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STUDENT ID# _____

April 26, 1999, MS-II Final Examination, Version 1
Spring Semester 1998-99

SECTION I: Each of the following questions has only one best answer. Mark the best selection on your Scantron sheet.

1. According to Dr. Willard, the beta-Afferent nerve fibers are NOT found in which of the following areas of the body:
 - a. within the joints
 - b. the viscera
 - c. skeletal muscle
 - d. the CNS
 - e. smooth muscle

2. Which of the following is the correct correlation between lumbar spinal levels and neurological relationships?

a.	L4 sensation: medial foot	DTR's: patellar reflex	Motor: extensor digitorum
<input checked="" type="radio"/> b.	L5 sensation: dorsum of foot	DTR's: patellar reflex	Motor: tibialis anterior
<input checked="" type="radio"/> c.	S1 sensation: lateral foot	DTR's: achilles reflex	Motor: peroneus muscles
d.	L4 sensation: dorsum of foot	DTR's: achilles reflex	Motor: extensor digitorum
<input checked="" type="radio"/> e.	S1 sensation: lateral foot	DTR's: patellar reflex	Motor: plantar flexion

3. While diagnosing your patient's lumbar spine, you find a lesion at L3 that is in the flexed position with rotation and sidebending to the right. What type of biomechanics describes such a lesion?
 - a. Fryette's Type I mechanics
 - b. Fryette's mechanics that involve multiple segments
 - c. Fryette's mechanics involving a single segment
 - d. Type IV mechanics
 - e. Fryette's mechanics, rotation and sidebending in opposite directions

4. In treating lumbar dysfunction with seated muscle energy, which of the following is TRUE?
- ~~a.~~ stand on the side of the more posterior transverse process and rotate the patient toward you
 - ~~b.~~ for neutral lesions, put your arm over the patient's shoulder closest to you and in front of his body, resting your hand on the patient's opposite shoulder to sidebend and rotate in the same direction
 - c. for flexion and extension lesions, rotate the patient toward you and sidebend toward you by pressing down on her shoulder closest to you
 - d. bring the patient into flexion if the lesion is a flexion lesion and into extension if the lesion is an extension lesion
 - e. the seated technique positioning for Type II localizes the barrier in two of the three planes
5. When unloaded, a structure (connective tissue) regains shape at a decreased rate and extent from that at which it was deformed. What is this phenomenon called?
- a. creep
 - b. hysteresis
 - c. tension
 - d. torsion
 - e. shear
6. Compartment syndrome consists of which of the following characteristics?
- a. pain, pus, pressure, paralysis, pulselessness
 - b. pain, pallor, parasthesia, pulselessness, paralysis
 - c. pain, pressure, pallor, parasthesia, paralysis
 - d. pain, pin-prick loss, pressure, pulselessness, paralysis
 - e. pain, putrefaction, pallor, parasthesia, paralysis
7. You diagnose a right posteriorly rotated ilium on your patient. You find a tender point on the right superior border of the lateral ramus of the pubic bone. What would be the correct CS position to treat this lesion?
- a. patient supine, hips and knees flexed on your thigh; internally rotate right thigh by pulling foot laterally
 - b. patient supine, hips and knees flexed; rotate hips 60° away from tender point
 - ~~c.~~ patient supine, right thigh extended off the table 30°
 - ~~d.~~ patient supine, right thigh slightly flexed, marked adduction
 - ~~e.~~ patient supine, right thigh flexed markedly to 130°

