

# **RPSC AP (Med. Edu.)**

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**(Ortho Spine)**

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पुस्तिका में पृष्ठों की संख्या : 24  
Number of Pages in Booklet : 24पुस्तिका में प्रश्नों की संख्या : 150  
No. of Questions in Booklet : 150

MPA-25

प्रश्न-पुस्तिका संख्या व बारकोड/  
Question Booklet No. & Barcode

813145

Paper Code : 31

इस प्रश्न-पुस्तिका को तब तक न खोलें जब तक  
कहा न जाए। Do not open this Question  
Booklet until you are asked to do so.

Sub : Ortho Spine

समय : 02:30 घण्टे + 10 मिनट अतिरिक्त\*

अधिकतम अंक : 150

Time : 02:30 Hours + 10 Minutes Extra\*

Maximum Marks : 150

प्रश्न-पुस्तिका के पेपर की सील/पोलिथीन बैग को खोलने पर प्रश्न-पत्र हल करने से पूर्व परीक्षार्थी यह सुनिश्चित कर लें कि :

- प्रश्न-पुस्तिका संख्या तथा ओ.एम.आर. उत्तर-पत्रक पर अंकित बारकोड संख्या समान हैं।
- प्रश्न-पुस्तिका एवं ओ.एम.आर. उत्तर-पत्रक के सभी पृष्ठ व सभी प्रश्न सही मुद्रित हैं। समस्त प्रश्न, जैसा कि ऊपर वर्णित है, उपलब्ध हैं तथा कोई भी पृष्ठ कम नहीं है/ मुद्रण त्रुटि नहीं है। किसी भी प्रकार की विसंगति या दोषपूर्ण होने पर परीक्षार्थी वीक्षक से दूसरा प्रश्न-पत्र प्राप्त कर लें। यह सुनिश्चित करने की जिम्मेदारी अभ्यर्थी की होगी। परीक्षा प्रारम्भ होने के 5 मिनट पश्चात् ऐसे किसी दावे/आपत्ति पर कोई विचार नहीं किया जायेगा।

On opening the paper seal/polythene bag of the Question Booklet before attempting the question paper, the candidate should ensure that :

- Question Booklet Number and Barcode Number of OMR Answer Sheet are same.
- All pages & Questions of Question Booklet and OMR Answer Sheet are properly printed. All questions as mentioned above are available and no page is missing/misprinted.

If there is any discrepancy/defect, candidate must obtain another Question Booklet from Invigilator. Candidate himself shall be responsible for ensuring this. No claim/objection in this regard will be entertained after five minutes of start of examination.

## परीक्षार्थियों के लिए निर्देश

1. प्रत्येक प्रश्न के लिये एक विकल्प भरना अनिवार्य है।
2. सभी प्रश्नों के अंक समान हैं।
3. प्रत्येक प्रश्न का मात्र एक ही उत्तर दीजिए। एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा।
4. OMR उत्तर-पत्रक इस प्रश्न-पुस्तिका के अन्दर रखा है। जब आपको प्रश्न-पुस्तिका खोलने को कहा जाए, तो उत्तर-पत्रक निकाल कर ध्यान से केवल नीले बॉल पॉइंट पेन से विवरण भरें।
5. कृपया अपना रोल नम्बर ओ.एम.आर. उत्तर-पत्रक पर सावधानीपूर्वक सही भरें। गलत रोल नम्बर भरने पर परीक्षार्थी स्वयं उत्तरदायी होगा।
6. ओ.एम.आर. उत्तर-पत्रक में करेक्शन पेन/व्हाइटनर/सफेदा का उपयोग निषिद्ध है।
7. प्रत्येक गलत उत्तर के लिए प्रश्न अंक का 1/3 भाग काटा जायेगा। गलत उत्तर से तात्पर्य अशुद्ध उत्तर अथवा किसी भी प्रश्न के एक से अधिक उत्तर से है।
8. प्रत्येक प्रश्न के पाँच विकल्प दिये गये हैं, जिन्हें क्रमशः 1, 2, 3, 4, 5 अंकित किया गया है। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले (बबल) को उत्तर-पत्रक पर नीले बॉल पॉइंट पेन से गहरा करना है।
9. यदि आप प्रश्न का उत्तर नहीं देना चाहते हैं तो उत्तर-पत्रक में पाँचवें (5) विकल्प को गहरा करें। यदि पाँच में से कोई भी गोला गहरा नहीं किया जाता है, तो ऐसे प्रश्न के लिये प्रश्न अंक का 1/3 भाग काटा जायेगा।
- 10.\* प्रश्न-पत्र हल करने के उपरान्त अभ्यर्थी अनिवार्य रूप से ओ.एम.आर. उत्तर-पत्रक जांच लें कि समस्त प्रश्नों के लिये एक विकल्प (गोला) भर दिया गया है। इसके लिये ही निर्धारित समय से 10 मिनट का अतिरिक्त समय दिया गया है।
11. यदि अभ्यर्थी 10% से अधिक प्रश्नों में पाँच विकल्पों में से कोई भी विकल्प अंकित नहीं करता है तो उसको अयोग्य माना जायेगा।
12. मोबाइल फोन अथवा अन्य किसी इलेक्ट्रॉनिक यंत्र का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित है। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है तो उसके विरुद्ध आयोग द्वारा नियमानुसार कार्यवाही की जायेगी।

चेतावनी : अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, तो उस अभ्यर्थी के विरुद्ध पुलिस में प्राथमिकी दर्ज करते हुए और राजस्थान सार्वजनिक परीक्षा (भर्ती में अनुचित साधनों की रोकथाम अध्यापय) अधिनियम, 2022 तथा अन्य प्रभावी कानून एवं आयोग के नियमों-प्रावधानों के तहत कार्यवाही की जाएगी। साथ ही आयोग ऐसे अभ्यर्थी को भविष्य में होने वाली आयोग की समस्त परीक्षाओं से विवर्जित कर सकता है।

