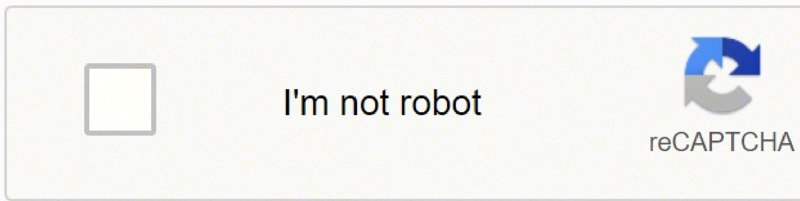

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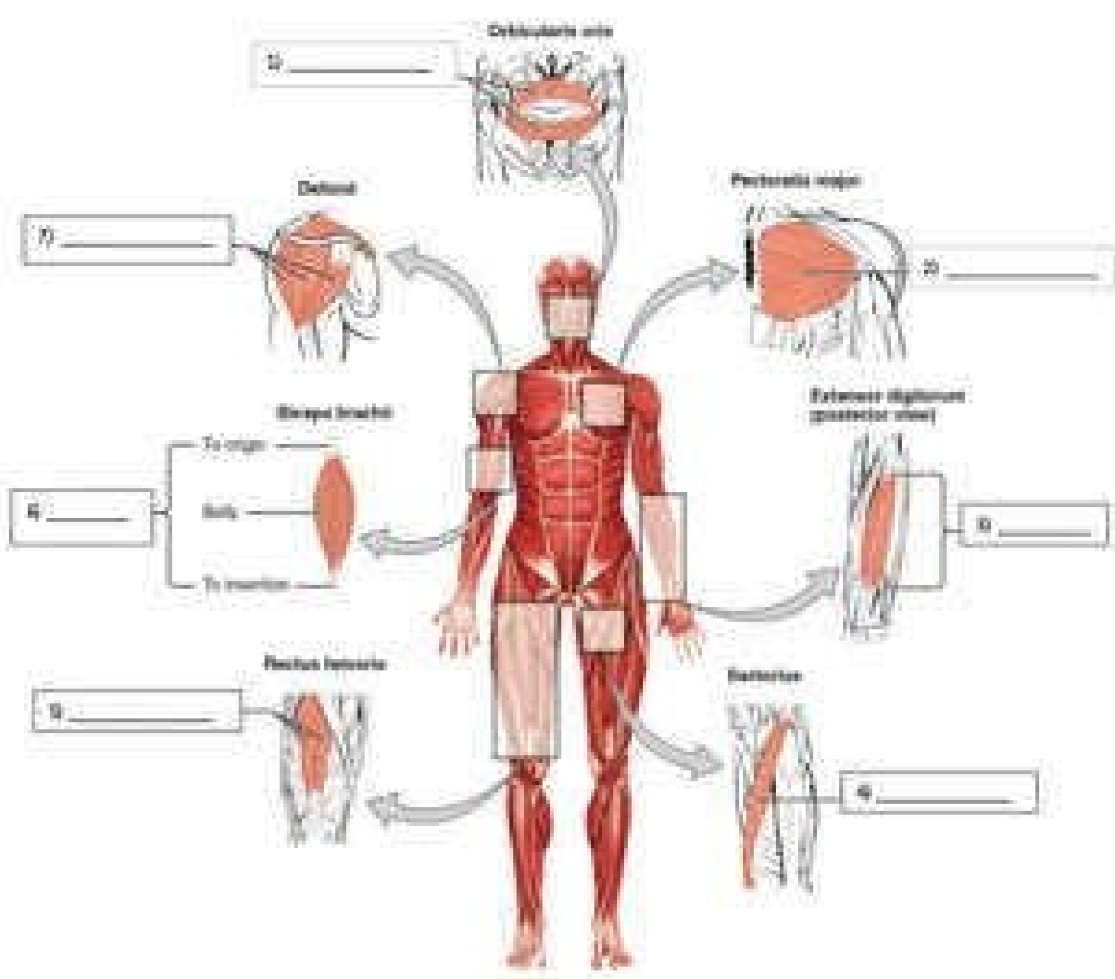
