5) Neuromuscular Re-education

        (6) Therapeutic Exercise

II. THERAPEUTIC PROCEDURES -- OPERATIVE

All operative interventions must be based upon positive correlation of clinical findings, clinical course, and diagnostic tests. A comprehensive assimilation of these factors must lead to a specific diagnosis with positive identification of pathologic condition(s). It is imperative to rule out non-physiologic modifiers of pain presentation or non-operative conditions mimicking radiculopathy or instability (e.g., peripheral neuropathy, piriformis syndrome, myofascial pain, scleratogenous or sympathetically mediated pain syndromes, sacroiliac dysfunction, psychological conditions, etc.) prior to consideration of elective surgical intervention.

Operative treatment is indicated when the natural history of surgically treated lesions is better than the natural history for non-operatively treated lesions. All patients being considered for surgical intervention should first undergo a comprehensive neuro-musculoskeletal examination to identify mechanical pain

generators that may respond to non-surgical techniques or may be refractory to surgical intervention.

While sufficient time allowances for non-operative treatment are required to determine the natural cause and response to non-operative treatment of low back pain disorders, timely decision making for operative intervention is critical to avoid de-conditioning and increased disability (exclusive of "emergent" or urgent pathology such as cauda equina syndrome or associated rapidly progressive neurologic loss).

In general, if the program of non-operative treatment fails, operative treatment is indicated when:

1. Improvement of the symptoms has plateaued and the residual symptoms of pain and functional disability are unacceptable at the end of 6 to 12 weeks of active treatment, or at the end of longer duration of non-operative programs for debilitated patients with complex problems; and/or
2. Frequent recurrences of symptoms cause serious functional limitations even if a non-operative active treatment program provides satisfactory relief of symptoms, and restoration of function on each recurrence.
3. Mere passage of time with poorly guided treatment is not considered an active treatment program.

Surgical workup and implementation for simple decompression of patients with herniated nucleus pulposus and sciatica should occur within 6 to 12 weeks after injury at the latest, within the above stated contingencies. For patients with true, refractory mechanical low back pain in whom fusion is being considered, it is recommended that a decisive commitment to surgical or non-surgical interventions occur within 5 months following injury, at the latest.

Re-operation is indicated only when the functional outcome following the re-operation is expected to be better, within a reasonable degree of certainty, than the outcome of other non-invasive or less invasive treatment procedures. "Functional outcomes" refer to the patient's ability to improve functional tolerances such as sitting, standing, walking, strength, endurance, and/or vocational status. While timely surgical decision-making is critical to avoid de-conditioning and increased disability, a time limited trial of reconditioning should be tried prior to re-operation. Re-operation has a high rate of complications and failure and may lead to disproportionately increased disability.

Complications are not listed with each and every procedure but include the normal complications associated with any operative intervention.

Every post-operative patient should be involved in an active treatment program. Interdisciplinary interventions should be strongly considered post-operatively in any patient not making functional progress within expected tine frames.

Return to work restrictions should be specific. Most non-fusion surgical patients can return to a limited level of duty between 3 to 8 weeks. Full activity is generally achieved between 8 weeks to 6 months depending on the procedure and healing of the individual.

A. DISCECTOMY

1. Description: To enter into and partially remove the disc.
2. Surgical Indications: To include all of the following: Primary radicular symptoms, radiculopathy on exam, correlating imaging study, and failure of non-surgical care. There is good evidence that surgery provides initial improvement of radicular symptoms with respect to chronic low back pain.
3. Operative Treatment: Partial discectomy and root decompression.
4. Post-Operative Therapy: A formal physical therapy program should be implemented post-operatively. Active treatment, which patients should have had prior to surgery, will frequently require a repeat of the sessions previously ordered.

B. PERCUTANEOUS DISCECTOMY

1. Description: An invasive operative procedure to accomplish partial removal of the disc through a needle which allows aspiration of a portion of the disc trocar under imaging control.

2. Surgical Indications: Percutaneous discectomy is rarely indicated. It is sometimes useful in suspected septic discitis or in order to obtain diagnostic tissue. It is not recommended for contained disc herniations or bulges with associated radiculopathy, due to lack of evidence to support long-term improvement.

3. Operative Treatment: Partial discectomy.

C. LAMINOTOMY/LAMINECTOMY/FORAMINOTOMY/FACETECTOMY

1. Description: These procedures provide access to produce neural decompression by partial or total removal of various parts of vertebral bone.

2. Surgical Indications: Include all of the following: Primary radicular symptoms, radiculopathy on exam, correlating imaging study, and failure of non-surgical care.