## INSTRUCTIONS FOR CANDIDATES

1. It is mandatory to fill one option for each question.
2. All questions carry equal marks.
3. Only one answer is to be given for each question. If more than one answers are marked, it would be treated as wrong answer.
4. The OMR Answer Sheet is inside this Question Booklet. When you are directed to open the Question Booklet, take out the Answer Sheet and fill in the particulars carefully with Blue Ball Point Pen only.
5. Please correctly fill your Roll Number in OMR Answer Sheet. Candidates will themselves be responsible for filling wrong Roll No.
6. Use of Correction Pen/Whitener in the OMR Answer Sheet is strictly forbidden.
7. 1/3 part of the mark(s) of each question will be deducted for each wrong answer. A wrong answer means an incorrect answer or more than one answers for any question.
8. Each question has five options marked as 1, 2, 3, 4, 5. You have to darken only one circle (bubble) indicating the correct answer on the Answer Sheet using BLUE BALL POINT PEN.
9. If you are not attempting a question then you have to darken the circle '5'. If none of the five circles is darkened, one third (1/3) part of the marks of question shall be deducted.
- 10.\* After solving question paper, candidate must ascertain that he/she has darkened one of the circles (bubbles) for each of the questions. Extra time of 10 minutes beyond scheduled time, is provided for this.
11. A candidate who has not darkened any of the five circles in more than 10% questions shall be disqualified.
12. Mobile Phone or any other electronic gadget in the examination hall is strictly prohibited. A candidate found with any of such objectionable material with him/her will be strictly dealt with as per rules.

Warning : If a candidate is found copying or if any unauthorized material is found in his/her possession, F.I.R. would be lodged against him/her in the Police Station and he/she would be liable to be prosecuted under Rajasthan Public Examination (Measures for Prevention of Unfair means in Recruitment) Act, 2022 &amp; any other laws applicable and Commission's Rules-Regulations. Commission may also debar him/her permanently from all future examinations.

उत्तर-पत्रक में दो प्रतियाँ हैं - मूल प्रति और कार्बन प्रति। परीक्षा समाप्ति पर परीक्षा कक्ष छोड़ने से पूर्व परीक्षार्थी उत्तर-पत्रक की दोनों प्रतियाँ वीक्षक को सौंपेंगे, परीक्षार्थी स्वयं कार्बन प्रति अलग नहीं करें। वीक्षक उत्तर-पत्रक की मूल प्रति को अपने पास जमा कर, कार्बन प्रति को मूल प्रति से कट लाइन से मोड़ कर सावधानीपूर्वक अलग कर परीक्षार्थी को सौंपेंगे, जिसे परीक्षार्थी अपने साथ ले जायेंगे। परीक्षार्थी को उत्तर-पत्रक की कार्बन प्रति चयन प्रक्रिया पूर्ण होने तक सुरक्षित रखनी होगी एवं आयोग द्वारा माँगे जाने पर प्रस्तुत करनी होगी।

1. The uncus is responsible for resistance to all except :
  - (1) Lateral bending
  - (2) Lateral listhesis
  - (3) Rotation
  - (4) Flexion
  - (5) Question not attempted
  
2. In TLIF, the graft is placed via :
  - (1) The anterior abdominal approach
  - (2) The neural foramen
  - (3) The lateral approach
  - (4) The inter-transverse process approach
  - (5) Question not attempted
  
3. Which of the following is a key advantage of the lumbar extra-cavitary approach for vertebrectomy over an anterior approach ?
  - (1) Better visualization of the anterior column
  - (2) Lower risk of vascular injury
  - (3) Greater correction of kyphosis
  - (4) More extensive exposure of paraspinal muscles
  - (5) Question not attempted
  
4. Incomplete injury is given a score of \_\_\_\_\_ in SLIC classification.
  - (1) 1
  - (2) 2
  - (3) 0
  - (4) 3
  - (5) Question not attempted
  
5. Which technique causes most hardware prominence ?
  - (1) C2 Laminar screw
  - (2) C1-2 trans-articular screw
  - (3) C2 pars screw
  - (4) C2 pedicle screw
  - (5) Question not attempted
  
6. when using a dural substitute, it is important to :
  - (1) Leave it loosely applied
  - (2) Secure it with multiple interrupted sutures.
  - (3) Ensure a watertight seal at the interface with native dura
  - (4) Use absorbable materials exclusively.
  - (5) Question not attempted
  
7. Which of the following is the primary indication for a Pedicle Subtraction Osteotomy (PSO) in the lumbar spine ?
  - (1) Fixed sagittal imbalance
  - (2) Lumbar spinal stenosis
  - (3) High-grade spondylolisthesis
  - (4) Recurrent disc herniation
  - (5) Question not attempted
  
8. Uni-cortical lateral mass screw can eliminate the following complication :
  - (1) Nerve root injury
  - (2) Spinal cord injury
  - (3) Facet fracture
  - (4) Vertebral artery injury
  - (5) Question not attempted

9. Which of the following is the most common complication associated with iliac screw fixation ?
- (1) Deep vein thrombosis
  - (2) Implant prominence and soft tissue irritation
  - (3) Sacral stress fractures
  - (4) L5-S1 pseudoarthrosis
  - (5) Question not attempted
10. In the context of cervical spine trauma, which ligament is primarily responsible for preventing anterior displacement of the atlas on the axis ?
- (1) Alar ligament
  - (2) Transverse ligament
  - (3) Apical ligament
  - (4) Ligamentum flavum
  - (5) Question not attempted
11. C1-C2 wiring provides maximum stability in which plane ?
- (1) Sagittal
  - (2) Coronal
  - (3) Axial
  - (4) Torsional
  - (5) Question not attempted
12. What is the purpose of using a Valsalva maneuver during intraoperative dural repair ?
- (1) To assess for CSF leakage
  - (2) To reduce intracranial pressure
  - (3) To improve spinal cord visualization
  - (4) To prevent epidural hematoma
  - (5) Question not attempted
13. Which of the following is not a contraindication for interspinous device usage ?
- (1) Spinal stenosis
  - (2) Defect in pars interarticularis
  - (3) Osteoporosis
  - (4) Stand alone usage
  - (5) Question not attempted
14. Which of the following is the most common complication of percutaneous pedicle screw fixation ?
- (1) Rod misalignment
  - (2) Screw malposition
  - (3) Pedicle fracture
  - (4) Adjacent segment degeneration
  - (5) Question not attempted
15. Which of the following is not a common type of dural substitute ?
- (1) Allograft dura
  - (2) Synthetic collagen matrix
  - (3) Titanium mesh
  - (4) Porcine small intestinal submucosa
  - (5) Question not attempted
16. While putting C2 pedicle screw, chances of vertebral artery injury are more if violation occurs :
- (1) Medially
  - (2) Laterally
  - (3) Superiorly
  - (4) Inferiorly
  - (5) Question not attempted

