Standard of Care: Operative Management of Spinal Disorders
Inpatient Physical Therapy Management of the patient with a spinal disorder undergoing operative management.

Case Type / Diagnosis: (diagnosis specific, impairment/dysfunction specific)

Practice Pattern: 4F- Impaired Joint Mobility, Motor Function, Muscle Performance, Range of Motion, and Reflex Integrity associated with Spinal Disorders.

ICD-9 Code: Dependent on specific pathology. The diagnoses that are under consideration for this standard of care include, but are not limited to: intervertebral disk disorders, spinal stenosis, spondylolthesis, and fracture of the vertebral column that require surgical intervention as the primary form of medical treatment. Specifically, this standard of care applies to patients with acute post-operative issues or complications that require inpatient hospitalization. Note that patients with associated spinal cord compromise will be excluded from this standard of care.

Indications for Treatment:
The objective for this standard of care is to provide a guideline for therapists treating patients with spinal dysfunction who are undergoing operative management, to assist in the development of a plan of care to facilitate the maximal functional outcome post-operatively.

Contraindications / Precautions for Treatment:
Sources to consult regarding potential contraindications and precautions for treatment:

- Activity order, including:
  - Weight-bearing status
  - Activity restrictions
  - Spinal orthosis requirements—see “Treatment Planning/Intervention” for details regarding prescription of orthosis.

- Signs and symptoms that may indicate a post-operative complication, new pathology, and/or spinal instability, such as: new onset urinary or bowel urgency/incontinence, ascending paresthesias, new onset of weakness, severe/intractable pain or headache, abnormal discharge or drainage from operative site, or new upper motor dysfunction such as a positive Babinski, new clonus, or spasticity. If the patient presents with any of these new signs and symptoms, it is the responsibility of the physical therapist to have a discussion with the MD or PA regarding the appropriateness of PT evaluation or intervention and any consequent activity restrictions in light of these new findings.
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Examination:

- **Medical History**: Review past medical/surgical history reported in the chart.

- **History of Present Illness**: Review pertinent diagnostic imaging, laboratory workup and other tests that lead to the current diagnosis and decision to pursue surgical management. Inquire about presenting signs and symptoms, including: type, duration, impact on function, and prior management of symptoms if applicable.

- **Hospital Course**: Review the type of surgery (see brief operative note in chart and/or detailed report of surgical procedure in BICS if available), as well as any remarkable intra-operative and post-operative events.

- **Social History**: Inquire regarding occupation, prior functional level, use of assistive devices, home environment setup, family and caregiver support system, and patient goals.

- **Medications**: Review current pharmacological management of the spinal dysfunction or any comorbidities. Common medications used in the management of patients following spinal surgery may include, but are not limited to: anti-inflammatory agents (i.e. ASA, NSAID’s, glucocorticosteroids), narcotic/opioid analgesics (i.e. Morphine, MS Contin, Meperidine, Oxycodone, Percocet, Fentanyl), non-opioid analgesics (i.e. Acetaminophen, Tramadol, Neurontin), muscle relaxants (i.e. Baclofen, Diazepam, Cyclobenzaprine), and anticoagulants/antiplatelet therapy for DVT prophylaxis.

Examination (Physical / Cognitive / applicable tests and measures / other)
This section is intended to capture the minimum data set and identify specific circumstance(s) that might Require additional tests and measures.

Systems Review

- **Cardiovascular/Pulmonary**: Blood pressure, edema, heart rate, respiratory rate, and oxygen saturation.

- **Integument**: Skin color and integrity, including observation of surgical incision, noting any discoloration or drainage from the operative site.

- **Musculoskeletal**: Gross assessment of ROM, strength, and symmetry (including UE’s, LE’s, trunk).

- **Neuromuscular**: Gross assessment of coordination of functional movements.

- **Communication, Affect, Cognition, Language and Learning Style**: Level of arousal/alertness, orientation (person, place, time), ability to make needs known, learning preferences.
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Tests and Measures

1. **Pain:** Assess patient’s subjective reports of pain including: location of pain (localized to surgical site versus radiating), type of pain (i.e. sharp, burning, etc.), and severity (using 0-10 verbal or visual analog scale). Note changes in pain with position changes and functional mobility.