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8. Which of the following is correct concerning the range of motion (ROM) of the cervical spine?
- a. normal flexion is approximately 40-50 degrees
 - b. normal extension is approximately 35-55 degrees
 - c. normal sidebending is approximately 45-50 degrees
 - d. normal rotation is approximately 60-75 degrees
 - e. in full rotation, approximately 30% comes from the typical cervicals and 70% from the AA joint
9. An 8-month pregnant woman presents to your clinic with low back pain. Your work-up was negative except for an increased lumbar lordosis and tight lumbar musculature. Which of the following treatments would be most appropriate for this patient?
- a. lumbosacral decompression - prone
 - b. lumbar HVLA
 - c. counterstrain of A10L
 - d. sacroiliac decompression - supine
 - e. lumbosacral decompression - lateral recumbent
10. When diagnosing your patient's lumbar spine, you notice a posteriorly rotated transverse process at L4 on the right with restricted motion in sidebending to the left. How would you position yourself relative to the patient using the seated lumbar HVLA technique? R.S.
- a. stand to the right and behind the patient while placing your left thenar eminence over the right transverse process of L4, grabbing your patient's left elbow with your right hand
 - b. sit directly behind your patient and place your right thenar eminence over the right transverse process of L4 while grabbing your patient's right elbow with your left hand
 - c. stand to the left and behind the patient and place your right thenar eminence over the ~~left~~^{R+} transverse process of L4 while grabbing your patient's right elbow with your left hand
 - d. sit directly behind your patient and place your left thenar eminence over the patient's left transverse process of L4 while grabbing your patient's left elbow with your right hand
 - e. stand directly behind your patient and place both thenar eminences over the right transverse process of L4

11. A 25 year old female medical student presents to your office with a 6 week h/o of right low back pain without evidence of trauma. The patient denies pregnancy and Beta HCG (Beta Human Chorionic gonadotropin) is negative. Palpatory findings denote a positive right seated flexion test with a deep left sacral sulcus and prominent posterior left inferior lateral angle (ILA) that becomes more prominent with backward bending. What is your diagnosis?

- a. bilateral sacral flexion
- b. bilateral sacral extension
- c. left unilateral sacral flexion
- d. left on left sacral torsion
- e. right unilateral sacral extension



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12. Following her jump shot, a basketball player lands on another player's foot, creating an inversion sprain in the shooter's right ankle. As the team physician, you choose to treat her ankle using counterstrain. Which of the following treatment positions will you most likely place the injured player?

- a. prone with knee flexed and ankle dorsiflexed
- b. left lateral recumbent with knee extended and ankle inverted
- c. seated with hip and knee flexed and ankle dorsiflexed
- d. right lateral recumbent with knee extended and ankle inverted
- e. supine with knee extended and ankle plantar flexed

13. Which structure is primarily responsible for sidebending and rotation of the OA being in opposite directions?

- a. lateral atlantal-occipital ligament
- b. apical ligament of the dens
- c. cruciate ligament
- d. anterior longitudinal ligament
- e. ligamentum nuchae

14. Which of the following actions is involved in the treatment of a bilateral sacral flexion using muscle energy?

- a. abducting both legs to maximally relax both SI joints
- b. applying an equally distributed force across the sacral base
- c. applying a force directed inferior and anterior
- d. instructing the patient to rotate his torso to the left
- e. instructing the patient to hold his breath in exhalation as you apply your force to the sacrum

15. According to Gillette's article: "A Practical Approach to the Patient with Back Pain", radiographic imaging studies are *most* useful in which of the following clinical situations?

- a. patients with an increased risk of systemic disease (e.g., over age 50 years, presence of fever, weight loss, or history of trauma)
- b. patients with recent onset pain associated with a strain or unaccustomed physical activity
- ~~c.~~ patients with an atraumatic history, recent onset of back and lower extremity pain that recovers spontaneously in about 2 weeks
- d. patients with pain localized to the low back with evidence of localized paraspinal muscle spasm and tenderness without evidence of leg pain
- e. patients with acute onset nerve root specific pain and hypesthesia associated with a positive straight leg raising maneuver without evidence of motor or sensory weakness

16. Of the following, which are the most optimum back surgery candidates?

- ~~a.~~ those patients whose sciatica and signs of nerve root impingement improve spontaneously or in response to conservative care of pain medications, short-term bed rest and gradual return to activity
- ~~b.~~ those patients whose sciatica and signs of nerve root impingement do not correspond to any imaging tests and there are obvious psychological overlays to their clinical presentation
- ~~c.~~ those patients whose sciatica and signs of nerve root impingement are accompanied by a previous history of litigation or workmen's compensation claims
- d. those patients whose sciatica and signs of nerve root impingement fail to improve after 4-6 weeks of conservative therapy, and whose imaging tests demonstrate dysfunction corresponding to the symptoms
- e. those patients whose sciatica and signs of nerve root impingement are the result of multiple previous surgeries