17. Which of the following provides the best correction and long-term outcomes for congenital hemivertebra in pediatric patients ?
- (1) Posterior-only hemivertebra resection with short-segment fusion
  - (2) Anterior-only hemivertebra resection
  - (3) Posterior distraction without fusion
  - (4) Observation until skeletal maturity
  - (5) Question not attempted
18. The hallmark radiographic finding in Ankylosing spondylitis (AS) is :
- (1) Diffuse Idiopathic Skeletal Hyperostosis (DISH)
  - (2) "Bamboo spine" due to bridging syndesmophytes
  - (3) Spondylolisthesis
  - (4) Osteoporosis with compression fractures
  - (5) Question not attempted
19. Which of the following is the most biomechanically stable surgical approach for high grade spondylolisthesis (Meyerding grade III-IV) ?
- (1) Posterior reduction with pedicle screws
  - (2) Anterior Lumbar Interbody Fusion (ALIF) alone
  - (3) Combined anterior-posterior fusion
  - (4) Posterior decompression without fusion
  - (5) Question not attempted
20. What is the most common primary spinal tumor ?
- (1) Chordoma
  - (2) Osteoid osteoma
  - (3) Vertebral hemangioma
  - (4) Chondrosarcoma
  - (5) Question not attempted
21. Which of the following is the most common vascular complication associated with posterior cervical spine surgery ?
- (1) Carotid artery injury
  - (2) Vertebral artery injury
  - (3) Subclavian artery injury
  - (4) External jugular vein injury
  - (5) Question not attempted
22. Which of the following complications is most commonly associated with anterior cervical plating ?
- (1) Dysphagia
  - (2) Pseudarthrosis
  - (3) Adjacent segment disease
  - (4) C5 nerve root palsy
  - (5) Question not attempted
23. Compared to PLIF, what is the primary biomechanical advantage of Transforaminal Lumbar Interbody Fusion (TLIF) ?
- (1) Greater exposure of both nerve roots
  - (2) Lower risk of dural tear
  - (3) Ability to restore sagittal balance better
  - (4) Higher fusion rates
  - (5) Question not attempted

24. Currarino triad does not include :
- (1) Presacral mass
  - (2) Tethered cord
  - (3) Anorectal anomalies
  - (4) Sacral bony anomalies
  - (5) Question not attempted
25. Which of the following is the primary indication for lumbar internal laminectomy in adult patients ?
- (1) Degenerative lumbar scoliosis
  - (2) High-grade lumbar spondylolisthesis
  - (3) Central lumbar stenosis
  - (4) Adjacent segment disease
  - (5) Question not attempted
26. What is the main goal of VEPTR (Vertical Expandable Prosthetic Titanium Rib) implantation used to treat Thoracic Insufficiency Syndrome (TIS) and severe scoliosis ?
- (1) To cure the underlying congenital defect
  - (2) To allow for lung growth
  - (3) To stop all spinal growth
  - (4) To cure all forms of scoliosis
  - (5) Question not attempted
27. Spinal manifestations are not common in :
- (1) Hurler syndrome
  - (2) Hunter syndrome
  - (3) Morquio syndrome
  - (4) Sanfilippo syndrome
  - (5) Question not attempted
28. Thoracic Insufficiency Syndrome (TIS) is primarily characterized by
- (1) Isolated pulmonary hypertension
  - (2) Inability of the thorax to support normal respiration and lung growth
  - (3) Congenital heart defects
  - (4) Isolated spinal cord compression
  - (5) Question not attempted
29. Which of the following intraoperative monitoring techniques is most reliable for detecting spinal cord injury in thoracic spine deformity correction ?
- (1) Somatosensory evoked potentials (SSEPs)
  - (2) Motor evoked potentials (MEPs)
  - (3) Electromyography (EMG)
  - (4) Brainstem auditory evoked potentials (BAEPs)
  - (5) Question not attempted
30. Which of the following is the most common vascular complication of ALIF at L4-L5 ?
- (1) Aortic injury
  - (2) Iliac vein injury
  - (3) Inferior vena cava thrombosis
  - (4) Common femoral artery dissection
  - (5) Question not attempted

31. What is the primary advantage of fluoroscopy based navigation over conventional fluoroscopy in spine surgery ?
- (1) Reduced radiation exposure to the patient
  - (2) Faster surgical time
  - (3) Higher accuracy of pedicle screw placement
  - (4) Lower cost
  - (5) Question not attempted
32. Radiographically, tethered cord is characterized by :
- (1) High conus medullaris
  - (2) Thin filum terminale
  - (3) Low conus medullaris and thickened filum terminale
  - (4) Normal conus and filum
  - (5) Question not attempted
33. Which is the most definitive intra-operative method to distinguish the filum from nerve roots ?
- (1) Visual inspection
  - (2) Palpation
  - (3) Intra-op electrical stimulation and recording of anal sphincter EMG
  - (4) Microscopic evaluation
  - (5) Question not attempted
34. A thickened filum terminale is defined as a diameter
- (1) Less than 1 mm
  - (2) Between 1 and 2 mm
  - (3) Greater than 2 mm
  - (4) Variable, depending on contrast concentration
  - (5) Question not attempted
35. The incidence of pedicle screw breakage and bending is highest in patients who :
- (1) Underwent single-level fusions
  - (2) Had minor deformity reductions
  - (3) Underwent major deformity reductions and multilevel fusions
  - (4) Had well-preserved anterior column support
  - (5) Question not attempted
36. Which of the following is a key difference between vertebroplasty and kyphoplasty ?
- (1) Vertebroplasty uses a balloon to create a cavity before cement injection
  - (2) Kyphoplasty has a higher risk of cement leakage
  - (3) Kyphoplasty has better height restoration and pain relief
  - (4) Vertebroplasty is preferred for burst fractures
  - (5) Question not attempted

