About This Curriculum

• It is the responsibility of both the resident and the attending to go over the goals and guidelines included in this handbook
  
  o At the beginning of the rotation
  o At the conclusion of the rotation

• Additional materials and/or service handbooks may be provided by the attendings at the beginning of the rotation
ORTHOPEDIC SPINE SERVICE GUIDELINES

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Schedules

<table>
<thead>
<tr>
<th>Dr. Lakatos</th>
<th>Dr. Wisneski</th>
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<tbody>
<tr>
<td>Monday: Spine clinic – Kenny Rd.</td>
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<td>Tuesday: OR at OSU East or Grant</td>
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<td>Wednesday: OR at OSU Main or Grant</td>
<td>Wednesday: TBD</td>
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<td>Thursday: OR at OSU East or Grant</td>
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<td>Friday: am – Clinic</td>
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<td>Pm - Conferences</td>
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Please consult individual attendings for weekly variations in the hourly clinic schedule.

Rounds

Rounds on operative cases at OSU East are essential for understanding the postoperative patient care requirements. Therefore, the resident is expected to round every day at OSU East and/or OSU Main.

Conferences

Didactic Spine conferences will be incorporated into the Friday conference schedule.
Weekly Multidisciplinary Spine Conference- Thursday 10 AM@ 10th Floor Doan Hall, Rm#
Spine Journal Club- bimonthly as scheduled.

Physician’s Assistants on the service
Physician’s Assistants can be a valuable source of information regarding future weekly schedules, the peri-operative care routine and in coordinating inpatient care and discharge plans. They will help greatly in lightening the burden of administrative duties that are non-educational.

P.A.’s may also assist in coordination of rounds and inpatient care at OSU Main Hospital. However, you will enter orders via the CAPI system and dictate discharge summaries as required for inpatients at OSU Main acquired through spine call.

Initial postoperative care and discharge orders are covered by a set of preprinted postoperative orders. The physician’s assistant may complete these. Please carefully review these in addition to the orders and note during daily rounds to maintain the highest awareness of care provided for our patients.

GENERAL CARE GUIDELINES FOR THE PATIENT WITH LOW BACK AND NECK SYNDROMES:

It is important to understand that patient care decision-making is a part of the global algorithm of care that is based more on the presenting clinical syndrome than on the pathologic changes identified on the MRI scan. The AHCPR guidelines from 1994 are a good starting point in developing a structured care plan and are included on the “OSU Spine Classics” DVD. Please review the algorithms contained on this disc and the “Physical Examination of the Spine” handout. Thereafter- **ASK Questions!**

Key points in the algorithm:

The most important job in the initial evaluation and management of a new patient presenting with an acute problem (or even subacute or chronic problem) is to exclude other pathologic entities, most importantly tumor and infection, through the history, exam and supplemental study. Know the red flag symptoms for tumor, infection, fracture and cauda equina syndrome.

Following the exclusion of those more worrisome pathologic entities, the treatment algorithm is based on the specific syndrome that depends on pain duration, pain location, and the presence or absence of neurologic impairment detected by motor reflex, sensory exam and EMG.

In the absence of red flags, advanced imaging is usually delayed for at least 4 weeks, even in the presence of clinically apparent lumbar disk herniation. Beyond that point, surgical intervention may be offered for the syndrome that includes radicular pain and detected neural impairment, if neural compression is identified on imaging. For others, particularly those with predominantly local back or neck pain, surgery is generally best-deferred and palliative measures and non-operative measures instituted for the first 3 months. These delays are warranted to allow for improvement without surgery, which is the usual case.

Appropriate imaging such as MRI is relevant in the patient’s care to define the specific pathoanatomic entity likely corresponding to the specific clinical syndrome, based on the pain location, exam and time duration. But this should not be in the initial evaluation protocol, in the absence of red flags, as there are many asymptomatic abnormalities seen in the MRI’s and CT’s of “normal” people, and such findings frequently detract from the usual appropriate optimism for the success of non-operative care. Timing of imaging is dependent upon the specific presenting syndrome: typically immediately for those with red flags, 4 weeks for those with radicular syndromes with neurologic findings, and 3 months for others.
OSU Spine Learning Objectives

GENERAL EDUCATIONAL GOALS

At the completion of this rotation the resident should be able to:

1. “Cure sometimes, heal often and comfort always”- Ambrose Pare
2. Be familiar with the principles and practice of spinal surgery.
3. Be proficient in the examination and management of spine surgery patients.
4. Be proficient and knowledgeable in the discussion of the patients from the initial hospital visit through surgical managements and postoperative recuperation and follow-up.
5. To acquire a practical field of knowledge concerning spinal disorders, including knowledge of basic science, anatomy, physiology, and biomechanics of the spine and an understanding of how to apply this information clinically. Those disorders that affect the spine including: congenital, infections, inflammatory, developmental, metabolic, degenerative, neoplastic, traumatic and deformities will be covered in detail, whether they occur in the cervical, thoracic, or lumbosacral spine. Additional time will be spent studying spinal cord injuries.
6. To understand the appropriate methods for a thorough history and physical examination of the spinal patient.
7. To understand the appropriate clinical and diagnostic methods for evaluation of patients with acute or chronic low back pain, i.e. a working knowledge of such spinal disorders as: all types of disc disorders, spinal stenosis, fractures/dislocations, deformities and the “failed low back”.
8. To gain knowledge of interpretive tests relating to spinal disorders including: plain x-rays, CAT scans, myelograms, discography, electrodiagnostic testing and MRI.
9. To gain an appreciation for the management of these patients using nonoperative (medications, therapy, orthotics, etc.), as well as operative means (perioperative and surgical management).
10. To participate directly in the care of patients in the office or clinic setting and in the hospital. To follow patients through initial assessment, evaluation, workup, surgery, post-operative care and followup.

SPECIFIC DUTIES AND RESPONSIBILITIES
The resident physician is expected to:

1. To work directly with and under the direction of the faculty of the Ohio State University Orthopaedic Department.
2. To work toward the accomplishment of the aforementioned goals through readings, deliberation, thoughtful questioning and physical participation in the care of patients.
3. To prepare appropriate cases for presentation at Spine Conference on a regular and frequent basis and Grand Rounds cases once a month.
Goals and Objectives for the Spine Service

At the completion of their rotation on the spine service the resident should be able to:

1. Evaluate and manage patients with spinal pathology including the ability to examine the spine as well as central and peripheral nervous system, interpret spinal imaging modalities and prioritize a spine intervention.
2. Understand patient selection and indications for operative and nonoperative management of spinal problems in the outpatient clinic and emergency department.
3. Develop an understanding of various spinal implants, their indications and usage in operative techniques.
4. Acquire the initial understanding of technical skills that would include and achieve goals of decompression, instrumentation and stabilization of the cervical, thoracic and lumbar spine. The PGY2 and PGY4 level residents are not expected to become surgically independent in spinal operations.
5. Recognize and treat complications of spinal surgery or conservatively managed conditions.
6. Develop an understanding of the diagnosis and management of such conditions as:
   - Degenerative disc disease
   - Herniated nucleus pulposus with radiculopathy
   - Spinal Stenosis
   - Spondylolysis and Spondylolisthesis
   - Ankylosing Spondylitis and Diffuse Idiopathic Skeletal Hyperostosis (DISH)
   - Rheumatoid arthritis (especially cervical spine involvement)
   - Spinal tumors
   - Spinal Infections
7. Develop an understanding of the pathophysiology, conservative treatment and indications for operative treatment of idiopathic scoliosis, scoliosis related to neuromuscular disease and adult scoliosis.
8. Diagnosis of spinal trauma including recognition from routine imaging, classification of the fracture or dislocation and differentiation of complete and incomplete cord injuries, cauda equina syndrome and nerve root injury and be able to formulate a treatment plan.
9. Understand the indications for and appropriately ordered spinal orthotics.
10. Develop an understanding of other treatment modalities for patients with chronic, mechanical, axial neck and back pain.
OSU Spine Learning Objectives