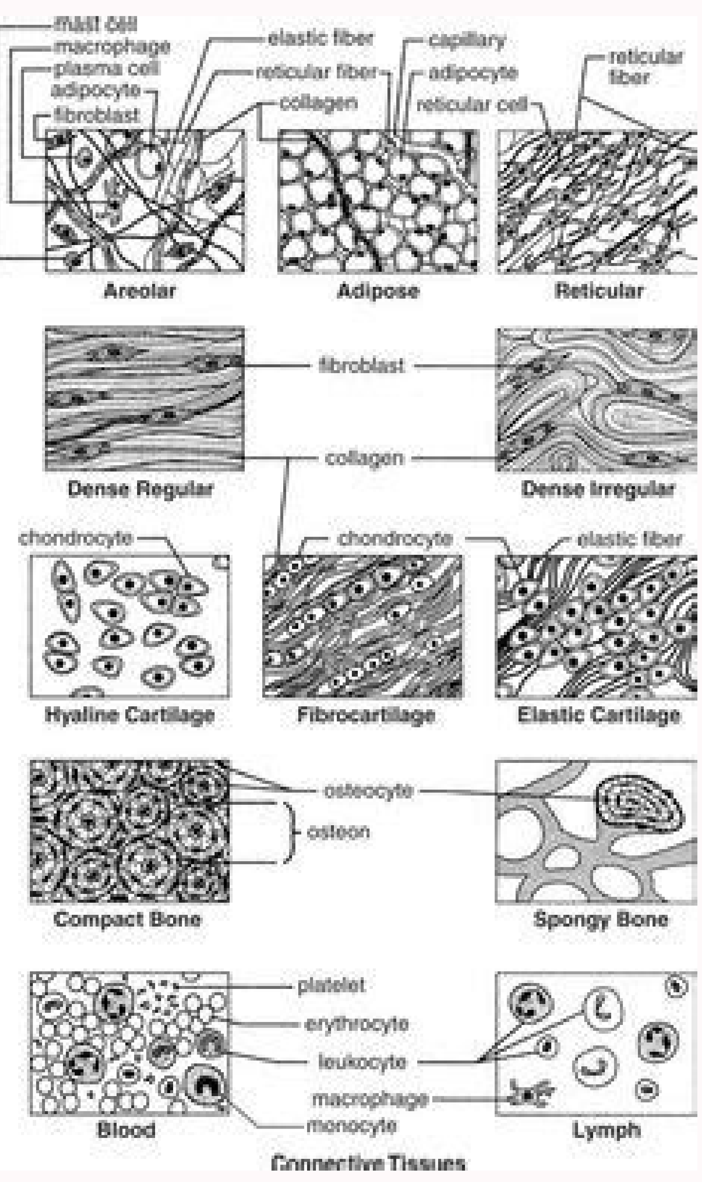
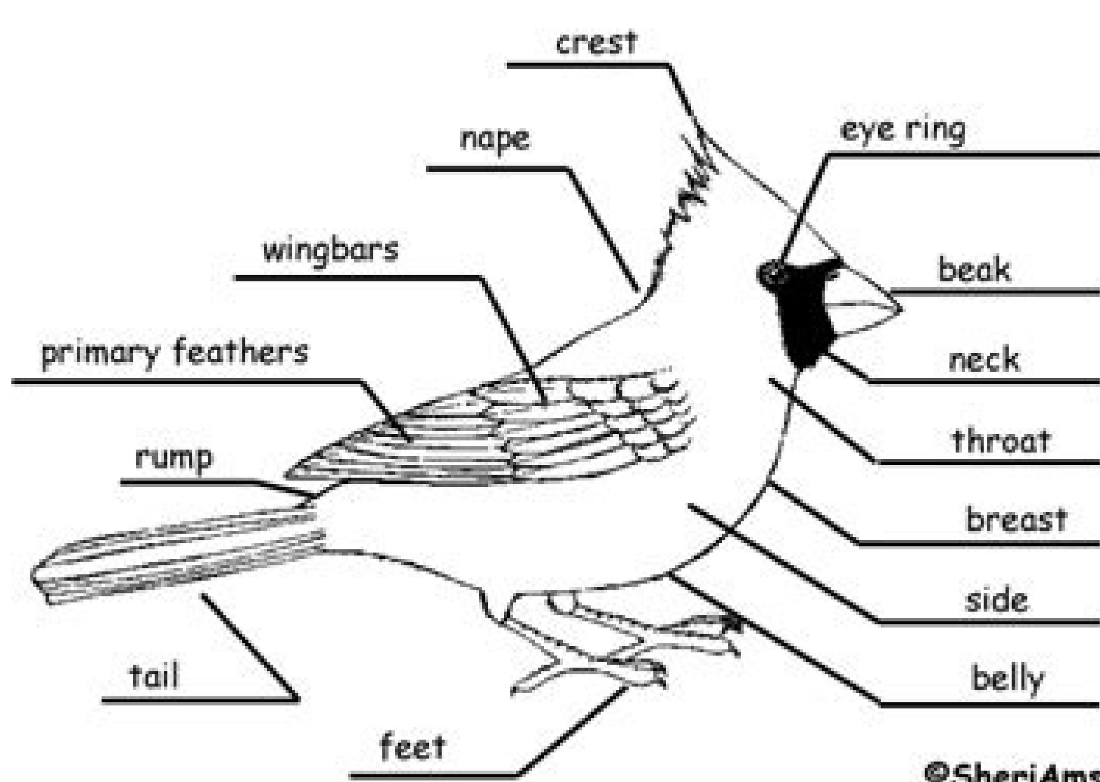
Muscle diagram worksheet with answers key 3rd