37. For lumbar screws, what is the recommended depth of penetration on lateral radiographs to minimize pullout risk ?
- (1) One-third of the vertebral body.
  - (2) Two-thirds of the vertebral body.
  - (3) Full penetration of the vertebral body.
  - (4) Just beyond the pedicle cortex.
  - (5) Question not attempted
38. What is the recommended torque for halo pin tightening in adults ?
- (1) 2-4 inch-pounds
  - (2) 6-8 inch-pounds
  - (3) 10-12 inch-pounds
  - (4) 14-16 inch-pounds
  - (5) Question not attempted
39. What is the recommended minimum mouth opening for a transoral odontoidectomy ?
- (1) 15 mm      (2) 20 mm
  - (3) 25 mm      (4) 30 mm
  - (5) Question not attempted
40. Which of the following is the ideal entry point for occipital plate screws ?
- (1) Just above the foramen magnum
  - (2) At the superior nuchal line
  - (3) 2 cm below the external occipital protuberance
  - (4) In the occipital condyles
  - (5) Question not attempted
41. What is the primary goal of Odontoid Screw Fixation (OSF) ?
- (1) To fuse the C1-C2 joint.
  - (2) To restore the structural integrity of the odontoid process without sacrificing normal mobility.
  - (3) To decompress the spinal cord.
  - (4) To stabilize the occiput to C2.
  - (5) Question not attempted
42. Which approach allows anterior odontoid screw fixation ?
- (1) Transoral approach
  - (2) Anterolateral retropharyngeal approach
  - (3) Smith-Robinson approach
  - (4) Submandibular approach
  - (5) Question not attempted
43. Which of the following is an absolute requirement for odontoid screw fixation ?
- (1) Fracture gap greater than 5 mm.
  - (2) Disruption of the transverse atlantal ligament.
  - (3) Intact transverse atlantal ligament.
  - (4) Fracture line oblique to the frontal plane.
  - (5) Question not attempted
44. What is the main indication for transoral odontoidectomy ?
- (1) Odontoid fracture (Type II)
  - (2) Basilar invagination with brainstem compression
  - (3) Atlantoaxial instability
  - (4) Rheumatoid pannus formation without compression
  - (5) Question not attempted

45. According to the traditional "Rule of Spence," a sum total overhang of both C1 lateral masses over C2 greater than which measurement suggests potential Transverse Atlantal Ligament injury ?
- (1) 3 mm
  - (2) 5 mm
  - (3) 7 mm
  - (4) 10 mm
  - (5) Question not attempted
46. What is the recommended starting point for C2 pedicle screw placement ?
- (1) Medial to the pars interarticularis
  - (2) Midpoint of the superior articular facet
  - (3) 3 mm lateral to the medial border of the pedicle
  - (4) Just inferior to the inferior facet
  - (5) Question not attempted
47. Which fixation technique provides the highest biomechanical stability for C1-C2 instability ?
- (1) Gallie fusion
  - (2) Brooks fusion
  - (3) Harms-Goel screw-rod construct
  - (4) Transarticular screw fixation
  - (5) Question not attempted
48. Which structure is most at risk during a left-sided Smith-Robinson ACDF approach ?
- (1) Vertebral artery
  - (2) Esophagus
  - (3) Recurrent laryngeal nerve
  - (4) Thoracic duct
  - (5) Question not attempted
49. Which ligament is most commonly involved in C1-C2 instability due to rheumatoid arthritis ?
- (1) Ligamentum flavum
  - (2) Anterior longitudinal ligament
  - (3) Transverse atlantal ligament (TAL)
  - (4) Posterior longitudinal ligament
  - (5) Question not attempted
50. Which of the following is the most commonly used trajectory for lateral mass screw placement in the cervical spine (Magerl technique) ?
- (1) 20° lateral, 20° cephalad
  - (2) 30° lateral, 15° cephalad
  - (3) 45° lateral, 10° cephalad
  - (4) 10° lateral, 25° cephalad
  - (5) Question not attempted
51. What is the approximate percentage of head rotation lost following a C1-C2 fusion ?
- (1) 25%
  - (2) 30%
  - (3) 50%
  - (4) 75%
  - (5) Question not attempted

52. The most effective postoperative management strategy for persistent CSF leak after spine surgery is :
- (1) Lumbar drain for 5 days
  - (2) Bed rest for 3 days
  - (3) Direct wound compression
  - (4) Repeat surgery within 24 hours
  - (5) Question not attempted
53. What is a key consideration when placing C2 pedicle screws ?
- (1) Avoiding the recurrent laryngeal nerve.
  - (2) Checking for aberrant vertebral artery location.
  - (3) Ensuring the patient is in a sitting position.
  - (4) Using only fluoroscopic guidance.
  - (5) Question not attempted
54. What is a potential complication of sacrificing the C2 dorsal root ganglion during C1 lateral mass screw placement ?
- (1) Dysphagia
  - (2) Occipital neuralgia
  - (3) Brachial plexus injury
  - (4) Recurrent laryngeal nerve palsy
  - (5) Question not attempted
55. What incision is typically used for ALIF ?
- (1) Midline thoracic incision
  - (2) Pfannenstiel's abdominal incision
  - (3) Posterior midline incision
  - (4) Lateral thoracotomy
  - (5) Question not attempted
56. The best management strategy for an intraoperative vertebral artery injury is
- (1) Immediate ligation
  - (2) Direct repair with sutures
  - (3) Endovascular stenting or embolization
  - (4) Packing with hemostatic agents
  - (5) Question not attempted
57. Which of the following is the most effective dural repair technique for a large dural tear ?
- (1) Simple suturing
  - (2) Autologous fascia lata graft with fibrin glue
  - (3) Non-penetrating titanium clips
  - (4) Fat graft placement without suture repair
  - (5) Question not attempted