17. Identify the type of foot deformity depicted in Figure A

- a. pes valgus
- b. pes planus
- c. pes varus
- d. pes cavus
- e. pes rigidus



18. Which of the following is true regarding whiplash injuries?

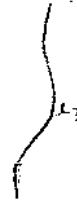
- ~~a.~~ If the patient is free from pain immediately following the insult, the diagnosis of whiplash can be excluded.
- ~~b.~~ The patient's pain is limited to his posterior neck.
- c. Whiplash injuries involve the pelvis and cranium.
- d. 90% of whiplash injuries resolve on their own within 3 weeks.
- e. The majority of damage is caused by hyperflexion of the neck.

19. The Trendelenburg maneuver is designed to test for weakness in which of the following structures?

- a. hip extensors
- b. hip flexors
- c. hip external rotators
- d. hip adductors
- e. hip abductors

20. In assessing a patient prior to performing a lumbar muscle energy technique, you note a lateral curvature in lumbar with an apex on the patient's right side at L3. This patient has which one of the following?

- ~~a.~~ right sidebending and left scoliosis
- b. right scoliosis and left sidebending
- c. right concavity and left convexity
- d. right convexity and right sidebending
- e. right sidebending and right scoliosis



21. Adam is a 45-year-old man complaining of pain in the fold of his right buttock. You find that his pain resolves when he is prone, his right knee flexed to 90°, and his thigh is in the counterstrain treatment position of extension, external rotation and adduction. Where is your finger monitoring the tender point? GEM

- a. 13cm inferior to the greater trochanter on the lateral shaft of the right femur
- b. superior lateral aspect of the posterior surface of the right greater trochanter
- c. midway between the right greater trochanter and the inferior lateral angle of the sacrum
- d. 4cm caudad to the trochanter on the posteromedial surface of the right femoral shaft
- e. right lateral side of the inferior lateral angle of the sacrum

22. Cauda equina syndrome is characterized by which of the following signs and symptoms?
- saddle anesthesia, bilateral leg weakness and positive Patrick's sign
 - saddle anesthesia, loss of C5-6 myotatic reflexes, bilateral leg weakness
 - saddle anesthesia, loss of bowel and bladder control and bilateral Babinski signs
 - saddle anesthesia, bilateral leg weakness and hyper-reflexia
 - saddle anesthesia, loss of bowel and bladder control and bilateral leg weakness
23. In the ICU patient, you can most accurately evaluate the thoracic vertebral and paraspinous structures in the supine position for TART and somatic dysfunction by:
- pushing downwards on the costal cage in the anterior-posterior direction to elicit rotation of the thoracic spine
 - lifting the patient up off the bed with your forearms, using your elbows as the fulcrums to get your fingertips to the spinous processes
 - sliding your hands palm upward under the costal cage and flexing your DIP joints with fingertips under the transverse process
 - translating the costal cage from side to side to get a sense of flexibility of the thoracic vertebral column
 - placing the patient in the lateral recumbent position
24. The Thomas test is used to assess the tightness of primarily which muscles?
- iliopsoas
 - gluteus maximus
 - piriformis
 - gemelli
 - sartorius
25. After diagnosing the pelvis, you place your patient into the following muscle energy position:
- patient supine, hips flexed to 90°, feet on table, knees together
 - physician wraps arms around patient's knees
- This position is for treatment of which type of pelvic somatic dysfunction?
- right on right sacral torsion
 - pubic dysfunction
 - posteriorly rotated innominate
 - anteriorly rotated innominate
 - unilateral sacral shear