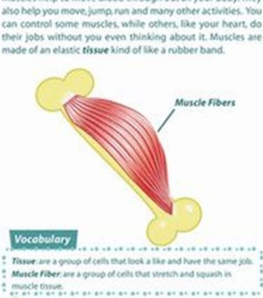


Name ______________________________ Date ___________ Per ______

Anatomy of the Muscular System Worksheet

Multiple Choice

1. An entire skeletal muscle is covered by a coarse sheath called
   a. Endomysium
   b. Perimysium
   c. Epimysium
   d. Aponeurosis
2. Muscles that are arranged like feathers in a plume are described as
   a. Parallel
   b. Convergent
   c. Sphincter
   d. Pennate
3. Aponeurosis is
   a. Broad and flat
   b. Tube-shaped
   c. Featherlike
   d. Circular
4. Antagonists are muscles that
   a. Oppose prime movers
   b. Facilitate prime movers
   c. Stabilize muscles
   d. Directly perform movements
5. A fixed point about which a rod moves is called a
   a. lever
   b. bone
   c. belly
   d. fulcrum
6. In first-class levers the
   a. Fulcrum is between the load and the force
   b. Load if between the fulcrum and force
   c. Force is between the fulcrum and load
   d. Load and force are equal
7. All of the following are rotator cuff muscles except
   a. Deltoid
   b. Infraspinatus
   c. Supraspinatus
   d. Teres minor
8. The muscle that shrugs the shoulders is the
   a. Sternocleidomastoid
   b. Deltoid
   c. Trapezius
   d. Pectoralis major
9. The posterior arm muscle that extends the forearm is the
   a. triceps brachii
   b. brachioradialis
   c. brachialis
   d. biceps brachii
10. The muscles of the quadriceps femoris include all of the following except
    a. Vastus intermedius
    b. Vastus medialis
    c. Vastus lateralis
    d. Vastus femoris
11. The anterior superior iliac spine is the site of origin for the
    a. Sartorius
    b. Rectus femoris
    c. Gracilis
    d. Iliacus
12. Plantar flexion of the foot is achieved by the
    a. Tibialis anterior
    b. Tibialis posterior
    c. Peroneus brevis
    d. Soleus
13. The muscles of the hamstring include all of the following except
    a. Iliopsoas
    b. Semitendinosus
    c. Semimembranosus
    d. Biceps femoris
14. Which of the following muscles does not move the upper arm?
    a. Pectoralis major
    b. Latissimus dorsi
    c. Deltoid
    d. Trapezius
15. The origin of a muscle is on the femur, and the insertion is on the tibia. When it contracts, it bends the knee. Which of the following is true?
    a. The knee is acting as a fulcrum
    b. It is an example of a first-class lever
    c. It is an example of a second-class lever
    d. A and C
16. The origin of a muscle is on the femur, and the insertion is on the tibia. When it contracts, it bends the knee. The fibers run parallel. What term might be a part of its name?
    a. Rectus
    b. Oblique
    c. Femoris
    d. A and C
17. Which of the following is not a function of all muscle?
    a. Excitability
    b. Elasticity
    c. Relaxibility
    d. Contractility