58. The artery most at risk during an Anterior Lumbar Interbody Fusion (ALIF) at L4-L5 is:
- (1) Aorta
  - (2) Common iliac artery
  - (3) Inferior mesenteric artery
  - (4) Middle sacral artery
  - (5) Question not attempted
59. Why is pathology at L5-S1 generally a contraindication for LLIF?
- (1) High risk of vascular injury.
  - (2) Interference from the ilium of the pelvis.
  - (3) Increased risk of nerve root injury.
  - (4) Difficulty in achieving adequate disc space distraction.
  - (5) Question not attempted
60. The optimal lumbar lordosis (LL) angle should be within how many degrees of pelvic incidence (PI) for sagittal balance?
- (1)  $PI-LL \leq 5^\circ$
  - (2)  $PI-LL \leq 10^\circ$
  - (3)  $PI-LL \leq 15^\circ$
  - (4)  $PI-LL \leq 20^\circ$
  - (5) Question not attempted
61. What is the minimum recommended titanium rod diameter for lumbar pedicle screw fixation for patients weighing 90-225 lbs (40-100 kg)?
- (1) 4.5 mm
  - (2) 5.5 mm
  - (3) 6.35 mm (1/4 inch)
  - (4) 3.0 mm
  - (5) Question not attempted
62. Which of the following is a key surgical goal in sagittal balance correction?
- (1) Pelvic incidence = Sacral slope
  - (2) Pelvic tilt  $< 25^\circ$
  - (3) Lumbar lordosis  $< 30^\circ$
  - (4) Thoracic kyphosis  $> 50^\circ$
  - (5) Question not attempted
63. What is the primary goal of both Smith-Petersen Osteotomy (SPO) and Pedicle Subtraction Osteotomy (PSO)?
- (1) To correct scoliosis.
  - (2) To correct sagittal imbalance or kyphosis.
  - (3) To treat lumbar disc herniation.
  - (4) To stabilize vertebral fractures.
  - (5) Question not attempted
64. Intraoperative loss of somatosensory evoked potentials (SSEPs) with preserved motor evoked potentials (MEPs) suggests:
- (1) Global spinal cord ischemia
  - (2) Selective dorsal column dysfunction
  - (3) Complete spinal cord injury
  - (4) Lower motor neuron injury
  - (5) Question not attempted
65. What are the two primary directions for S2 screw placement?
- (1) Anterior and posterior
  - (2) Medial and lateral-superior
  - (3) Superior and inferior
  - (4) Proximal and distal
  - (5) Question not attempted

66. Which spinal surgery carries the highest risk of motor evoked potential (MEP) signal loss ?
- (1) Anterior cervical discectomy and fusion (ACDF)
  - (2) Posterior cervical laminectomy
  - (3) Spinal deformity correction with osteotomies
  - (4) Minimally invasive lumbar decompression
  - (5) Question not attempted
67. What is a key difference between kyphoplasty and vertebroplasty?
- (1) Kyphoplasty uses saline; vertebroplasty uses PMMA.
  - (2) Kyphoplasty involves balloon tamp use; vertebroplasty does not.
  - (3) Vertebroplasty aims to restore vertebral body height; kyphoplasty does not.
  - (4) There is no difference between the two procedures.
  - (5) Question not attempted
68. Which of the following describes the key characteristic of a Pedicle Subtraction Osteotomy (PSO) ?
- (1) Resection of only the spinous process.
  - (2) Resection of the posterior elements, pedicles, and vertebral body.
  - (3) Anterior only vertebral body resection.
  - (4) Resection of the Transverse process.
  - (5) Question not attempted
69. What is a potential complication of PMMA injection during Vertebroplasty/Kyphoplasty ?
- (1) Increased bone mineral density.
  - (2) Cement leakage into the spinal canal.
  - (3) Decreased risk of adjacent level fractures.
  - (4) Improved disc hydration.
  - (5) Question not attempted
70. The most common complication following revision lumbar fusion surgery is :
- (1) Implant failure
  - (2) Dural tear
  - (3) Adjacent segment disease
  - (4) Pseudarthrosis
  - (5) Question not attempted
71. Which of the following techniques reduces the risk of adjacent segment disease after lumbar fusion ?
- (1) Use of rigid pedicle screw fixation
  - (2) Sacral slope correction
  - (3) Motion-preserving dynamic stabilization
  - (4) Hyperlordotic fusion
  - (5) Question not attempted

- 813145
72. Which of the following is the most common reason for revision laminectomy ?
- (1) Residual disc fragment
  - (2) Scar tissue formation
  - (3) Epidural hematoma
  - (4) Incorrect level decompression
  - (5) Question not attempted
73. What is the suspected pathophysiology of Scheuermann's kyphosis ?
- (1) Congenital vertebral anomalies
  - (2) Disorganization in the growth plate
  - (3) Muscle imbalances causing vertebral rotation
  - (4) Ligamentous laxity leading to kyphosis
  - (5) Question not attempted
- 813145
74. What is a potential benefit of kyphoplasty over vertebroplasty ?
- (1) Increased risk of cement extravasation.
  - (2) Potential restoration of vertebral body height.
  - (3) Increased operative time.
  - (4) Increased post operative pain.
  - (5) Question not attempted
- 813145
75. What is a surgical indication for Scheuermann's kyphosis ?
- (1) Kyphosis  $< 50^\circ$
  - (2) Kyphosis  $> 70^\circ$
  - (3) Mild pain controlled with NSAIDs.
  - (4) Skeletally mature patients with stable curves.
  - (5) Question not attempted
76. The most common vascular injury during anterior cervical spine surgery is :
- (1) Carotid artery injury
  - (2) Vertebral artery injury
  - (3) Internal jugular vein injury
  - (4) Thyroid artery injury
  - (5) Question not attempted
77. The normal Pelvic Incidence-Lumbar Lordosis (PI-LL) mismatch should be less than :
- (1)  $10^\circ$
  - (2)  $15^\circ$
  - (3)  $20^\circ$
  - (4)  $25^\circ$
  - (5) Question not attempted

78. The primary indication for cervical disc arthroplasty over anterior cervical discectomy and fusion (ACDF) is :
- (1) Severe spondylosis
  - (2) Multilevel disc disease
  - (3) Single-level soft disc herniation without instability
  - (4) Severe facet arthropathy
  - (5) Question not attempted
79. During a lumbar laminectomy at L4-L5, excessive bleeding is encountered from the lateral aspect of the vertebral body. Considering the vascular anatomy of the lumbar spine, which vessel is most likely the source of the hemorrhage ?
- (1) The median sacral artery
  - (2) The iliolumbar artery
  - (3) The ascending lumbar artery
  - (4) The segmental artery
  - (5) Question not attempted
80. When is surgical intervention typically indicated for Hemivertebra ?
- (1) When there is less than 5 degrees of curve progression.
  - (2) When there is 5 degrees of curve progression.
  - (3) When the patient reaches skeletal maturity.
  - (4) When the patient is asymptomatic.
  - (5) Question not attempted
81. What anatomical structure poses a risk of injury during the minimally invasive presacral retroperitoneal approach for lumbosacral axial instrumentation ?
- (1) the spinal cord
  - (2) the ureters
  - (3) the psoas muscle
  - (4) the transverse processes
  - (5) Question not attempted
82. Which anticoagulant regimen is preferred for preoperative bridging in a patient on chronic warfarin therapy undergoing spine surgery ?
- (1) Stop warfarin 1 day before, restart immediately post-op
  - (2) Stop warfarin 5 days before, start LMWH 3 days pre-op, stop LMWH 24 hours pre-op
  - (3) Stop warfarin 5 days before, no bridging required
  - (4) Continue warfarin throughout surgery
  - (5) Question not attempted
83. The best suture technique for watertight dural closure is
- (1) Running non-absorbable suture
  - (2) Simple interrupted absorbable sutures
  - (3) Running locked absorbable sutures
  - (4) Non-penetrating clips
  - (5) Question not attempted