2. **Muscle Performance (Including Strength, Power, and Endurance):** Assessment via manual muscle testing of UE, LE, and trunk musculature. Please refer to Appendix 1 for myotomes to be considered during UE and LE strength testing.

3. **Range of Motion:** P/AA/AROM assessment of extremities via observation during functional activities. Abnormalities or deficiencies that may impact function should be noted and measured more specifically via goniometry.

4. **Sensory Integrity:** Assess patient’s light touch perception, ability to discriminate sharp/dull, proprioception, and kinesthesia. Please refer to Appendix 1 for dermatomes to be considered during sensory testing.

5. **Gait, Locomotion, and Balance:**
   - Gait or locomotion (i.e. wheelchair mobility) during functional activities with or without an assistive, orthotic, protective, or supportive device. Note distance ambulated, gait pattern, presence of gait abnormality, use of device, and level of assist on both level surfaces and stairs.
   - Balance during functional activities with or without an assistive, orthotic, protective, or supportive device. Common balance assessments may include: Romberg, tandem stance, unilateral stance, or functional balance tools (i.e. Berg, Tinetti, Dynamic Gait Index).
   - Safety during gait or locomotion assessed via PT observation and patient report.

6. **Posture:**
   - Lateral View: cervical, thoracic, lumbar alignment
   - Anterior View: shoulder, pelvis, and knee position
   - Posterior View: scapular position, presence/absence of scoliosis, and foot position

7. **Aerobic Capacity and Endurance:** Assess via patient report of rate of perceived exertion (RPE) on 0-10 VAS or 6-20 Borg scale during functional activities.

8. **Orthotic, Protective, and Supportive Devices:** Assess components, alignment, fit, and ability to care for spinal orthosis. The initial fitting will be performed by the orthotist, typically with the PT present for initial evaluation and mobility training in brace. Thereafter, the PT should continually reassess above factors and seek the orthotist’s input if modifications need to be considered. Assess level of assist needed to don/doff brace.
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Additional Functional Mobility Considerations:
1. Bed mobility: Note level of assistance needed, angle of the head of bed, use of bedrails, and technique used.
2. Transfers: Note level of assistance and device, if needed.

Evaluation / Assessment:

Establish Diagnosis and Need for Skilled Services

Problem List (Identify Impairment(s) and/or dysfunction(s)):
1. Pain
2. Impaired muscle performance (including strength, power, and endurance)
3. Impaired sensory integrity
4. Impaired ROM
5. Impaired aerobic capacity and endurance
6. Impaired balance
7. Impaired posture
8. Impaired gait
9. Impaired integumentary integrity (surgical incision) or potential for impaired integumentary integrity (use of spinal orthosis that may lead to skin breakdown).
10. Knowledge deficit regarding use of proper body mechanics during functional activities and use of logroll for bed mobility.
11. Knowledge deficit regarding management of spinal orthosis (donning/doffing procedures, wearing schedule).

Functional Limitations and disabilities:
1. Decreased independence in bed mobility.
2. Decreased independence in transfers.
3. Decreased independence with ambulation on level surfaces.
4. Decreased independence with ambulation on stairs.
5. Decreased ability to perform tasks that require bending or heavy lifting.
6. Decreased ability to tolerate static positions for a prolonged period of time, including sitting and standing.
7. Decreased independence in basic and instrumental activities of daily living.

Prognosis

Over the course of 1 to 6 months, the patient will demonstrate optimal joint mobility, motor function, muscle performance, and range of motion and the highest level of functioning in home, work, community and leisure environments. Within this broad
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timeframe, factors that may affect the prognosis positively or negatively include: age, specific pathology, chronicity or severity of the condition, type of surgical intervention, presence of post-operative complications, comorbidities, secondary impairments, barriers to learning, and barriers to reentrance to the home environment or community. Should post-operative complications (i.e. wound infection) occur, this timeframe may be extended.