Miscellaneous:

1. The usual rules that apply to resident activities regarding vacation and leave time apply to this rotation.
2. The resident may elect to participate in a project related to spinal disorders.
3. A strong emphasis will be placed on the learning of the aforementioned principles in adults but the resident will also be expected to demonstrate a functional knowledge of how these principles apply to all patients with spinal disorders.
4. The resident may elect to spend a portion of the rotation working on a basic science research project regarding the spine under the supervision of the Ohio State University faculty.
5. Night call duty for the residents will be assigned by the office of the Residency Program Director, the resident should be ready and available to participate with spinal fractures on the occasional emergency case, or to help out where appropriate.
6. The resident’s performance evaluation will be conducted by the spine faculty of the Ohio State University and forwarded to the Department Chairman of Orthopaedics at the completion of the rotation.
7. The PGY3 resident will participate in this three-month rotation and a PGY4 may elect to participate as well.

Rotation Description:
This rotation is designed for a PGY-2 and PGY-4 resident to participate in a two-month block during which they will interact with faculty members of the Department of Orthopaedic Surgery and learn how to evaluate all types of spinal disorders. Residents receive instruction in obtaining pertinent history, performing a complete physical examination, formulating a differential diagnosis, making decisions on when to order the appropriate diagnostic studies and recommending treatment. The resident will see patients in the office, follow them through their hospital course, and follow them during their recuperative period as much as possible. By the completion of this block of time, the resident should be able to evaluate patients thoroughly and determine which diagnostic studies are indicated and when. The resident should also be able to understand the various treatment options and when surgery is indicated. He is expected to participate in surgery during which time he will become familiar with the surgical anatomy of the spine, the various approaches, and proper techniques of exposure. The resident will work under direct supervision in the operating room at all times. He will also become familiar with the postoperative management of these patients.

Conferences:
The resident will be expected to participate in conferences at the University and be able to present cases relating to spinal disorders in a logical and cohesive fashion. The weekly Spine Conference at the OSU Spine Center is an opportunity for presentation of patients and the discussion of indications for surgery as well as a time for more in-depth discussions of spinal topics. The resident may also be asked to participate in a clinical study at the Ohio State University Medical Center.
### The Ohio State University Medical Center

**Department of Orthopaedic Surgery**

**Spine Learning Objectives**

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<th>Evaluation</th>
<th>PGY – 2 and PGY-4 Rotations</th>
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<th><strong>Patient Care</strong></th>
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<td>Faculty will evaluate the resident’s ability to obtain an H &amp;P and appropriate radiographs and formulate a treatment plan. Will be evaluated on a regular basis in the outpatient clinic when resident is given the opportunity to present at least 3 new and follow-up patients and formulate a treatment plan.</td>
<td>Able to perform a comprehensive history and physical examination for a patient seen in the Spine clinics and in the emergency room. A complete history includes recording the chief complaint, history and detailed mechanism of injury if any, occupational requirements and hobbies, past medical and surgical history, medications and social history. The physical exam should include an exam for identification of the main categories of problems: (&quot;TAMING MNEMONIC&quot;)</td>
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<td>In the operating room resident’s familiarity with the patient, indications for surgery and postoperative plan after surgery will be reviewed by the faculty.</td>
<td>Possesses a working knowledge of the various conditions – the etiology and the natural history with and without surgical treatment.</td>
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Effectively able to evaluate the following conditions via a thorough H&P:

1) disc disorders
2) spinal stenosis
3) fractures/dislocations
4) deformities
5) the “failed low back”
6) spinal cord injury
7) spondylosis
8) instability

Effectively communicates the history taken from the patient and/or family in a succinct and systematic fashion

Effectively communicates and demonstrates respectful and caring behavior when interacting with patients, their guardians and their families

Competent in developing initial management plan including specialized investigations for patients with hand complaints such as MRI scans, bone scans, CT or electrophysiological studies

Competent in assuming responsibility for specifically inquiring about the presence or absence of relevant systemic disease depending upon the condition being evaluated – such as diabetes mellitus, hypothyroidism, polyarthritis, liver disease