84. Which positioning complication is most common in prone-positioned spine surgeries ?
- (1) Brachial plexus injury
  - (2) Air embolism
  - (3) Ischemic Optic Neuropathy (ION)
  - (4) Pulmonary edema
  - (5) Question not attempted
85. What is a key difference between foot drop caused by radiculopathy and that caused by peroneal neuropathy ?
- (1) Radiculopathy typically presents with painless foot drop.
  - (2) Peroneal neuropathy involves proximal muscle weakness.
  - (3) Radiculopathy often presents with pain and sensory changes in the dermatome.
  - (4) Peroneal neuropathy affects the posterior tibialis muscle.
  - (5) Question not attempted
86. What surgical approach is typically used for lumbar total disc arthroplasty ?
- (1) Posterior midline approach
  - (2) Lateral trans-psoas approach
  - (3) Anterior retroperitoneal or transperitoneal approach
  - (4) Thoracotomy
  - (5) Question not attempted
87. When is an EMG most reliable in evaluating foot drop ?
- (1) Immediately after symptom onset.
  - (2) After 1 week of symptoms.
  - (3) After approximately 3 weeks of symptoms.
  - (4) After 6 months of symptoms.
  - (5) Question not attempted
88. The recommended temperature for preventing intraoperative hypothermia in spine surgery is :
- (1) 34-35°C
  - (2) 35-36°C
  - (3) 36-37°C
  - (4) 37-38°C
  - (5) Question not attempted
89. The primary reason for using total intravenous anesthesia (TIV1) in spine surgery is :
- (1) Reduced nausea and vomiting
  - (2) Lower blood loss
  - (3) Improved intraoperative neuromonitoring signals
  - (4) Faster recovery
  - (5) Question not attempted

90. The ideal intraoperative goal for mean arterial pressure (MAP) during spine surgery to optimize spinal cord perfusion is :
- (1) 50-60 mmHg
  - (2) 60-70 mmHg
  - (3) 70-85 mmHg
  - (4) 85-100 mmHg
  - (5) Question not attempted
91. What is a common indication for performing a vertebrectomy via the lateral extracavitary approach ?
- (1) Lumbar disc herniation
  - (2) Vertebral osteomyelitis
  - (3) Cervical spondylosis
  - (4) Scoliosis correction in the lumbar spine
  - (5) Question not attempted
92. What is a common surgical technique used for spondylolysis repair ?
- (1) Anterior lumbar interbody fusion (ALIF)
  - (2) Pars repair with direct screw fixation
  - (3) Laminectomy alone
  - (4) Vertebroplasty
  - (5) Question not attempted
93. What is a common method of instrumentation used during a posterior spinal fusion for a high grade spondylolisthesis ?
- (1) Interspinous process spacers
  - (2) Pedicle screws and rods
  - (3) Facet joint screws
  - (4) Kyphoplasty
  - (5) Question not attempted
94. A patient is diagnosed with tuberculous osteomyelitis of the spine. Which of the following is a characteristic feature of this condition ?
- (1) Rapid progression of symptoms
  - (2) Presence of a palpable abscess
  - (3) Formation of a cold abscess
  - (4) Sudden onset of neurological deficits
  - (5) Question not attempted
95. A patient presents with discitis. Which of the following is the most common causative organism ?
- (1) Staphylococcus aureus
  - (2) Escherichia coli
  - (3) Pseudomonas aeruginosa
  - (4) Streptococcus pneumoniae
  - (5) Question not attempted

96. A patient with a high-grade spondylolisthesis, develops post operative cauda equina syndrome. Which of the following is the most appropriate next step in management ?
- (1) Observation and conservative management
  - (2) Immediate surgical decompression
  - (3) High dose corticosteroids
  - (4) Lumbar puncture to evaluate for infection
  - (5) Question not attempted
97. A patient is diagnosed with pyogenic osteomyelitis of the lumbar spine. Which of the following is the most common causative organism ?
- (1) Staphylococcus aureus
  - (2) Escherichia coli
  - (3) Pseudomonas aeruginosa
  - (4) Streptococcus pneumoniae
  - (5) Question not attempted
98. A patient presents with a spinal epidural abscess. Which of the following is the most appropriate initial treatment ?
- (1) Antibiotics alone
  - (2) Surgical drainage alone
  - (3) Antibiotics and surgical drainage
  - (4) Supportive care alone
  - (5) Question not attempted
99. A patient presents with a 2-month history of back pain, fever, and weight loss. Imaging studies reveal a destructive lesion in the thoracic spine. What is the most likely diagnosis ?
- (1) Pyogenic osteomyelitis
  - (2) Tuberculous osteomyelitis
  - (3) Spinal epidural abscess
  - (4) Discitis
  - (5) Question not attempted
100. During a complex spinal deformity surgery, the patient's temperature drops to 34 degrees Celsius. What effect does this have on the neuromonitoring studies ?
- (1) It will increase the amplitude of the SSEPs. (Somatosensory Evoked Potentials)
  - (2) It will decrease the amplitude and increase the latency of both SSEPs and MEPs.
  - (3) It will have no effect on the neuromonitoring studies.
  - (4) It will increase the amplitude of the MEPs. (Motor Evoked Potentials)
  - (5) Question not attempted