Goals (with measurable parameters and with specific timelines):

Within 7-10 days, the patient will:
1. Perform bed mobility using log roll technique with least amount of assist.
2. Perform transfers, with device if needed, with least amount of assist.
3. Ambulate household and short community distances, with device if needed, with least amount of assist.
4. Ascend/descend one flight of stairs, with device if needed, with least amount of assist.
5. Independently utilize strategies for pain management.
6. Demonstrate knowledge of proper body mechanics with functional tasks.
7. Verbalize understanding of post-operative activity orders/precautions, including spinal orthosis wearing schedule as per MD orders if appropriate.
8. Demonstrate proper donning/doffing technique for spinal orthosis with least amount of assist.

Age Specific Considerations

As with all patients, normal physiologic changes that occur with aging should be considered when assessing patient impairments, functional limitations, and disabilities. These include: changes in posture, balance, sensorimotor systems (visual, auditory, vestibular, reflexes, reaction time), cognition (memory and learning, executive functioning). These factors should be considered on an individualized basis when formulating the assessment, prognosis, and rehabilitation plan for each patient. Please refer to Geriatric Physical Therapy (2nd edition) for further details of age-related changes and considerations.

Treatment Planning / Interventions

Established Pathway _X_ Yes, see attached. (Appendix 2) ___ No
Established Protocol ___ Yes, see attached. _X_ No
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Interventions most commonly used for this case type/diagnosis.
This section is intended to capture the most commonly used interventions for this case type/diagnosis. It is not intended to be either inclusive or exclusive of appropriate interventions.

Once possible contraindications to treatment have been ruled out, physical therapy intervention can proceed, taking into consideration the patient’s medical status, activity orders/restrictions, and spinal orthosis requirements. Common interventions for this case type are as follows:

Therapeutic Exercise:
1. Strength, power and endurance training for affected extremity and trunk muscle groups, incorporating active assistive, active, and resistive exercises as appropriate.
2. Gait and locomotion training.
3. Body mechanics and postural stabilization activities.
4. Aerobic capacity/endurance conditioning or reconditioning with emphasis on progressive OOB mobility/ambulation.
5. Flexibility exercises, incorporating stretching and ROM as appropriate.
6. Relaxation exercises, including: breathing strategies, movement strategies, and relaxation techniques.

Functional Training in Self-Care and Home Management:
1. ADL training, with focus on bed mobility and transfer training.
2. Instruction in donning/doffing spinal orthosis, incorporating training of caregivers/family members as needed.
3. Instruction in injury prevention/reduction with the use of assistive devices and/or spinal orthosis during self-care tasks.

Prescription, Application, and, as Appropriate, Fabrication of Devices and Equipment (Assistive, Adaptive, Orthotic, Protective):
1. Prescription of assistive devices as needed (i.e. canes, crutches, long-handled reachers, static and dynamic splints, walkers, wheelchairs).
2. Orthotic/Protective devices:
   - Check first to see if the patient was measured/fit for a brace pre-operatively, or if they have a brace already that the physician has approved for use post-operatively.
   - If neither of the above applies, a new order for a spinal orthosis is necessary. Orders for the specific type of spinal orthosis should be placed in the PT consult. See Appendix 3 for Spinal Orthoses Specifications.
   - Check appropriateness of the ordered brace based on:
     - Type of surgery.
     - Spinal levels involved.
     - Amount of stabilization needed (complete immobilization vs. postural support/comfort only).
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- Clarify orders with physician, physician’s assistance, or nurse practitioner as needed, and obtain specifics regarding:
  - Positioning for donning/doffing brace (supine vs. sitting vs. standing).
  - Wearing schedule, including:
    - On at all times vs. for OOB only.
    - On for bathing vs. able to remove for shower/bathing.

Physical Agents and Mechanical Modalities: In a small percentage of patients with particular difficulty controlling post-operative pain and/or spasm, physical agents or modalities may be included in treatment. If cleared by MD, these may include: cryotherapy (cold packs, ice massage), and/or thermotherapy (hot packs).