26. A 25-year-old male presents to your office with a chief complaint of "pain inside my knee" which started 2 days ago after playing a game of football. You found a tender point in the middle of the popliteal fossa. Which of the following would be the classic treatment position for this tender point?
- PC L
- patient supine with leg off the table; flex knee to 60° with marked internal rotation of the tibia and mild varus of the knee
 - patient supine with leg off the table; flex knee to 40° with slight external rotation of the tibia and mild valgus of the knee
 - patient supine with knee flexed to 45° with external rotation of the tibia; fine tune by adduction of leg and foot
 - patient supine with pillow placed under proximal end of tibia; apply pressure on distal femur anteroposteriorly, and add internal rotation to the tibia
 - patient supine with pillow placed under distal femur; apply pressure on proximal tibia anteroposteriorly, and add internal rotation to the tibia
27. Which of the following is true concerning Roentgenographic Postural Studies?
- studies are best appreciated with the patient in the supine position
 - feet are equidistant from midline so that midheel is directly in the plane of the femoral head
 - x-ray's focus should be at the lumbosacral junction to include lower extremities
 - if the patient is obese or with knees that are genuvalgus, have the patient stand with heels together and toes outgoing
 - lateral views are unnecessary to visualize a scoliosis, as these spinal curvatures exist only in the coronal planes
28. Which of the following tender points is correctly matched with its location?
- LAN 1.5 cm anterior and superior to the lateral malleolus
 - FAN lateral to the extensor hallicus longus tendon
 - MAN 2 cm below the medial malleolus
 - FMC posterior to the distal EXA tender point on the medial calcaneus
 - EXA on the inferior surface of the posterior calcaneus
29. If a patient presents with a history of plantar fasciitis, which of the following counterstrain tender points is most likely to be tender to palpation?
- extended metatarsal 5 (EM5)
 - extension metatarsals (EXM)
 - plantar navicular (PLNAV)
 - flexion calcaneus (FCA) FMC
 - plantar cuboid (CUB)

30. Sara landed hard on her right leg after a lay-up at basketball practice today, which resulted in a first-degree inversion sprain of her ankle. Which of the following is the most appropriate treatment for her ankle?

- ~~a.~~ Hiss plantar whip
- b. direct MFR release of the talotibial articulation
- c. direct MFR release of the fibula
- d. muscle energy, taking the foot primarily into eversion
- e. indirect MFR of the right ankle

31. While performing a muscle strength evaluation, you observe that the patient can raise his arm through full shoulder abduction, but is unable to if any resistance is applied to his arm. You would grade him at what strength level for shoulder abduction?

- a. 1/5
- b. 2/5
- c. 3/5
- d. 4/5
- e. 5/5

32. A 22 year old female sprained her ankle about 2 weeks ago. Now she complains of lateral knee discomfort. Your exam revealed a posterior fibular head. What would be the best position for the patient's foot to achieve a successful HVLA correction?

- a. everted, dorsiflexed and internally rotated
- ~~b.~~ inverted, plantarflexed and externally rotated
- ~~c.~~ inverted, plantarflexed and internally rotated
- d. everted, dorsiflexed and externally rotated
- e. inverted, dorsiflexed and externally rotated

33. Which of the following lesions can be found in a common compensatory pattern in the majority of people?

- ~~a.~~ OA/C1/C2 complex is rotated right
- ~~b.~~ C7/T1 and T1-3 are rotated left
- ~~c.~~ T12/L1 is rotated right
- d. L5/S1 is rotated right
- e. sacrum is in a forward right on right torsion

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R L₅
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34. Which of the following statements about the autonomic nervous system is correct?

- ~~a.~~ whereas the nerves that innervate organs often travel to the organ along the same pathway as their blood supply, this is not true with sympathetic innervation to visceral organs
- ~~b.~~ each visceral organ is only innervated by one branch of the autonomic nervous system, i.e., either parasympathetic or sympathetic
- c. the visceral primary afferent fibers contribute to the neural activity occurring at the segmental level of the spinal cord
- ~~d.~~ very few autonomic nerves contain afferent fiber
- e. spinal neural activity may be acted upon by either somatic or visceral primary afferent fibers, although this does not occur simultaneously

35. A 28-year-old female roller blader presents to your office with a chief complaint of right low back pain after sustaining a fall some weeks earlier. Outside radiologic studies denoted no evidence of fracture or bony abnormality. On examination you note evidence of somatic dysfunction as denoted by a positive standing and seated flexion test on the right side with a deep right sacral sulcus and prominent inferior angle (ILA) on the left. There was good lumbosacral spring. What is your diagnosis?