101. A patient undergoes a CSF analysis after a spinal cord stimulation trial. The results show a normal protein level and glucose level. What is the most likely interpretation of this finding ?
- (1) Normal CSF analysis
  - (2) Abnormal CSF analysis due to spinal cord stimulation
  - (3) Abnormal CSF analysis due to infection
  - (4) Abnormal CSF analysis due to spinal cord injury
  - (5) Question not attempted
102. What is the anatomical generator of the N13 wave of SSEP thought to be ?
- (1) The dorsal root ganglion
  - (2) The cervicomedullary junction
  - (3) The thalamus
  - (4) The primary sensory cortex
  - (5) Question not attempted
103. Which SSEP (Somatosensory Evoked Potentials) component is most sensitive to changes in anesthetic depth ?
- (1) Peripheral nerve components
  - (2) Spinal cord components
  - (3) Cortical components
  - (4) All components are equally sensitive
  - (5) Question not attempted
104. What is a common application of CT-based navigation in spine surgery ?
- (1) Disc replacement
  - (2) Vertebroplasty
  - (3) Pedicle screw placement
  - (4) Laminectomy alone
  - (5) Question not attempted
105. A patient undergoes a CSF analysis after a spinal tumor resection. The results show a protein level of 120 mg/dL. What is the most likely interpretation of this finding ?
- (1) Normal protein level
  - (2) Elevated protein level due to tumor presence
  - (3) Elevated protein level due to surgical trauma
  - (4) Decreased protein level due to CSF leak
  - (5) Question not attempted
106. A patient presents with a spinal subarachnoid hemorrhage. What would you expect to find on CSF analysis ?
- (1) Elevated red blood cell count and xanthochromia
  - (2) Normal red blood cell count and no xanthochromia
  - (3) Decreased red blood cell count and xanthochromia
  - (4) Elevated white blood cell count and no xanthochromia
  - (5) Question not attempted

107. A patient presents with a spinal epidural abscess. What would you expect to find on CSF analysis ?
- (1) Elevated protein level and low glucose level
  - (2) Normal protein level and normal glucose level
  - (3) Decreased protein level and elevated glucose level
  - (4) Elevated white blood cell count and normal protein level
  - (5) Question not attempted
108. A patient with a history of chronic renal failure requires a lumbar spinal fusion. Which bone graft material should be avoided due to potential complications related to their medical history ?
- (1) Autograft from the iliac crest
  - (2) Allograft cancellous bone
  - (3) Bone Morphogenetic Protein-2 (BMP-2)
  - (4) Demineralized Bone Matrix (DBM)
  - (5) Question not attempted
109. What is a common material used for synthetic bone grafts ?
- (1) Titanium
  - (2) Polymethylmethacrylate (PMMA)
  - (3) Calcium phosphate
  - (4) Stainless steel
  - (5) Question not attempted
110. Which of the following is a common complication of inadequate dural repair ?
- (1) Epidural fibrosis
  - (2) Arachnoiditis
  - (3) CSF fistula
  - (4) Spinal stenosis
  - (5) Question not attempted
111. Chassaignac tubercle is an important landmark to identify :
- (1) C3-4
  - (2) C4-5
  - (3) C5-6
  - (4) C6-7
  - (5) Question not attempted
112. A patient undergoes a lumbar puncture after a spinal cord injury. The CSF analysis reveals a protein level of 80 mg/dL. What is the most likely interpretation of this finding ?
- (1) Normal protein level
  - (2) Elevated protein level due to spinal cord injury
  - (3) Elevated protein level due to infection
  - (4) Decreased protein level due to CSF leak
  - (5) Question not attempted

113. Which anatomical parameter is more critical for pedicle screw placement ?
- (1) Sagittal pedicle height
  - (2) Transverse pedicle width
  - (3) Sagittal pedicle angle
  - (4) Coronal pedicle angle
  - (5) Question not attempted
114. Which factor is most strongly associated with postoperative C5 nerve palsy ?
- (1) Increased spinal canal diameter
  - (2) Excessive posterior decompression
  - (3) Preoperative myelomalacia
  - (4) Use of cervical pedicle screws
  - (5) Question not attempted
115. Which spinal cord morphological type is associated with highest incidence of IONM loss ?
- (1) Type 1      (2) Type 2
  - (3) Type 3      (4) Type 4
  - (5) Question not attempted
116. What is the most common late complication after cervical laminectomy without fusion ?
- (1) Epidural hematoma
  - (2) Post-laminectomy kyphosis
  - (3) CSF leak
  - (4) C5 palsy
  - (5) Question not attempted
117. Which of the following is the most appropriate approach for an anterior thoracic corpectomy at T5-T6 ?
- (1) Transthoracic approach
  - (2) Thoracoabdominal approach
  - (3) Transsternal approach
  - (4) Posterior costotransversectomy
  - (5) Question not attempted
118. During a TLIF procedure, you are placing a pedicle screw at L4. Intraoperative EMG monitoring shows a sudden decrease in the left L4 nerve root signal. What is the most likely cause and the most appropriate immediate action ?
- (1) Lateral breach of the pedicle; withdraw and redirect the screw.
  - (2) Medial breach of the pedicle; immediately remove the screw.
  - (3) Ventral breach of the vertebral body; advance the screw.
  - (4) Thermal injury from drilling; irrigate with cold saline.
  - (5) Question not attempted
119. A patient with a known metal allergy requires pedicle screw fixation. Which of the following implant materials is most appropriate ?
- (1) Stainless steel
  - (2) Cobalt-Chromium alloy
  - (3) Titanium alloy
  - (4) Polyetheretherketone (PEEK)
  - (5) Question not attempted

120. What is the disadvantage of percutaneous pedicle screw placement ?
- (1) decreased operative time
  - (2) decreased radiation exposure
  - (3) Increased radiation exposure
  - (4) decreased blood loss
  - (5) Question not attempted
121. Avulsion fracture of Apical/Alar ligament from odontoid is classified as :
- (1) Type I
  - (2) Type II
  - (3) Type IIA
  - (4) Type III
  - (5) Question not attempted
122. Dynesys is an example of :
- (1) Soft fusion
  - (2) Dynamic stabilization
  - (3) Semi-rigid fixation
  - (4) Prosthetic fixation
  - (5) Question not attempted
123. During a left-sided thoracotomy for T6 corpectomy, which structure is at highest risk of injury ?
- (1) Azygous vein
  - (2) Thoracic duct
  - (3) Recurrent laryngeal nerve
  - (4) Aorta
  - (5) Question not attempted
124. Which of the following is a key advantage of endoscopic thoracic discectomy over open discectomy ?
- (1) Better visualization of spinal cord
  - (2) Lower risk of dural tear
  - (3) Reduced pulmonary complications
  - (4) More complete disc removal
  - (5) Question not attempted
125. Polyaxial pedicle screws, compared to monoaxial screws, have :
- (1) Higher strength
  - (2) Lower strength
  - (3) Equal strength
  - (4) No difference in strength
  - (5) Question not attempted
126. What is the primary indication for Vertical Expandable Prosthetic Titanium Rib (VEPTR) surgery ?
- (1) Adolescent idiopathic scoliosis
  - (2) Early-onset scoliosis with thoracic insufficiency
  - (3) Congenital kyphosis
  - (4) Post-traumatic spinal deformity
  - (5) Question not attempted
127. Which lumbar disc replacement has the largest and longest clinical experience ?
- (1) Charite
  - (2) Prodisc-L
  - (3) Maverick
  - (4) FlexiCore
  - (5) Question not attempted