Frequency & Duration

The frequency and duration of physical therapy intervention on an inpatient basis will be based on the patient’s impairments and functional limitations. The BWH Guidelines for Frequency of Physical Therapy Patient Care in the Acute Care Setting are available to assist the therapist in determining the appropriate frequency of treatment based on the patient’s impairments and functional limitations.

The Guide to Physical Therapy Practice states that a range of 8 to 24 visits represents the lower and upper limits of the number of PT visits required to achieve the anticipated goals and outcomes for patients in this practice pattern. Note this total number of visits encompasses the number of PT visits along the continuum of care and may include PT visits in all settings (i.e. inpatient rehab, outpatient, home).

Patient / family education

The patient and caregivers/family should receive education and training focusing on:
- Current condition, impairments, and functional limitations.
- The role of the physical therapist in the acute care setting and, if applicable, in the rehab, home care, or outpatient settings in which the patient is to receive further care.
- The PT plan of care.
- The use of proper body mechanics (i.e. lifting, logrolling for bed mobility) with daily activities to minimize strain on the spine and prevent re-injury.
- Proper use and care of assistive devices, adaptive equipment, and spinal orthoses.
- Pacing and post-operative activity progression.
- Home therapeutic exercise programs as applicable.
Written instructions should be provided whenever possible to reinforce teaching. Written materials available within the department to facilitate patient/family education include:

- Instructions for use of spinal orthoses (Clamshell, Clamshell with Minerva Extension, Boston Overlap Brace, Thoracic Corset, Warm and Form, Miami J, Philadelphia Collar)
- Managing Back Pain: Daily Activities Guide for Back Pain Patients
- Manual Para El Cuidado Del Cuello
- Back Tips for People Who Sit
- Sex and Back Pain

**Recommendations and referrals to other providers**

1. **Occupational Therapy**: Indicated if a patient presents with impairments that affect his or her ability to perform activities of daily living independently and/or if they demonstrate the need for adaptive equipment.

2. **Speech Language Pathology**: May be indicated if a patient demonstrates impairments that affect their ability to communicate or to swallow effectively.

3. **Care Coordination**: Indicated if the patient demonstrates the need for continued services (i.e. PT, OT, nursing) beyond the acute care setting, and/or in the case of complicated discharge plans.

4. **Social Worker**: May be indicated for patients with difficulty returning to work or social roles, or those patients facing financial or insurance issues that may impede accessibility of necessary resources.

5. **Orthopedic Technician**: Indicated for patients with certain bracing or support needs, including: cervical soft collars, Miami J collars, Philadelphia collars, or orthomold (warm and form) lumbar supports.

6. **Orthotist**: Indicated for patients with custom-fit and more specialized bracing needs (i.e. Clamshell, Boston Overlap Brace). See above for specifics regarding spinal orthosis prescription. Note, any brace adjustments must be performed by the orthotist who originally provided the brace.
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Re-evaluation / assessment

Re-examination is to be performed at least every 10 days after the initial examination to assess progress and to modify the intervention program if necessary. Re-evaluation may also be performed if there is a significant change in status, presence of new clinical findings, failure to respond to physical therapy intervention, if the patient is discharging to home or to another facility, and/or if the physical therapy goals have been met.

Discharge Planning

The team, which typically includes the physician, PT, OT, care coordination and, in some cases, social work, will collaborate with the patient and the patient’s family/caregivers to develop the discharge plan. It will be a highly individualized, taking into account the patient’s specific medical, physical, and social needs.