- a. right on left sacral torsion
 - b. left on right sacral torsion
 - c. left on left sacral torsion
 - d. right on right sacral torsion
 - e. right unilateral sacral flexion
- Rob L/L

36. During Dr. Jones' lecture on integrated treatment, the subject of spirituality was discussed. He suggested that if you have a patient in the ICU, you should do which of the following regarding spirituality and the patient:

- ~~a.~~ Demand that the patient and/or family recognize the need for spirituality involvement
- ~~b.~~ Avoid the subject, only atheists end up in the ICU
- c. The subject has nothing to do with osteopathic physicians, don't waste your time.
- d. Encourage a nurse to spend some time with the patient on the subject of spirituality.
- e. Simply ask if the patient is spiritually involved, because 90% of patients typically are.

37. Although Homan's sign is better known and more commonly used than Lisker's sign, the advantage of Lisker's sign is which one of the following?

- a. it helps in the differential diagnosis of lower leg symptoms that are local in origin versus symptoms that are radicular in origin, i.e., disc herniation
- ~~b.~~ it is much faster to perform
- ~~c.~~ it is far more accurate than Homan's sign and involves the femur for testing
- d. it involves knowing the location of the dorsalis pedis, and posterior tibial arteries and is a better assessment of blood flow
- e. it is better at determining the specific location of the thrombus

38. Susan came to your office 2 weeks post-partum for treatment. She had epidural anesthesia, requiring her to be in stirrups for the delivery. Deciding to treat her hip with indirect MFR, which of the following would you expect to be one of the components of your positioning?

- a. extension of the hip
- b. internal rotation of the hip
- c. marked internal rotation of the femur
- d. marked adduction of the femur
- e. marked external rotation of the hip

39. A 22 year old female sprained her left ankle about 1 month ago. Now she complains of discomfort on dorsiflexion of that foot. On exam, you found the left calcaneus to be more resistant to posterior talocrural glide. Which of the following steps would be **INCORRECT** when using HVLA to correct this dysfunction?

- a. position the patient supine with leg extend
- b. grasp the patient's foot with your fingers curled over the anterosuperior aspect of the talus
- ~~c.~~ place both thumbs on the plantar surface of the foot
- d. plantarflex the ankle to the restrictive barrier
- e. thrust inferiorly on the talus with your fingers to free the talus from the crura

40. The main goal of the initial treatment of an acute whiplash injury is to:

- a. minimize edema and tissue reaction
- b. realign the cervical vertebrae
- c. avoid litigation
- d. reestablish full range of motion
- e. treat the counterstrain tender points

41. When performing indirect MFR of the lumbar spine with your patient supine, which of the following is correct?
- a. flex only the patient's hips and not the knees, and support the patient's legs with your hand
 - ~~b.~~ add rotation by moving the patient's feet laterally
 - ~~c.~~ add sidebending by moving the patient's knees laterally
 - d. add activating force by flattening the lumbar curve and holding the position for 90 seconds
 - e. take the vertebra into its position of ease and fine tune the position as tissues release and change
42. Which of the following is true regarding treatment of whiplash injuries?
- a. HVLA should not be used until at least 3 months post injury.
 - b. Lymphatic drainage techniques are important to decrease edema.
 - ~~c.~~ Vigorous range of motion exercises should be implemented immediately following the injury and continued indefinitely.
 - d. In the acute stage of injury, OMT should be deferred for 48-72 hours.
 - ~~e.~~ MFR should be avoided until the early chronic stage.
43. What is the correct sequence of the following for the development of post-op fever?
- a. water, wind, wound, walking and wonder drugs
 - b. wind, water, wound, walking and wonder drugs
 - c. wound, water, wind, walking and wonder drugs
 - d. wound, wind, water, walking and wonder drugs
 - e. malignant hyperthermia, thyroid crisis, adrenocortical insufficiency, transfusion reaction and wonder drugs
44. Which of the following counterstrain tender points are found on the plantar surface of the foot?
- a. extension metatarsals (EXM), plantar cuboid (CUB), and flexion calcaneus (FCA)
 - b. plantar navicular (PLNAV), flexion calcaneus (FCA) and plantar cuboid (CUB)
 - c. extension metatarsal 5 (EM5), extension metatarsals (EXM), and plantar navicular (PLNAV)
 - d. plantar cuboid (CUB), plantar navicular (PLNAV), and extension metatarsals (EXM)
 - e. plantar cuboid (CUB), flexion calcaneus (FCA), and extension metatarsal 5 (EM5)