3. Operative Treatment: Laminotomy, partial discectomy, and root compression.

4. Post-Operative Therapy: A formal physical therapy program should be implemented post-operatively. Active treatment, which patients should have had prior to surgery, will frequently require a repeat of the sessions previously ordered. The implementation of a gentle aerobic reconditioning program (e.g., walking) and back education within the first post-operative week is appropriate in uncomplicated post-surgical cases. Some patients may benefit from several occupational therapy visits to improve performance of ADLs. Participation in an active therapy program which includes restoration of range of motion (ROM), core stabilization, strengthening, and endurance is recommended to be initiated 3-12 weeks post-operatively. The goals of the therapy program should include instruction in a long-term home based exercise program.

D. SPINAL FUSION

1. Description: Use of bone grafts including autologous or allograft combined with metal or bio-compatible devices to produce a rigid, bony connection between two or more adjacent vertebrae. Fusions can either be instrumented with pedicle screw fixation, facet fusion, or anterior plating with various devices in the anterior lumbar spine.

2. Surgical Indications: A timely decision-making process is recommended when considering patients for possible fusion. For chronic low back problems, fusion should not be considered within the first 5 months of symptoms, except for fracture, dislocation, symptomatic spondylolisthesis that has failed conservative measures, or large central disc herniations.

   Bone formation materials including biologics are to be used at the surgeon's discretion.

   Indications for spinal fusion may include:

   a. Neural Arch Defect - Spondylolytic spondylolisthesis, degenerative spondylolisthesis, and congenital unilateral neural arch hypoplasia.

   b. Segmental Instability - Excessive motion, as in degenerative spondylolisthesis, segmental instability, and surgically induced segmental instability.

   c. Primary Mechanical Back Pain/Functional Spinal Unit Failure - Multiple pain generators objectively involving two or more of the following: (i) internal disc disruption (poor success rate if three or more discs are involved but less if fusion is solid), (ii) painful motion segment, such as in annular tears, (iii) disc resorption, (iv) facet syndrome, and/or (v) ligamentous tear.

   d. Three-level spinal fusions are rarely, if ever, indicated for primary low-back pain. It is the committee recommendation that this would rarely, if ever, be authorized, as functional outcomes appear to be poor.

   e. Revision surgery for failed previous operation(s) if significant functional gains are anticipated.

   f. Infection, tumor, or deformity of the lumbosacral spine that cause intractable pain, neurological deficit, and/or functional disability.

3. Pre-operative Surgical Indications: Required pre-operative clinical surgical indications for spinal fusion include all of the following:

   a. All pain generators are adequately defined and treated; and

   b. All physical medicine and manual therapy interventions are completed; and

   c. X-ray, MRI, myelogram/CT, or CT/discography demonstrate disc pathology or spinal instability; and

   d. Spine pathology is limited to two levels; and

   e. Psychosocial evaluation with confounding issues addressed.

   f. For any potential fusion surgery, it is recommended that the injured worker refrain from smoking for at least six weeks prior to surgery and during the period of fusion healing. Because smokers have a higher risk of non-union and higher post-operative costs, it is recommended that insurers cover a smoking cessation program peri-operatively.

4. Operative Therapy: Operative procedures may include: a) Intertransverse Fusion; b) Anterior Fusion - generally used for component of discogenic pain where there is no significant radicular component requiring decompression; c) Posterior Interbody Fusion - generally used for component of discogenic pain where posterior decompression for radicular symptoms also performed; or d) Anterior/posterior (360-degree) Fusion - most commonly seen in unstable or potentially unstable situations or non-union of a previous fusion. This also may be indicated as one technique to increase the surgical fusion rate by fusing both anteriorly within the interbody and posterolaterally, most often combined with spinal instrument fixation.

   Lumbar fusions are limited to no more than two levels without prior authorization.

   a. Post-Operative Therapy A formal physical therapy program should be implemented post-operatively. Active treatment which patients should have had prior to surgery, will frequently require a repeat of the sessions previously ordered. The implementation of a gentle aerobic reconditioning program (e.g., walking) and back education within the first post-operative week is appropriate in uncomplicated post-surgical cases. Some patients may benefit from several occupational therapy visits to improve performance of ADLs. Participation in an active therapy program which includes core stabilization, strengthening, and endurance is recommended to be initiated once the fusion is solid and without complication. The goals of the therapy program should include instruction in a long-term home based exercise program.

   b. Return to Work: Barring complications, patients responding favorably to spinal fusion may be able to return to sedentary-to-light work within 6 to 12 weeks post-operatively, light-to-medium work within 6 to 9 months post-operatively, and medium-to-medium/heavy work within 6 to 12 months postoperatively. Patients requiring fusion whose previous occupation involved heavy-to-very-heavy labor should be considered for vocational assessment as soon as reasonable restrictions can be predicted. The practitioner should release the patient with specific physical restrictions and should obtain a clear job description from the employer, if necessary. Once an injured worker is off work greater than 6 months, the functional prognosis with or without fusion becomes guarded for that individual.