**TAMING MNEMONIC**

1) Traumatic
2) Arthritic/degenerative
3) Metabolic
4) Inflammatory/Infections
5) Neoplastic
6) Genetic/Congenital
| Patient Care (cont.) | Demonstrates knowledge and application of knowledge of non-operative treatment modalities including medical therapy such as anti-inflammatories, prescription of appropriate physical therapy, and bracing  
Demonstrates understanding and ability in commonly encountered surgical procedures in spine surgery such as disc excision, decompression, arthrodesis, instrumentation, and internal fixation  
Demonstrates facility in positioning the patient in the operating room, appropriate prepping and draping of the patient, and the appropriate application of a postoperative dressing in a functional or protective position as per the procedure performed  
Able to apply knowledge of the basics of postoperative therapy to patient care  
Demonstrates the ability to practice culturally competent medicine  
Able to use information technology such as data from current clinical studies as well as information from current journals to support patient care decisions and patient education  
Able to work with other health care professionals from various disciplines to provide complete patient-focused care |
| Medical Knowledge | Demonstrates knowledge of relevant history and physical exam findings and lab results for patients on whom surgical treatment is being planned  
1. Possesses understanding of the scientific basis of diagnosis and treatment of commonly encountered surgical conditions, such as disc disorders, spinal stenosis, fractures/dislocations, deformities and the “failed low back”  
Demonstrates knowledge of the indications for basic spine surgical procedures  
Demonstrates knowledge of non operative treatment (anti-inflammatories, therapy, application of heat and cold as well as basics of orthotic management) including application of tongs and traction  
Demonstrates understanding of anatomy of the spine through active participation in the Anatomy dissection sessions  
Demonstrates basic understanding of the classic and contemporary literature pertaining to surgery of the spine through self-guided study and active participation in the Journal Club  
Demonstrates knowledge of the basics of postoperative therapy |
Able to accurately locate, appraise and assimilate evidence from scientific studies relating to the patient’s surgical problem. This requires knowledge of the pertinent recent literature, as may be obtained from the American and British Journal of Bone and Joint Surgery, and the journal Foot and Ankle
Demonstrates facility in the critical reading of a manuscript, notably those from the Spine journal through active participation in the service’s Journal Club
Demonstrates facility at using on-line search engines, such as MEDLINE, to locate and access appropriate educational materials and peer review reference articles relevant to patient care
Successfully maintains a record of all operative cases via the resident operative log via the ACGME website |
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<td>Participate at conferences and journal clubs to demonstrate awareness of background and recent advances in common surgical procedures and surgical principles and indications. An exit interview will be conducted along with a review of the operative log at the start and completion of the rotation.</td>
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| Interpersonal & Communication Skills | Demonstrates communication skills that result in an effective information exchange with patients, their families and caregivers, and other physicians and members of the health care team
Creates and sustains a therapeutic and ethically sound relationship with patients and their families
Able to effectively use listening skills in communication with all parties involved in patient care
Able to work effectively with other members of the team, specifically medical assistants, medical specialists, Nurses and therapists |
| **Professionalism** | Demonstrates a commitment to carry out professional responsibilities, an adherence to ethical principles and standards and a sensitivity to the diverse patient population from all over the state  
Demonstrates professionalism and a responsiveness to a patient’s sensitivity to age, culture and gender  
Understands and demonstrates the ability to obtain an informed consent from a patient which includes the presentation of the natural history of both surgical and non-surgical care of the patient’s condition  
Demonstrates an understanding of the value of patient confidentiality  
Demonstrates sensitivity to the culture, age, gender and disabilities of fellow health care professionals  
Demonstrates appropriate conduct in the timely completion of the dictated notes, chart operative summaries and discharge summaries as well as clinic notes |
|---|
| **Systems-Based Practice** | Demonstrates an understanding of how their patient care and other professional practices affect other care professionals and the health care organization. Specifically, the identification of a proper site before surgery and a confirmation of the operative procedure to be done with the Chief Resident or Hand Fellow in the pre-operative holding area is crucial in the duties of the second year resident.  
Demonstrates appropriate conduct in the timely completion of the dictated operative notes, chart operative summaries and discharge summaries as well as clinic notes.  
Understands how the delay of these activities impacts patient care throughout the system on the whole  
Successfully teams with the staff and ancillary personnel to ensure that all radiographic and clinical notes are available preoperatively and intraoperatively |
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<th>DAY/DATE</th>
<th>PAT/EDUCATIONAL CLASS</th>
<th>ADMISSION/SDA/OR DAY</th>
<th>POST-OP DAY 1</th>
<th>POST-OP DAY 2</th>
<th>POST-OP DAY 3</th>
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<td><strong>DAY 1</strong></td>
<td><strong>PATIENT OUTCOMES</strong></td>
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<td>Patient will:</td>
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<td>Attend pre-op spine class</td>
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<td>Have initial PT education</td>
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<td>Receive education regarding home care</td>
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<td>Family/S.O. included in education when possible.</td>
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<td>Obtain clearance for surgery through PATC appointment.</td>
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<td>Identify support person to assist with meals, transportation, and appointments</td>
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<td><strong>MEDICATIONS</strong></td>
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<td>Obtain list of all home medications. Pt will identify pharmacy for all post-op prescriptions.</td>
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<td>Pain control</td>
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<td>Tolerant Patients: Continue Longacting (LA) opioids as baseline</td>
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<td>Pre-op: Take a.m. LA opioid with sip H2O</td>
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<td>Post-op: Resume LA Opioid when pt is tolerating PO</td>
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<td><strong>NURSING CALL FOR:</strong></td>
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<td>Call HO for:</td>
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<td>Inadequate pain relief (&gt;4/10), agitation, restlessness, lethargy, Temp &gt;102°, itching, nausea, RR&lt;12, skin erythema, rash, s/s of CSF leak, or neurological changes.</td>
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<td>Call HO for:</td>
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<td>SBP &lt; 90</td>
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<td>PC &lt; 60 &gt; 120</td>
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<td>RR&lt;12&gt;32</td>
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<td>UOP &lt; 200cc/8hr</td>
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<td>Temp &gt; 38.6° w/Tylenol</td>
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<td>Obtain cardiac/medical clearance for surgery</td>
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<td>Pre-op baseline VS</td>
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<td>Post-op VS per hospital policy</td>
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<td>Monitor per routine</td>
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<td><strong>RESPIRATORY</strong></td>
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<td>Introduce and review use of IS and teaching regarding C&amp;DB exercises</td>
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<td>For extubated patients:</td>
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<td>Teach &amp; encourage CDB every 1hr WA IS every hour x10 (goal 1500 cc)</td>
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<td>Encourage CDB every 1hr WA IS every hour x10 (goal 2000 cc) Wean O2 per protocol</td>
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<td>Encourage CDB every 1hr WA IS every hour x10 (goal 2000 cc) Wean O2 per protocol</td>
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<td>Encourage CDB every 1hr WA Continue IS 4 x day (goal 2000 cc) Wean O2 per protocol</td>
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<td>Patient will be given list of community resources for meals</td>
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<td>Pre-op:</td>
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<td>Diet: NPO</td>
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<td>Dentures should be removed if applicable and stored in patient room</td>
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<td>Post-op:</td>
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<td>Screen for nutritional risk: notify Nutritional Services if @ risk</td>
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<td><strong>ELIMINATION/REPRODUCTIVE</strong></td>
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<td>Foley: Measure surgical site drain every 8 hrs and maintain</td>
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<td>Foley: Measure surgical site drain every 8 hrs and maintain</td>
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<td>Bowel care per MD orders</td>
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<td>D&amp;C Foley: Bladder Scan Protocol if no void after 6 hours. Notify HO if no BM since admission</td>
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</tr>
<tr>
<td></td>
<td>Notify HO if no BM since admission</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Discharge Criteria**

**Home or Home with Home Health**

<table>
<thead>
<tr>
<th>Functional</th>
<th>Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Independent with bed mobility</td>
<td>- Tolerates fluid and food without nausea and vomiting</td>
</tr>
<tr>
<td>- Transfers independently, including getting in and out of bed</td>
<td>- Adequate pain control with or without non-narcotic means</td>
</tr>
<tr>
<td>- Patient will maintain and verbalize spinal precautions (see above)</td>
<td>- No signs of surgical site infection or drainage</td>
</tr>
<tr>
<td>- Ambulates independently ≥50 feet (with or without assistive device)</td>
<td>- Temperature normal or ≤100.0°F</td>
</tr>
<tr>
<td>- Independent with ADL’s (bathing, dressing, toileting)</td>
<td>- Patient is able to urinate independently</td>
</tr>
<tr>
<td>- Patient or caregiver safely demonstrate ability to don and doff brace if applicable</td>
<td></td>
</tr>
</tbody>
</table>

**Post-Acute Facility (SNF, inpatient rehab)**

<table>
<thead>
<tr>
<th>Functional</th>
<th>Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Transfers with minimal to maximal assistance (including getting in and out of bed)</td>
<td>- Tolerates fluids and food without vomiting</td>
</tr>
<tr>
<td>- Ambulates with minimal to maximal assistance ≤40 feet</td>
<td>- Functional mobility is limited by pain</td>
</tr>
<tr>
<td>- Poor compliance with spinal precautions</td>
<td>- Surgical wound without redness, warmth, or drainage or may require further evaluation</td>
</tr>
<tr>
<td>- Needs moderate to maximal assistance with ADL’s</td>
<td>- Lab values meet admission criteria for post-acute facility</td>
</tr>
</tbody>
</table>

---

**NEUROLOGICAL**

- Neuro checks every 1 hour
- Neuro checks every 4 hours

**SKIN**

- Post-op: Assess operative site every 4 hours
- MD will do first dressing change to operative site

**COMFORT**

- Administer pain meds before therapy
- Discontinue PCA, notify physician if pt reports pain greater than 5/10 despite intervention.
- Ensure adequate pain management on PO pain medications before discharge