If the patient is appropriate to discharge from the inpatient acute care facility, but has medical, physical or social needs that require further attention on an inpatient basis, the patient may require discharge to an extended care facility (i.e. acute or subacute rehabilitation center). For patients who are appropriate for discharge home, a discharge plan will be devised either without continued services, or if necessary, with continued PT services on a home or outpatient basis.
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Appendix 1

Cervical and Lumbar Spine Neurological Screen

<table>
<thead>
<tr>
<th>Neurological Level</th>
<th>Motor</th>
<th>Dermatome</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1-C2</td>
<td>Neck Flexion</td>
<td>Occiput</td>
</tr>
<tr>
<td>C3-C4</td>
<td>Shoulder Elevation</td>
<td>Supraclavicular</td>
</tr>
<tr>
<td>C5</td>
<td>Shoulder Abduction</td>
<td>Lateral Deltoid</td>
</tr>
<tr>
<td>C6</td>
<td>Wrist Extension</td>
<td>Radial Forearm</td>
</tr>
<tr>
<td>C7</td>
<td>Wrist Flexion</td>
<td>Middle Finger</td>
</tr>
<tr>
<td>C8</td>
<td>Thumb Abduction</td>
<td>Ulnar Forearm</td>
</tr>
<tr>
<td>T1</td>
<td>Finger Abd/Add</td>
<td>Medial Elbow</td>
</tr>
<tr>
<td>L1-L2</td>
<td>Hip Flexion</td>
<td>Groin</td>
</tr>
<tr>
<td>L3-L4</td>
<td>Knee Extension</td>
<td>Anterior Thigh</td>
</tr>
<tr>
<td>L4</td>
<td>Ankle DF</td>
<td>Medial Leg/Foot</td>
</tr>
<tr>
<td>L5</td>
<td>Great Toe Extension</td>
<td>Dorsum of Foot</td>
</tr>
<tr>
<td>S1</td>
<td>Foot Eversion</td>
<td>Lateral Foot</td>
</tr>
<tr>
<td>S2</td>
<td>Ankle PF</td>
<td>Posterior Calf</td>
</tr>
</tbody>
</table>
Standard of Care: Operative Management of Spinal Disorders

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Appendix 2

<table>
<thead>
<tr>
<th>Brigham &amp; Women's Hospital: Plan for Stay for NSU Spine Surgery Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Day of Surgery</strong></td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Physical Status</td>
</tr>
<tr>
<td>Maintains optimal neurological function</td>
</tr>
<tr>
<td>Maintains effective airway</td>
</tr>
<tr>
<td>Hemodynamically stable</td>
</tr>
<tr>
<td>Appropriate diet as tolerated</td>
</tr>
<tr>
<td>Activity</td>
</tr>
<tr>
<td>Effective cough and airway clearance</td>
</tr>
<tr>
<td>Appropriate collar/brace ordered</td>
</tr>
<tr>
<td>Emotional Support</td>
</tr>
<tr>
<td>Pt/Fam free of anxiety and confusion regarding surgery and postoperative course</td>
</tr>
<tr>
<td>Pt/Fam education initiated</td>
</tr>
<tr>
<td>Pt/Fam education initiated</td>
</tr>
<tr>
<td>Pt/Fam discuss expected LOS/discharge plan</td>
</tr>
<tr>
<td>Pt/Fam planning for 10AM discharge in 24 hrs</td>
</tr>
<tr>
<td>Pt/Fam planning for discharge plan</td>
</tr>
</tbody>
</table>
# Appendix 3