E SACROILIAC JOINT FUSION

1. Description Use of bone grafts, sometimes combined with metal devices, to produce a rigid connection between two or more adjacent vertebrae providing symptomatic instability as a part of major pelvic ring disruption.

2. Complications: Instrumentation failure, bone graft donor site pain, in-hospital mortality, deep infection, superficial infection, and graft extrusion.

3. Surgical Indications: Sacroiliac (SI) joint fusion may be indicated for stabilization of a traumatic severe disruption of the pelvic ring. This procedure has limited use in minor trauma and would be considered only on an individual case-by-case basis. In patients with typical mechanical low back pain, this procedure is considered to be investigational. Until the efficacy of

this procedure for mechanical low back pain is determined by an independent valid prospective outcome study, this procedure is not recommended for mechanical low back pain.

F. IMPLANTABLE SPINAL CORD STIMULATORS are reserved for those low back pain patients with pain of greater than 6 months duration who have not responded to the standard non-operative or operative interventions previously discussed within this document. Refer to section G.1. of the Oklahoma Guidelines for Treatment of Chronic Pain Disorders dealing with neurostimulation

G. INTRADISCAL ELECTROTHERMAL ANNULOPLASTY (IDEA) (more commonly called IDET, or Intradiscal Electrothermal therapy)

1. Description: An outpatient non-operative procedure. A wire is guided into the identified painful disc using fluoroscopy. The wire is then heated at the nuclear annular junction within the disc. Physicians performing this procedure must have been trained in the procedure and certified. Prior authorization is required for IDET.

2. Surgical Indications: Failure of conservative therapy including physical therapy, medication management, or therapeutic injections. Indications may include those with chronic low back pain, disc related back pain, or pain lasting for greater than 6 months. There is conflicting evidence regarding its effectiveness. In one of the most recent studies only approximately 40% of patients had greater than 50% relief of pain. Patients should be aware of these percentages.

   IDET procedures, because of limited success rates, which often are anecdotal, are not recommended by the PAC.

H. LASER DISCECTOMY involves the delivery of laser energy into the center of the nucleus pulposus using a fluoroscopically guided laser fiber under local anesthesia. The energy denatures protein in the nucleus, causing a structural change which is intended to reduce intradiscal pressure. Its effectiveness has not been fully established, and laser discectomy is not recommended by the PAC.

I. ARTIFICIAL LUMBAR DISC REPLACEMENT

1. Description: Involves the insertion of a prosthetic device into an intervertebral space from which a degenerated disc has been removed, sparing only the peripheral annulus. The endplates are positioned under intraoperative fluoroscopic guidance for optimal placement in the sagittal and frontal planes. The prosthetic device is designed to distribute the mechanical load of the vertebrae in a physiologic manner and maintain range of motion.

   General selection criteria for lumbar disc replacement includes symptomatic one-level degenerative disc disease. The patient must also meet fusion surgery criteria, and if the patient is not a candidate for fusion, a disc replacement procedure should not be considered. Additionally, the patient should be able to comply with pre-and-post-surgery protocol.

   The theoretical advantage of total disc arthroplasty is that it preserves range of motion and physiological loading of the disc. This could be an advantage for adults who are physically active. Studies do not demonstrate a long-term advantage of measured function or pain over comparison groups undergoing fusion. The longevity of this prosthetic device has not yet been determined. Significant technical training and experience is required to perform this procedure successfully. Surgeons must be well-versed in anterior spinal techniques and should have attended appropriate training courses, or have undergone training during a fellowship.

2. Surgical Indications:

   a. Symptomatic one-level degenerative disc disease established by objective testing (CT or MRI scan followed by positive provocation discogram)

   b. Symptoms unrelieved after six months of active non-surgical treatment

   c. All pain generators are adequately defined and treated

   d. All physical medicine and manual therapy interventions are completed

   e. Spine pathology limited to one level

f. Psychosocial evaluation with confounding issues addressed.