**ACTIVITY/SAFETY**

- Patient will verbalize function and appropriate use of TED’s & SCD’s
- No lifting, bending, twisting, or stooping.
- No flexion/extension, rotation, or bending of the thoracic or lumbar spine

**PSYCHOSOCIAL / SPIRITUAL / CULTURAL**

- Assess any special needs for patient or family

**EDUCATION**

- Pt will: Attend Pre-op Spine class
- Receive Spine Class education materials
- RN will review Review and reinforce pre-op teaching
- Assess discharge teaching needs

**REHABILITATIVE SERVICES**

- Be fitted for brace (depending upon procedure) and bring to the hospital for post surgery therapy.
- Practice exercises as instructed by PT or RN
- PT/OT Consult Dangle at side of bed, pt may stand at side of bed with assist.
- WBAT BLE’s

**SERVICES**

- Record variances
- Record variances
- Record variances
- Record variances

**VARIANCES**

- Record variances
- Record variances
- Record variances
- Record variances

**POST-ACUTE FACILITY (SNF, INPATIENT REHAB)**

- Discharge to home POD day #3 or #4
- Pt should verbalize proper use of pain medications and potential side effects

---

**Discharge Criteria**

- Have patient demonstrate & maintain spine precautions (no bending, twisting, stooping, fles/ext, rotation, etc) prior to discharge
- Dangle at side of bed, pt may stand at side of bed with assist.
- WBAT BLE’s

**HOME OR HOME WITH HOME HEALTH**

- Independent with bed mobility
- Transfers independently, including getting in and out of bed
- Patient will maintain and verbalize spinal precautions (see above)
- Ambulates independently ≥50 feet (with or without assistive device)
- Independent with ADL’s (bathing, dressing, toileting)
- Patient or caregiver safely demonstrate ability to don and doff brace if applicable

**VARIANCES**

- Record variances
- Record variances
- Record variances
- Record variances

---

**Discharge Criteria**

- Tolerates fluid and food without vomiting
- Adequate pain control with or without non-narcotic means
- No signs of surgical site infection (drainage, warmth, or redness)
- Temperature normal or ≤100.0°F
- Patient is able to urinate independently

**POST-ACUTE FACILITY (SNF, INPATIENT REHAB)**

- Tolerates fluids and food without vomiting
- Functional mobility is limited by pain
- Surgical wound without redness, warmth, or drainage or may require further evaluation
- Lab values meet admission criteria for post-acute facility

---

**Discharge Criteria**

- Independent with bed mobility
- Transfers independently, including getting in and out of bed
- Patient will maintain and verbalize spinal precautions (see above)
- Ambulates independently ≥50 feet (with or without assistive device)
- Independent with ADL’s (bathing, dressing, toileting)
- Patient or caregiver safely demonstrate ability to don and doff brace if applicable

**HOME OR HOME WITH HOME HEALTH**

- Independent with bed mobility
- Transfers independently, including getting in and out of bed
- Patient will maintain and verbalize spinal precautions (see above)
- Ambulates independently ≥50 feet (with or without assistive device)
- Independent with ADL’s (bathing, dressing, toileting)
- Patient or caregiver safely demonstrate ability to don and doff brace if applicable

**VARIANCES**

- Record variances
- Record variances
- Record variances
- Record variances
I. Specialty Specific Knowledge and Psychomotor Skills - Spine  
(appplies to both PGY2 and PGY4 Rotation)

Team specific:

• Evaluation (including history and physical, interpretation of radiographic studies as well as creation of treatment plans for patients in orthopedic spine clinic)

• Learn and incorporate various OSUMC system resources such as CAPI and IHIS to improve and expedite patient care

• Learn and use internet-based systems such as Pub Med to research patient diagnoses, treatment outcomes, and other aspects of patient care

• Understand non-operative treatment of common spine conditions
  Indications for nonoperative treatment
  Type of bracing
  Spinal Precautions
  Rehabilitation protocol

• Learn and be proficient with the evaluation of spinal injuries in poly-traumatized patients

• Understand operative treatment of common spinal disorders
  o Indications for operative treatment
  o Operative risks, benefits, possible complications
  o Perioperative treatment

  ✻ ✻ Antibiotic coverage
  ✻ ✻ DVT prophylaxis
  ✻ ✻ Rehabilitation
  ✻ ✻ Patient education
  ✻ ✻ Postoperative protocol

• Communicate with other services (ie general surgery, neurosurgery, other consultant services)
• Self-study for spine by reading journals, books including but not limited to the Spine Orthopedic Knowledge Update (OKU). A review of one to two chapters of OKU will be held with the entire team during monthly Wed Spine Case Conference.

• OITE review based on spine topics

• Attendance at weekly Grand Rounds and other lectures

• Attendance at monthly M&M

• Daily team rounds

• Understand indications for further imaging (CT scan, MRI, etc)

• Learn to recognize and treat spine emergencies

• Evaluation of consults in a timely manner

• Present cases at weekly spine conference with relevant literature

• Establish basic operating principles including soft tissue handling, surgical approaches to the entire spine, basic spinal decompressions, and insertion of spinal implants such as interbody devices and pedicle screws.

• Supervise and teach medical students with basic skills such as suturing.

All residents are responsible for participation in the care of all inpatients and assisting with the pre-operative workup. Additionally, patients are seen in clinics staffed by faculty in the outpatient facilities of the OSUMC. The residents provide care (non-operative and operative) for patients at the OSUMC Main Campus, the OSUMC East Hospital and the OSU Spine Center.

Upon completion of the two-month rotation it is expected that the residents will:

• Understand spine anatomy: Cervical, Thoracic, and Lumbar.

• Develop an organized approach to evaluation and treatment of spine-injured patients with or without neurological involvement.

• Assess spinal stability/instability.
• Develop an organized approach to evaluate and treat outpatients with complaints of back/leg, neck/arm pain as related to traumatic, arthritic, metabolic, inflammatory, neoplastic and genetic (congenital/developmental) spinal disorders ("TAMING mnemonic").
• Have familiarity with adult scoliosis.
• Develop an organized approach to spine surgery: pre-op, intra-op and post-op along with improvement in surgical skills.
• Understand the rationale and indications for using spinal orthoses: commercial and fabricated.

II. PGY2 Specialty Specific Knowledge and Psychomotor Skills Expectations- Spine

TEAM SPECIFIC:
1. Become proficient in the use of the OSUMC system resources and computerized record keeping for Orthopaedic In-Patients and Out-Patients.
2. Become proficient with respect to OSUMC patient processing procedures for managing Out-Patients, for Surgical Scheduling, and for the Ambulatory Surgery Unit scheduling in order to expedite patient care.
3. Become proficient in the indications for and ordering of radiologic imaging including X-Rays, MRIs, CAT scans, myelography and advanced imaging modalities.
4. Become proficient with respect to requirements of the Pre-Op-Team patient encounter, the Time-Out process, and the Post-Op Review process.
5. Practice punctuality with respect to data entry Pre-Op, dictation of the Operative Procedure, and data entry describing postoperative care, including discharge planning and followup.
6. Become familiar with respect to OSUMC educational resources, and the internet-based resources including Pub Med, EBP (Evidence Based Practice), and Orthopaedic Knowledge On-Line (OKO, OTA.org) portals.
7. Attend the weekly Spine Conference Team and scheduled preop/postop case review.
8. Learn commutation pipelines to major consulting services: Infectious Disease, General Surgery, Plastic Surgery, Neurosurgery, Urology, Neurology, ENT, PM&R/ Rehabilitation, etc.
9. Attend weekly program wide Grand Rounds and educational programs (Friday AM).
10. Attend monthly mortality and morbidity conferences.