45. A 10-year-old boy brought to the urgent care by his mom. Mom states that he has been complaining of right knee pain since his soccer game yesterday. She surfed the web and said that her son has Osgood-Schlatter's Syndrome. Your physical exam revealed a tender point on the medial aspect of the infrapatellar tendon. You commended the mom for being resourceful and proceeded to treat her son with counterstrain. After 90 seconds the knee pain resolved. What was your treatment position?
- a. patient supine with knee extended; apply pressure on lateral side of the patella
 - b. patient supine with knee extended; apply pressure on the medial side of the patella
 - c. patient supine with knee flexed to 60° and marked internal rotation of the tibia and slight varus
 - d. patient supine with marked extension of the knee; elevate distal thigh on a towel, press downward on the leg just below the knee with internal rotation of the tibia
 - e. patient supine with marked extension of the knee; elevate lower leg on a towel, press downward on the thigh just above the knee with internal rotation of the tibia
46. The patient is positioned on his right side with his torso rotated to the right (face toward table). If using muscle energy, which sacral lesion do you treat in this position?
- a. L/R sacral torsion
 - b. right unilateral sacral flexion
 - c. right unilateral sacral extension
 - d. R/L sacral torsion
 - e. R/R sacral torsion
47. In the hospitalized patient, significant areas of somatic dysfunction are often found at:
- a. T2 on the left
 - b. T5-9 for diverticulitis
 - c. T9-12 for heart disease
 - d. transitional areas of the spine
 - e. T1-5 for left colon diseases

48. While diagnosing the pelvis, you discover the following findings:

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- | | |
|-------------------------|-----------------------------|
| L+standing flexion test | L sacral sulcus – shallower |
| L ASIS low | L pubic tubercle – low |
| L PSIS high | L leg longer |

What is the proper physician and patient positions for treatment of the pelvis using muscle energy?

- a. physician stands on the right side of the supine patient with the patient's right knee and hip flexed; physician places caudad shoulder against flexed knee with cephalad hand contacting the right ASIS, and caudad hand contacting the right ischial tuberosity
 - b. physician standing on the left side of the supine patient; patient's left knee and hip flexed; physician's caudad shoulder against flexed knee, cephalad hand contacts left ASIS and caudad hand contacts the left ischial tuberosity
 - c. physician stands on the right side of the supine patient with patient's right leg off the table; physician stabilizes right leg between his legs with the right hand on the left ASIS and left hand on right knee
 - d. physician stands to the left side of the prone patient with the patient's knees flexed and the physician monitoring with both hands
 - e. physician stands to the right of the supine patient; patient's hips flexed to 90°, feet on the table and knees together
49. Which of the following would be a **CONTRAINDICATION** for heel lift therapy?
- a. anatomical short leg
 - b. sacral base unleveling
 - c. scoliosis
 - d. TMJ dysfunction syndrome
 - e. Type IV unleveling
50. Which one of the following statements is correct concerning pulmonary embolism?

- a. it is commonly caused by either fat or blood clot material usually not preceded by DVT in the lower extremities, as in the case of thromboemboli
- b. it is commonly caused by either fat or blood clot material usually preceded by DVT in the lower extremities, as in the case of thromboemboli
- c. the gold standard is the ventilation perfusion lung scan
- d. the classic signs of hemoptysis, pleural ~~and~~ friction rub, gallop rhythm cyanosis and chest splinting are the most common presentation by greater than 90% of the time
- e. OMT is not recommended for the improvement of respiratory function