128. rhBMP-2 is FDA approved for following :
- (1) TLIF cage
  - (2) PLIF cage
  - (3) OLIF cage
  - (4) ALIF cage
  - (5) Question not attempted
129. Gas in the disc space is known as
- (1) Knuttson Phenomenon
  - (2) Hutchinson Phenomenon
  - (3) Kummel's Phenomenon
  - (4) Mixer Phenomenon
  - (5) Question not attempted
130. Which of the following factors most strongly predicts correction loss after posterior thoracolumbar fusion for scoliosis ?
- (1) Patient age
  - (2) Preoperative Cobb angle
  - (3) Use of allograft vs. autograft
  - (4) Number of fused segments
  - (5) Question not attempted
131. Which of the following is a key advantage of pedicle screw fixation over other spinal fixation methods ?
- (1) It only engages the posterior column of the spine.
  - (2) It provides the weakest point of attachment to the spine.
  - (3) It engages all three columns of the spine.
  - (4) It requires intact dorsal elements.
  - (5) Question not attempted
132. What is the most appropriate reconstruction strategy after a complete vertebrectomy for a thoracic spinal tumor ?
- (1) Structural allograft only
  - (2) Titanium mesh cage with anterior plating
  - (3) Pedicle screw fixation alone
  - (4) Autograft alone
  - (5) Question not attempted
133. Which of the following surgical adjuncts can help minimize epidural fibrosis after a revision laminectomy ?
- (1) Use of hemostatic agents alone
  - (2) Leaving the dura exposed
  - (3) Placement of an absorbable barrier
  - (4) Avoiding closure of the paraspinal muscles
  - (5) Question not attempted
134. In a patient presenting with recurrent radiculopathy following a previous lumbar laminectomy, which imaging finding would most strongly suggest the need for revision surgery ?
- (1) Mild disc desiccation at the operated level.
  - (2) Minimal facet joint hypertrophy.
  - (3) Epidural scar tissue causing significant neural foramen stenosis.
  - (4) Slight increase in vertebral body endplate sclerosis.
  - (5) Question not attempted

135. Compared to primary laminectomy, revision laminectomy is associated with :
- (1) Lower risk of dural tears
  - (2) Decreased operative time
  - (3) Higher risk of epidural fibrosis
  - (4) Lower risk of nerve root injury
  - (5) Question not attempted
136. Which of the following is a feature of IDD on MRI ?
- (1) Disc space narrowing
  - (2) Black disc
  - (3) Endplate sclerosis
  - (4) Vacuum sign
  - (5) Question not attempted
137. Which of the following is the greatest risk factor for neurologic injury during scoliosis surgery ?
- (1) Use of allograft
  - (2) Preoperative myelomalacia
  - (3) Overcorrection of deformity
  - (4) Patient age
  - (5) Question not attempted
138. Compared to Smith-Petersen osteotomy, a Pedicle Subtraction Osteotomy (PSO) provides :
- (1) Less correction per level
  - (2) Greater sagittal plane correction
  - (3) Lower risk of neurologic injury
  - (4) More preservation of posterior elements
  - (5) Question not attempted
139. Which vessel is most at risk during an anterior approach to the lower thoracic spine (T10-T12) ?
- (1) Aorta
  - (2) Inferior vena cava
  - (3) Segmental arteries
  - (4) Subclavian artery
  - (5) Question not attempted
140. Which surgical procedure involves a bilateral posterior approach, with removal of the lamina and insertion of inter-body cages directly into the disc space ?
- (1) ALIF
  - (2) PLIF
  - (3) TLIF
  - (4) LLIF
  - (5) Question not attempted
141. Most common level for thoracic disc herniation is :
- (1) T8-9
  - (2) 9-10
  - (3) T10-T11
  - (4) T11-12
  - (5) Question not attempted
142. The most important factor in determining the outcome of revision laminectomy is
- (1) the presence of epidural fibrosis.
  - (2) the adequacy of decompression.
  - (3) the presence of significant medical comorbidities.
  - (4) the patient's preoperative neurological function.
  - (5) Question not attempted

143. Which of the following techniques provides the most direct access to decompress the thoracic spinal cord for a central disc herniation ?
- (1) Posterior laminectomy
  - (2) Costotransversectomy
  - (3) Transpedicular approach
  - (4) Lateral extra-cavitary approach
  - (5) Question not attempted
144. Which approach often requires the mobilization of the great vessels ?
- (1) PLIF
  - (2) TLIF
  - (3) ALIF
  - (4) LLIF
  - (5) Question not attempted
145. Which procedure has maximum support in literature for neck pain ?
- (1) ACDF
  - (2) ACCF
  - (3) Anterior cervical discectomy
  - (4) Disc arthroplasty
  - (5) Question not attempted
146. Indication for corpectomy in the treatment of cervical myelopathy include all except :
- (1) OPLL
  - (2) Migrated disc fragment
  - (3) Posterior osteophytes
  - (4) Lordotic cervical alignment
  - (5) Question not attempted
147. Which of the following provides the strongest biomechanical stability for spinopelvic fixation ?
- (1) Iliac screws
  - (2) S2 alar-iliac (S2AI) screws
  - (3) Sacral alar screws
  - (4) Traditional sacral screws
  - (5) Question not attempted
148. Compared to PLIF, TLIF requires :
- (1) More extensive nerve root retraction
  - (2) Less nerve root retraction
  - (3) An anterior approach
  - (4) Larger bone grafts
  - (5) Question not attempted
149. Which of the following factors most strongly correlates with poor outcomes following posterior lumbar discectomy ?
- (1) Age > 60 years
  - (2) Large annular defect
  - (3) Disc herniation at L3-L4
  - (4) Presence of Modic changes
  - (5) Question not attempted
150. Roy Camille classified the flexion deformity of upper sacrum with posterior displacement as :
- (1) Type I
  - (2) Type II
  - (3) Type III
  - (4) Type IV
  - (5) Question not attempted

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