Clinical Year PGY2:
1. Learn to take and record a detailed present complaint and history relevant to the patient afflicted with a spinal disorder.
2. Learn to process and record a detailed, but efficient past history from each patient.
3. Learn to perform and document a thorough musculoskeletal exam.
4 Learn to process a detailed differential diagnosis relevant to the musculoskeletal history and physical examination
5 Learn to assess the appropriate requirements for relevant laboratory and imaging studies for musculoskeletal complaints
6 Integrate effectively as a team player with other residents and faculty
7 Make rounds with the team twice daily and record relevant observations and lab data in a timely manner
8 Provide one-on-one instruction in musculoskeletal essentials of history and physical examination to the service intern and medical students.
9 Evaluate consults in a timely manner
10 Present weekly Pre-Op cases to team members at Monday AM case reviews and be prepared to comment on each case as required
11 Learn basic surgical operating practice including general operating room discipline, patient positioning, the skills relevant to soft tissue handling, hemostasis and neurological precautions.
12 Accomplish efficient team discipline with respect to integration of duties with junior and senior team members
13 Learn efficient delegation of appropriate duties to physician assistants and PCRN’s.
14 Enhance decision making skills with respect to general orthopaedic elective surgical practice
15 Make twice daily rounds with team members and record notable observations and laboratory findings or delegate same to PA’s or intern with appropriate oversight
16 Enhance analytical abilities in respect to surgical indications
17 Maintain rigorous discipline with respect to preoperative reading, and relevant on-line research in preparation for surgical cases and Review anatomical dissections preoperatively in certain insistences of unusually complex reconstructive spinal procedures.
18 Practice good teaching principles with respect to the educational needs of more junior residents, interns, nurses and other ancillary healthcare professionals.

**Clinical Year PGY4:**
1 Assume responsibilities as team leader of a spine service and direct delegation of responsibilities among interns, junior residents and PA’s
2 Assume teaching responsibilities consistent with a Chief Resident leadership position, guiding junior residents, interns and nurse practitioners
3 Conduct twice daily rounds and document notable observations and laboratory data or delegate and oversee that responsibility
4 Oversee all aspects of inpatient and outpatient care
5 Provide decision making leadership with regard to surgical indications and appropriate scheduling of cases
6 Oversee the details of surgical preparation including necessary implants, special surgical equipment, and communication with the OR nursing staff the day before surgery or earlier if indicated
7 Provide leadership to team members with respect to surgical preparation including relevant literature on evidence based surgical intervention, and technical aspects of the procedures to be performed
8 Demonstrate appropriate communication skills with consultants preoperatively and postoperatively
9 Improve upon surgical skills and teach surgical skills at appropriate levels for junior faculty, interns and medical students.
The Ohio State University
Department of Orthopaedics
Orthopaedic Residency Program

*Physical Exam Competencies*

**Spine Service: PGY2 and PGY4**

By the end of the PGY2 rotation on the Spine Service, the resident should be able to demonstrate proficiency in the key physical examination tests; The PGY4 rotation is an opportunity to polish these physical examination skills.

**OSU ORTHOPAEDICS- CORE LEARNING**

**PHYSICAL EXAMINATION OF THE SPINE**

or

**Strains**

**Sprains**

**Subluxations**

**Spondylitis**

**Spondylosis**

**Spondylolysis**

**Spondylolisthesis**

**Scoliosis**

and

**Sundry**

**Serious**

**Situations**

**Sustained by**

**Spinal**

**Structures**
The
Systematic
Survey
of the
Subjects
Surface

ESSENTIALS OF THE SPINAL EXAMINATION
Ronald J. Wisneski, M.D.

I. Introduction

Neck and back pain with or without radicular or spinal cord involvement are common perplexing problems. Spinal pain is best understood as a symptom complex occurring from many causes. A history that concentrates on pain description and a physical examination which includes making a logical list of causes will be helpful. This lecture will review the critical history and examination factors that compose a complete assessment of patients with neck and low back pain.

II. The Clinical Interview

A. General considerations

B. Eliciting a history

1. Mode of onset
2. Pain description
3. Mechanical vs. non-mechanical pain
4. Intraspinal vs. extraspinal
5. Types of pain
   a. local
   b. referred
   c. radicular

C. Physical examination – (see accompanying handout for details)
1. Standing
2. Seated
3. Supine
4. Lateral
5. Prone

D. Synthesis

E. Differential diagnosis- “TIMCAT” (Trauma, infection, metabolic, congenital, Arthritic or tumor)

F. Diagnostic testing

SPINAL DISORDERS – DIFFERENTIAL DIAGNOSIS

1. CONGENITAL LESIONS

A. Primary
   1. Absences
   2. Excesses
   3. Fusions
   4. Dysplasias
   5. Hamartomas

B. Abiotrophies – individuals appear normal for part of life span (eg. hereditary degenerative diseases, myotonia, dystrophia, progeria)

2. ACQUIRED CONDITIONS – (Take note: the first letters of the acquired conditions combine to form the mnemonic “NICE MINI PACET”)

A. Neurologic
   1. Central
   2. Peripheral

B. Infection
   1. Acute
   2. Chronic
   3. Suppurative
   4. Nonsuppurative

C. Circulatory
   1. Central
   2. Peripheral
   3. Hematogenetic

D. Enzymatic

E. Metabolic
LOW BACK PAIN – PATIENT EVALUATION

Beginning with the broad universe of patients who present to our office with low back pain with or without sciatica, the keystone of clinical diagnosis remains the history and physical examination. The history should allow one to develop a precise subjective assessment of the patient’s pain syndrome. The patient should be asked to describe the character (C) of the pain whether it be sharp, dull, aching, burning or dysesthetic in character. They should describe the location (L) of the pain. Exacerbating (E) and ameliorating (A) phenomena should be defined. It is particularly important in this regard to differentiate back pain that is mechanical in nature from non-mechanical pain which is present at rest. Any pattern of radiation (R) should be defined. In this regard it is important to differentiate referred (sclerotomal) from true radicular (neurotomal) radiation of the pain. The patient should be questioned for any particular time relationships (TR) that the pain syndrome exhibits. Pain that intensifies at night and keeps the patient from obtaining a sound and restful sleep should often alert one to the possibility of a neoplastic condition. Lastly, in performing a thorough review of systems, one should question the patient specifically as to any associated phenomena (AP) that may exist in addition to the pain. We specifically question the patient with regard to the presence or absence of numbness, paresthesias, weakness, a sense of instability in the lower extremities, stiffness, change in bowel or bladder habits, and constitutional symptoms such as fever, chills or weight loss. Any change in the patient’s pattern of appetite, exercise tolerance, sleep habits, or pattern of social and sexual activity may give a clue to an underlying malignancy but much more frequently indicate an underlying depressive disorder. It is also of importance to obtain any history of trauma along with the precise details of the mechanism of injury. One should note by the first letter capitals in parenthesis that they conveniently combine to produce the mnemonic CLEAR TRAP,
this is a convenient memory device which we routinely teach to our medical students and residents.