3. Contraindications:
   a. Significant spinal deformity/scoliosis
   b. Facet joint arthrosis
   c. Spinal instability
   d. Deficient posterior elements
   e. Infection
   f. Previous spinal surgery at a different level
   g. Any contraindications to an anterior abdominal approach (including multiple prior abdominal procedures)
   h. Evidence of nerve root compression, depending on the device used
   i. Previous compression or burst fracture
   j. Multiple-level degenerative disc disease (DDD)
   k. Spinal canal stenosis
   l. Spondylolysis
   m. Spondylolisthesis greater than 3 mm
   n. Osteoporosis or any metabolic bone disease. DEXA - bone-density scanning - may be indicated to determine bone mineral density.
   o. Chronic steroid use or other medication known to interfere with bone or soft tissue healing
   p. Autoimmune disorder
   q. Allergy to device components/materials
   r. Depending on the device selected, pregnancy or desire to become pregnant
   s. Morbid obesity (e.g., body/mass index (BMI) of greater than 40, over 100 pounds overweight)
   t. Active malignancy

4. Post-operative Therapy: A formal physical therapy program should be implemented post-operatively. Active treatment, which patients should have had prior to surgery, will frequently require a repeat of the sessions previously ordered. The implementation of a gentle aerobic reconditioning program (e.g., walking) and back education within the first post-operative week is appropriate in uncomplicated post-surgical cases. Some patients may benefit from several occupational therapy visits to improve performance of ADLs. Participation in an active therapy program which incudes restoration of ROM, core stabilization, strengthening, and endurance is recommended to be initiated at the discretion of the surgeon. Lifting and bending begin within six weeks in uncomplicated cases. The goals of the therapy program should include instruction in a long-term home based exercise program

J. KYPHOPLASTY

1. Description: A surgical procedure for the treatment of symptomatic thoracic or lumbar vertebral compression fractures, most commonly due to osteoporosis or other metabolic bone disease, and occasionally with post-traumatic compression fractures and minor burst fractures that do not significantly compromise the posterior cortex of the vertebral body. Pain relief can be expected in approximately 92% of patients treated, and studies have found there is no correlation between reduction in deformity and the degree of pain relief

2. Operative Treatment: Kyphoplasty involves the percutaneous insertion of a trocar and inflatable balloon or expanding polymer into the vertebral body, which re-expands the body, elevating the

endplates and reducing the compression deformity. Polymethylmethacrylate (PMMA) bone cement is injected under low pressure into the cavity created by the balloon inflation. In contrast to vertebroplasty, which introduces PMMA cement under high pressure, the space created by balloon inflation allows a higher viscosity PMMA to be injected under lower pressure, which may reduce the risks associated with extravertebral extravasation of the material. There may be an advantage to performing the procedure within one month of the fracture, since the elevation of the endplates may be more readily achieved than when the procedure is delayed.

3. Surgical Indication: Kyphoplasty is an accepted treatment for the following indications:
   a. Compression fracture
   b. Vertebral height loss between 20% and 85%
   c. Vertebral height restoration. Kyphoplasty is more likely to increase vertebral height if performed within 30 days of fracture occurrence.
4. Contraindications:
   a. The presence of neurologic compromise related to fracture
   b. High-velocity fractures with a significant burst component
   c. Significant posterior vertebral body wall fracture
   d. Severe vertebral collapse (vertebra plane)
   e. Infection, and
   f. Coagulopathy

K. VERTEBROPLASTY

1. Description: A procedure for the treatment of painful thoracic and lumbar vertebral compression fractures caused by osteoporosis or other metabolic bone disease. Polymethylmethacrylate (PMMA) bone cement is injected with high pressure into the vertebral body via an 11-to-13-gauge needle, with the goal of stabilizing the spine and relieving pain. The procedure does not correct spinal deformity. Pain relief can be expected in approximately 90% of patients.~~.~~
2. Indications:
   a. Compression fracture of preferably less than 30 days.
   b. Vertebral height loss between 20% and 85%.
   c. Intact posterior wall.
3. Contraindications:
   a. The presence of neurologic compromise related to the fracture
   b. High velocity fractures with a significant burst component
   c. Posterior vertebral body wall fracture
   d. Severe vertebral collapse (vertebra plana)
   e. Infection
   f. Coagulopathy

L. PERCUTANEOUS RADIOFREQUENCY DISC DECOMPRESSION is not recommended, as there have been no valid studies to substantiate this.

M. NUCLEUS PULPOSUS REPLACEMENT involves the introduction of a prosthetic implant into the intervertebral disc, replacing the nucleus while preserving the annulus fibrosus. It is limited to investigational use in the United States at this time. It is not recommended.

N. INTRAOPERATIVE MONITORING is a common intraoperative electrodiagnostic technique that may include somatosensory evoked potentials (SSEP), motor evoked potentials (MEP), electromyography (EMG), pedicle screw monitoring. The monitoring procedure may be used to evaluate spinal cord integrity and function during the operative procedure. The use of intraoperative monitoring can be anticipated to become more common as percutaneous spinal procedures gain greater acceptance.