**ORTHOSSES SPECIFICATIONS**

**DEPARTMENT OF REHABILITATION SERVICES**

<table>
<thead>
<tr>
<th>SPINAL BRACE</th>
<th>PURPOSE</th>
<th>LEVELS SUPPORTED</th>
<th>WHO FITS</th>
<th>SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLAMSHELL BRACE WITH CERVICAL ATTACHMENT (CTLSO)</td>
<td>STABILIZES SPINE</td>
<td>C1 TO S1</td>
<td>ORTHOTIST</td>
<td>24 HOUR FOR DELIVERY (OFTEN MEASURED SAME DAY)</td>
</tr>
<tr>
<td>CLAMSHELL BRACE W/ THIGH (SPICA) ATTACH.</td>
<td>STABILIZES SPINE, MINIMIZES ROTATIONAL STRESSES ON SACRAL &amp; PELVIC REGIONS</td>
<td>T5 TO S1</td>
<td>ORTHOTIST</td>
<td>24 HOUR FOR DELIVERY</td>
</tr>
<tr>
<td>CLAMSHELL (TLSO)</td>
<td>STABILIZES SPINE</td>
<td>T5 TO S1</td>
<td>ORTHOTIST</td>
<td>24 HR. FOR DELIVERY</td>
</tr>
<tr>
<td>CHAIRBACK BRACE</td>
<td>SMALL AMOUNT STABILIZATION</td>
<td>LOW THORACIC/ LUMBAR</td>
<td>ORTHOTIST</td>
<td>24 HR. FOR DELIVERY</td>
</tr>
<tr>
<td>BOSTON OVERLAP BRACE (BOB)</td>
<td>STABILIZES SPINE</td>
<td>T11 TO S1</td>
<td>ORTHOTIST</td>
<td>24 HR. FOR DELIVERY</td>
</tr>
<tr>
<td>JEWETT &amp; CASH BRACE</td>
<td>3 POINT PRESSURE SYSTEM THAT HYPEREXTENDS SPINE TO DECOMPRESSES ANTERIOR COMPRESSION FRACTURES</td>
<td>LOW THORACIC AND LUMBAR SPINE</td>
<td>ORTHOTIST</td>
<td>PREFAB, SAME DAY FIT</td>
</tr>
<tr>
<td>SOFT TLSO CORSET WITH STAYS</td>
<td>MUSCULAR SUPPORT, COMFORT MINIMAL STABILIZATION</td>
<td>SUPPORTS THORACIC AND LUMBAR SPINE</td>
<td>ORTHOTIST</td>
<td>PREFAB, SAME DAY FIT</td>
</tr>
<tr>
<td>SOFT CORSET WITH INSERT (SEVERAL BRANDS)</td>
<td>PROVIDES MUSCULAR SUPPORT AND COMFORT. DOES NOT PROVIDE SPINE STABILITY</td>
<td>LUMBOSACRAL OR THORACO-LUMBAR AVAL.</td>
<td>ORTHOTECH THERAPIST</td>
<td>SAME DAY FITTING</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NECK BRACE</th>
<th>PURPOSE</th>
<th>LEVELS SUPPORTED</th>
<th>WHO FITS</th>
<th>TIME FRAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>HALO</td>
<td>STABILIZES UNSTABLE CERVICAL SPINE</td>
<td>ENTIRE CERVICAL SPINE</td>
<td>PHYSICIAN</td>
<td></td>
</tr>
<tr>
<td>MINERVA &amp; SOMI BRACE</td>
<td>STABILIZES C-SPINE, ALSO USED TO IMPROVE POSTURE IN UPPER THORACIC SPINE</td>
<td>C1 TO T1 (PER MANUFACTURER)</td>
<td>ORTHOTIST</td>
<td>PREFAB, SAME DAY FIT</td>
</tr>
<tr>
<td>MIAMI JTO</td>
<td>MIAMI-J COLLAR WITH THORACIC EXTENSION, STABILIZES C-SPINE, WORKS WELL WITH KYPHOTIC PATIENTS</td>
<td>C1 TO T1 (PER MANUFACTURER)</td>
<td>ORTHOTIST</td>
<td>PREFAB, SAME DAY FIT</td>
</tr>
<tr>
<td>MIAMI-J COLLAR &amp; PHILADELPHIA COLLAR</td>
<td>COMFORT WITH INCREASED SUPPORT</td>
<td>BEST AT C1 TO C5</td>
<td>ORTHOTECH THERAPIST</td>
<td>PRE FAB, SAME DAY FIT</td>
</tr>
<tr>
<td>SOFT COLLAR</td>
<td>COMFORT ONLY</td>
<td>NONE</td>
<td>ORTHOTECH THERAPIST</td>
<td>PREFAB, SAME DAY FIT</td>
</tr>
</tbody>
</table>
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Reference List

1. BWH Department of Rehabilitation Services Physical Therapy Standard of Care: General Surgery.
2. BWH Department of Rehabilitation Services Outpatient Physical Therapy Evaluation Form: Lumbar and Cervical Spine.

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Reviewed by: Merideth Donlan, PT; Joel Fallano, PT, 3/05

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