In performing the physical examination the differential diagnosis should be oriented to separating intraspinal from extraspinal causes of the patient’s pain. Intraspinal causes may be secondary to intradural (intramedullary, extramedullary) or extradural (epidural, foraminal, paraspinal) pathology. Extraspinal causes similarly can be divided into intrapelvic and extrapelvic pathology. In this regard, it is vitally important to examine the abdomen and perform a rectal examination if the patient has not had a recent examination, as well as, consider early gynecologic consultation, if the examination of a female patient leads one to suspect pelvic pathology.

Lastly, we scrupulously observe the patient in the process of performing a physical examination, to detect any non-organic physical signs. We utilize Waddell’s 5 standardized group of tests, specifically performing stimulation tests, distraction, tests, tests to detect tenderness which is superficial and non-anatomic, and regional motor or sensory deficit tests, as well as closely observing the patient for any patterns of over-reaction to the examiner’s maneuvers. If three or more of these non-organic signs are present, we feel it will often be necessary to perform a more detailed psychological evaluation of the patient.

ORTHOPAEDIC PHYSICAL EXAMINATION – Mnemonic

“EVERY SYSTEM GETS MEASURED THEN JOINTS MIGHT NEED RETESTING”

Have the patient undressed:
Except in obvious cases where the problem is very focal, have the patient get into an examining gown. (The knee cannot be properly examined under a rolled-up pant leg; a cavus foot might be secondary to a spinal disorder; knee pain may be referred from the hip).

Equipment:
i.e. Crutches (what type; which side if only one); cane (which hand); braces, splints; night splints or casts; shoe lifts and wedges, etc. Describe any unusual wear in the equipment which might indicate the site of an abnormality.

Stance:
- General symmetry: pelvis and shoulders level; thickness of wood block needed under short leg to level pelvis; is trunk balanced over pelvis; (leaning forward or backward; leaning to one side—measured by a plumb bob from C-7 or occiput); is head, or are arms and legs held in unusual postures, etc.
- Back: Lordosis, scoliosis? Kyphosis? Rotation? (Test by forward bending—
  “rib hump” – measure height of hump from spinous process to line level with
top of hump); Flexibility of abnormal curves
- Abnormal position or rotation of legs and feet
- Trendelenberg test

**Gait**: (With & without equipment)
- Analyze by phase: i.e., stance phase vs. swing phase; (heel strike, foot, flat,
toe off; acceleration; deceleration)
- Smooth or irregular; weight on one leg longer than the other
- Toe walk; heel walk

**Measurements**:
- ASIS – mm “true leg length” Anterior superior iliac spine to medial tibial
  malleolus
- Umb – mm “apparent leg length” Umbilicus to medial tibial malleolus
- Thigh: Thigh circumference taken at an arbitrary level above a fixed point
generally at the level of the vastus medialis where atrophy commonly begins
(e.g. 15 cm. proximal to anterior tibial tubercle or 3 fingers breadth above
superior border of the patella for rough approximation)
- Calf: maximum calf circumference
- Others: as indicated (e.g. acromion to olecranon to radial styloid; jaw
  opening; length of feet, etc.)

**Tests**: (appropriate to the specific region)
  e.g. Knee – McMurray; Slocum
  Hand – Littler
  Hip – Ober; Ely; Trendelenburg; Thomas
  Spine – SLR; crossed SLR; femoral stretch

**Joints**:
- Description: Size, color warmth, tenderness, synovial thickening, fluid
- Character of motion: e.g. muscle spasm due to pain; muscle spasm due to
  sudden stretching (i.e. “grab” in cerebral palsy; crepitus; appropriate
  mechanics (i.e. patella tracks properly)
- ROM; Range of motion (use a goniometer) active and passive as indicated.
  See following charts for neutral positions from which measures are taken.
- Thomas test
- Ligaments: Laxity in general; specific laxity

**Motor Exam**:
5 - normal  full ROM against gravity with full resistance
4 - good  full ROM against gravity with some resistance
3 - fair  full ROM against gravity alone
2 - poor  full ROM with gravity eliminated
1 - trace  no motion but muscle contracture
0 - zero nothing

Plus and minus grades are interpolated between the above grades.

Neurological Examination: Sensation, DTR’s pathologic reflexes

REGIONAL EXAMINATIN OF THE SPINE

A. Patient Standing
   1. Stance
      a. skin – observe for midline nevus, café-au lait spots, dimples, etc.
      b. check coronal and sagittal curves
      c. shoulder and pelvic obliquity
      d. spasm and list
      e. palpation and percussion – CVAT
      f. range of motion
      g. chest expansion
      h. Shober’s test
      i. Spurling’s test

   2. Gait
      a. heel-and-toe walking
      b. squat
      c. single leg stool ascension
      d. stance and swing phase of gait cycle

B. Patient Seated
   1. Adson’s Maneuver
   2. Shoulder evaluation
   3. Pulses
   4. DTR’s – pathological reflexes

C. Patient Supine
   1. Leg lengths
   2. Extremity circumference
   3. Straight leg raising test - variants
   4. Patrick’s test
   5. Gaenslen’s test
   6. Abdominal exam

D. Patient Lateral
   1. Check hip abductors
   2. Palpate trochanters and sciatic notch
   3. Rectal
   4. Perianal and buttock sensation
   5. Females - consider pelvic

E. Patient Prone
1. Midline palpation
2. Hip rotation
3. Ankle jerks
4. Reverse SLR

DOCTOR WISNESKI’S FAVORITE MNEMONICS

1. MOO-MODE OF ONSET
2. MOI- MECHANISM OF INJURY
3. CLEARTRAP
4. TIMCAT or NICEMINIPACET-DIFF. DX.
5. LMNOP’S OF SPINE FX. MANAGEMENT
   a. L=LOCATION
   b. M= MECHANISM OF INJURY
   c. N= NEUROLOGIC STATUS
   d. O= OPEN OR CLOSED or OTHER FACTORS
   e. P= PERSONALITY OF THE INJURY
   f. S= STABILITY CONCEPTS (ie. The TLISS-THORACOLUMBAR INJURY SEVERITY SCALE

6. COLER LARD-WISNESKI’S FRACTURE MNEMONIC
   a. C= COMPLICATED OR NOT
   b. O= OPEN OR CLOSED
   c. L= LOCATION-e.g. proximal, distal, epiphyseal, metaphyseal, diaphyseal, etc.
   d. E= EXTENT- e.g. simple, transverse, spiral, comminuted, intra-articular, segemental, etc.
   e. R= RELATIONSHIP OF FX. FRAGMENTS
      i. L= LENGTHENING OR SHORTENING
      ii. A= ANGULATION
      iii. R= ROTATION
      iv. D= DISPLACEMENT
   LARD= “THE FRACTURE FORMULA”- TO TREAT THE FRACTURE REVERSE THE FORMULA TO RESTORE THE NORMAL FORM AND THEN CREATE A PLAN FOR FUNCTIONAL RESTORATION
THE 7 A’S OF EXCELLENCE

AVAILABILITY
AFFABILITY
ABILITY
APPRECIATE THE NEEDS OF THE PATIENT
ACCOUNTABILITY/AFFORDABILITY
ADVERTISING
AWARENESS OF ONE’S LIMITATIONS

THE 5 E’S

The American Academy of Orthopaedic Surgeons (AAOS) urges orthopaedic surgeons to use patient-focused communication skills during their direct patient encounters.

These include:
Listening attentively
Eliciting concerns and calming fears
Answering questions honestly
Informing and educating patients about treatment options and the course of care
Involving patients in decisions concerning their medical care
Demonstrating sensitivity to patients’ cultural and ethnic diversity
Showing empathy and respect

ENGAGE, EMPATHY, EVALUATE, EDUCATE & ENLIST
STANDARD NEUROLOGICAL CLASSIFICATION
OF SPINAL CORD INJURY

MOTOR
KEY MUSCLES
(scorings on reverse side)

R  L
C5  Elbow flexors
C6  Wrist extensors
C7  Elbow extensors
C8  Finger flexors (distal phalanx of middle finger)
T1  Finger abductors (little finger)

UPPER LIMB
TOTAL
(MAXIMUM) (25) (25) (50)

SENSORY
KEY SENSORY POINTS

0 = absent
1 = impaired
2 = normal
N7 = not testable

Any anal sensation (Yes/No)

PIN PRICK SCORE
(LIGHT TOUCH) (max: 112)

LIGHT TOUCH SCORE
(TOTALS) (max: 112)

LOWER LIMB
TOTAL
(MAXIMUM) (25) (25) (50)

Comments:

Patient Name ____________________________
Examiner Name __________________________ Date/Time of Exam___________________

This form may be copied freely but should not be altered without permission from the American Spinal Injury Association.

REV 03/06
### MUSCLE GRADING

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Total paralysis</td>
</tr>
<tr>
<td>1</td>
<td>Palpable or visible contraction</td>
</tr>
<tr>
<td>2</td>
<td>Active movement, full range of motion, gravity eliminated</td>
</tr>
<tr>
<td>3</td>
<td>Active movement, full range of motion, against gravity</td>
</tr>
<tr>
<td>4</td>
<td>Active movement, full range of motion, against gravity and provides some resistance</td>
</tr>
<tr>
<td>5</td>
<td>Active movement, full range of motion, against gravity and provides normal resistance</td>
</tr>
<tr>
<td>5*</td>
<td>Muscle able to exert, in examiner’s judgement, sufficient resistance to be considered normal if identifiable inhibiting factors were not present</td>
</tr>
</tbody>
</table>

**NT not testable.** Patient unable to reliably exert effort or muscle unavailable for testing due to factors such as immobilization, pain on effort or contracture.

---

### ASIA IMPAIRMENT SCALE

- **A = Complete:** No motor or sensory function is preserved in the sacral segments S4-S5.
- **B = Incomplete:** Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-S5.
- **C = Incomplete:** Motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a muscle grade less than 3.
- **D = Incomplete:** Motor function is preserved below the neurological level, and at least half of key muscles below the neurological level have a muscle grade of 3 or more.
- **E = Normal:** Motor and sensory function are normal.

### CLINICAL SYNDROMES (OPTIONAL)

- Central Cord
- Brown-Sequard
- Anterior Cord
- Conus Medullaris
- Cauda Equina

---

### STEPS IN CLASSIFICATION

The following order is recommended in determining the classification of individuals with SCI.

1. Determine sensory levels for right and left sides.
2. Determine motor levels for right and left sides.  
   - **Note:** in regions where there is no myotome to test, the motor level is presumed to be the same as the sensory level.
3. Determine the single neurological level.  
   - **This is the lowest segment where motor and sensory function is normal on both sides, and is the most cephalad of the sensory and motor levels determined in steps 1 and 2.**
4. Determine whether the injury is Complete or Incomplete (sacral sparing).  
   - **If voluntary anal contraction = No AND all S4-5 sensory scores = 0 AND any anal sensation = No,** then injury is COMPLETE.  
   - Otherwise, injury is incomplete.
5. Determine ASIA Impairment Scale (AIS) Grade:  
   - **Is injury Complete?**  
     - **If YES, AIS=A** Record ZPP (For ZPP record lowest dermatome or myotome on each side with some (non-zero score) preservation)
     - **If NO, AIS=B** (Yes=voluntary anal contraction OR motor function more than three levels below the motor level on a given side.)
   - **Are at least half of the key muscles below the (single) neurological level graded 3 or better?**  
     - **If NO, AIS=C**
     - **If YES, AIS=D**

**If sensation and motor function is normal in all segments, AIS=E**  
**Note:** AIS E is used in follow up testing when an individual with a documented SCI has recovered normal function. If at initial testing no deficits are found, the individual is neurologically intact; the ASIA Impairment Scale does not apply.
C-spine assessment
To be used by trained ED staff in all adult blunt trauma patients if arriving with spinal precautions or if c-spine injury is a concern
Not to be used if injury >48h old or if repeat presentation

Disclaimer:
This is a clinical template; clinicians should use judgment when managing individual patients

Is patient stable?
- No, as one or more of below
  - GCS < 15
  - Respiratory rate < 10
  - Respiratory rate > 24
  - Systolic BP < 90
- Yes, as none of the above

Indirect feature triad?
- Yes – ALL of the below are present
  - Evidence of trauma above levels
  - Not ambulatory since injury
  - Dangerous mechanism (see box 5)
- No – none or only some of the above

Dangerous mechanism?
- Yes - one of the below
  - Fall ≥3 feet or 5 steps
  - Axial load to head, e.g., diving
  - Crash with motorized recreational vehicle (e.g., quad bike)
  - Motor vehicle crash at ≥65mph, rollover or ejection
  - Bicycle collision
- No – none of the above

Known c-spine problem?
- Yes - one or more of the below
  - Rheumatoid arthritis
  - Ankylosing spondylitis
  - Cervical spinal stenosis
  - Previous c-spine surgery
- No – none of the above

Is ROM-testing safe?
- Yes, as one or more of the below
  - Ambulatory at any time after injury
  - Sitting position in the ED
  - Onset of pain not immediate
  - Simple rear-end MVC (see box 8)
  - No midline c-spine tenderness
- No, as none of the above

Simple rear-end MCV?
- No, as at least one of the features below
  - Pushed into oncoming traffic
  - Hit by high speed vehicle
  - Rollover
  - Hit by bus or large truck
- Yes, as none of the above

This assessment was carried out by

Print name: [Print name]
Signature: [Signature]
Position: [Position]
Date: [Date]
Time completed: [Time completed]
Definition:
Orthopedic spine surgery is that branch of medicine that deals with the anatomy, physiology and biomechanics of the musculoskeletal system that is exterior to the spinal dura and below the level of the foramen magnum.

Throughout a medical student and resident's education it is vital that the curriculum provides the student with the knowledge and skills to manage patients afflicted with a broad-spectrum of spinal disorders. The specific clinical goals for any such patient include:
1. Prompt diagnosis -- understanding the pathology is the keystone of clinical diagnosis
2. Efficient use of diagnostic studies
3. Individualized treatment -- an understanding of the natural history is the keystone to individualized treatment advice
4. Minimize the use of poorly conceived surgical interventions
5. Provide a route for recovery and return to optimum function -- "Individualized treatment and proper patient selection remain the keystone's for maximizing patient outcomes".

Spinal Disorders Didactic Educational Schedule
Basic science curriculum
1. Anatomy and embryology emphasizing spinal and neural development
2. Biomechanics and biomaterials
3. Pathophysiology of degenerative disc disease and related symptoms
4. History and Physical Examination Skills- Differential Diagnosis
5. Spinal imaging: Radiographs, computed tomography, myelography, and magnetic resonance imaging along with interventional techniques
6. Clinical neurophysiology
7. Research methods including outcome assessment, nomenclature and coding
8. Disability evaluation and medical ethics

Conservative Treatment and Rehabilitation
1. Pharmacologic management of spinal patients
2. Diagnostic and therapeutic spinal injections
3. Rehabilitation concepts including functional restoration, manipulative treatments and other passive modalities
4. Rehabilitation of spinal cord injuries including prosthetics and orthotics

Adult Topics
1. Initial evaluation and management of spinal trauma
2. Fractures and dislocations of the cervical spine
3. Fractures and dislocations of the thoracolumbar spine and sacrum
4. Evaluation and treatment of neck pain and cervical disk disease
5. Cervical spondylotic myelopathy and other disorders of the spinal cord
6. Head and neck injuries in athletes
7. Evaluation and treatment of back pain and lumbar degenerative disk disease
8. Spinal stenosis  
9. Spondylolisthesis  
10. Adult Scoliosis  
11. Diagnosis and treatment of neoplastic spinal disease  
12. Rheumatoid and rheumatoid variant spondyloarthropathy  
13. Spinal infections  
14. Management and treatment of osteoporosis and metabolic bone disease affecting the spine  
15. Complications of Spine Surgery  
16. Spinal instrumentation  
17. Spine arthroplasty including motion sparing technologies  
18. Spinal arthrodesis including biological enhancement  

**Pediatric Topics**  

1. Back pain in children and adolescents including Scheuermann's disease  
2. Pediatric spine trauma  
3. Infantile, Juvenile and Adolescent Idiopathic Scoliosis  
4. Congenital and neuromuscular scoliosis
The Ohio State University
Department of Orthopaedics
Orthopaedic Residency Program

Spine Reading List

1. Required Readings/Lecture References

   AAOS Comprehensive Orthopaedic Review
   Chapter 10
   Chapter 11
   Chapter 12
   Chapter 13
   Chapter 17
   Chapter 27
   Chapter 36
   Chapter 37
   Chapter 38
   Chapter 39
   Chapter 40
   Chapter 41
   Chapter 42
   Chapter 43
   Chapter 44
   Chapter 46
   Chapter 50
   Chapter 65
   Chapter 66
   Chapter 67
   Chapter 68
   Chapter 70
   Chapter 71
   Chapter 72

   JAAOS – Required Readings (Note: All are available on Sharepoint site)

   • Degenerative Lumbar Scoliosis: Evaluation and Management
   • Sagittal Plane Deformity in the Adult Patient
   • Neurologic Injury in the Surgical Treatment of Idiopathic Scoliosis: Guidelines for Assessment and Management
   • Use of All-pedicle-screw
   • Constructs in the Treatment of Adolescent Idiopathic Scoliosis
   • Cervical Spondylotic Myelopathy: Diagnosis and Treatment Cervical Radiculopathy
   • Surgical Management of Cervical Radiculopathy
• Odontoid Fractures: Update on Management
• Subaxial Cervical Spine Trauma

• Upper Cervical Spine Injuries
• Adverse Events Associated With Anterior Cervical Spine Surgery
• The Role of Fibrin Sealants in Orthopaedic Surgery
• Neurologic Complications After Lumbar Spine Surgery
• Reporting and Notification of Adverse Events in Orthopaedics
• Cauda Equina Syndrome
• Nonsurgical Management of Acute and Chronic Low Back Pain
• Low Back Pain: Pathophysiology and Management
• Lumbar Spinal Stenosis
• Degenerative Lumbar Stenosis: Diagnosis and Management
• Randomized Controlled Trials of the Treatment of Lumbar Disk Herniation: 1983-2007
• Recurrent Lumbar Disk Herniation
• Thoracic Disk Disease: Diagnosis and Treatment
• Postoperative Spinal Wound Infections
• Prophylactic Antibiotics in Orthopaedic Surgery
• Spinal Infections
• Evaluation of the Adult Patient (Aged >40 Years) With a Destructive Bone Lesion
• Metastatic Disease of the Spine
• Preoperative Embolization in the Treatment of Spinal Metastasis
• Acute Management of Spinal Cord Injury
• Advances in the Management of Spinal Cord Injury
• Central Cord Syndrome
• Clearing the Cervical Spine in the Blunt Trauma Patient
• Clearing the Pediatric Cervical Spine Following Injury
• Orthopaedic Management of Ankylosing Spondylitis
• Diffuse Idiopathic Skeletal Hyperostosis: Musculoskeletal Manifestations
• Rheumatoid Arthritis in the Cervical Spine
• Rheumatoid Arthritis of the Cervical Spine
• Adult Isthmic Spondylolisthesis
• Degenerative Lumbar Spondylolisthesis: Trends in Management
• Degenerative Lumbar Scoliosis: Evaluation and Management
• Spondylolysis and Spondylolisthesis in Children and Adolescents: I. Diagnosis, Natural History, and Nonsurgical Management
• Spondylolysis and Spondylolisthesis in Children and Adolescents: II. Surgical Management
• The Effects of Medications on Bone
• Recommendations for Optimal Care of the Fragility Fracture Patient to Reduce the Risk of Future Fracture
• Percutaneous Treatment of Vertebral Body Pathology
• Sacral Fractures
• Thoracolumbar Spine Trauma Classification

• Thoracolumbar Spine Trauma: Evaluation and Classification
• Thoracolumbar Spine Trauma: Principles of Management

2. Optional Readings/Lecture References

• Spine Classics CD (note – all available on Sharepoint site)
• Skeletal Trauma, 3rd Edition
  Vol. 1, Section 1, Chapter 19, Chronic Osteomyelitis, pp. 483 – 506
  Section II, Spine, Chapters 35 – 34, pp. 685 – 1028
  Pelvis, Fx’s of the sacrum, pp. 1031 – 1051

• AAOS Comprehensive Review
• OKU Spine 3 & 4
The Ohio State University  
Department of Orthopaedics  
Orthopaedic Residency Program  

**Didactic Sessions – Spine Service**

- For all Residents (Friday conference)

  12 lectures over a 2 year period, covering the following topics:

  1) Clinical evaluation of the patient with LBP/neck pain
  2) Differential diagnosis and conservative treatment of LBP/neck pain
  3) Imaging and diagnostics  
     a. NRB, facet blocks, discography, electrodiagnostics, NCS, EMG, SSEP
  4) Cervical degenerative disease/treatment
  5) The aging spine/Lumbar spinal stenosis/degenerative disorders
  6) Lumbar fusion: indications/controversies
  7) Cervical spine trauma
  8) Thoracolumbar trauma
  9) Spondylolysis/Spondylolisthesis
  10) Tumors of the spine/infection of the spine
  11) Inflammatory arthritis of the spine/osteoporosis of the spine
  12) Other spine topics/misc (thoracic disk disease/adult spinal deformity)

- For Residents on Service:

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4. Congenital and neuromuscular scoliosis

The spine curriculum will be supplemented by:

1. Thursday morning spine conference at OSU Spine Center
2. Spine journal club – every other month
3. Required readings while on the spine rotation

Faculty: Dr. Wisnesdi, Dr. Lakatos