Tator CH, Rowed DW, Schwartz ML. The sensory scores provide a means of numerically documenting changes in sensory function.Motor level: The motor level is determined by examining the key muscle functions within each of 10 myotomes and is defined by the lowest key muscle function that has a grade of at least 3 (on supine MMT), providing the key muscle functions represented by segments above that level are judged to be intact (graded as a 5). For further explanation of the clarifications and changes in this revision, see the accompanying article (Kirshblum S., et al. If there are no partially innervated segments below a motor or sensory level, the motor and sensory level should be entered in the box for the ZPP on the worksheet.Note that motor function does NOT follow sensory function in recording ZPP, but rather the caudal extent of the motor ZPP must be based on the presence of voluntary muscle contraction below the motor level. Tetraplegia results in impairment of function in the arms as well as typically in the trunk, legs and pelvic organs, i.e. including the four extremities. Traumatic cervical Brown-Sequard and Brown-Sequard plus syndromes: the spectrum of presentations and outcomes. The sensory score cannot be calculated if any required key sensory point is not tested. The inability to distinguish between dull and sharp sensation (as well as no feeling when being touched by the pin) is graded as 0.A grade of 1 for pin prick is given when sharp/dull sensation is impaired. Austin GM: The Spinal Cord: Basic Aspects and Surgical Considerations. The distal most part of the spinal cord is called the conus medullaris. Frankel HL, Hancock DO, Hyslop G, et al. If at initial testing no deficits are found, the individual is neurologically intact; the ASIA Impairment Scale does not apply.1. Aids to Investigation of Peripheral Nerve Injuries Medical Research Council War Memorandum, 2nd ed, Revised London, HMSO, 1943 [Google Scholar]2. It is recommended that each key muscle function should be examined in a rostral-caudal sequence, utilizing standard supine positioning and stabilization of the individual muscles being tested. A score of 5 for each of the five key muscle functions of the upper extremity would result in a maximum score of 25 for each extremity, totaling 50 for the upper limbs. This will be necessary to classify the patient correctly.Injuries are classified in general terms of being neurologically "complete" or "incomplete" based upon the sacral sparing definition. Blakiston's Son, 1917 [Google Scholar]10. Joints that can be tested include the interphalangeal (IP) joint of the thumb, the proximal IP joint of the little finger, the wrist, the IP joint of the great toe, the ankle, and the knee.Deep pressure appreciation of the limbs (applying firm pressure to the skin for 3–5 seconds at different locations of the wrist, fingers, ankles and toes) can be tested for patients in whom light touch and pin prick modalities are graded as 0 (absent). American Spinal Injury Association: International Standards for Neurological Classification of Spinal Cord Injury, revised 2000; Atlanta, GA, Reprinted 2008.4. American Spinal Injury Association Reference manual for the International Standards for Neurological Classification of Spinal Cord Injury. 136 Philadelphia: P. Spinal Cord. In this case, the patient reliably distinguishes between the sharp and dull ends of the pin, but states that the intensity of sharpness is different in the key sensory point than the feeling of sharpness on the face. No sensory or motor function is preserved in the sacral segments S4-S5.B = Sensory incomplete. 2010;33(4):346–52 [PMC free article] [PubMed] [Google Scholar]14. 2nd ed, p.762 Springfield, IL: Thomas, 1972 [Google Scholar]6. review and revisions of the international standards for the neurological classification of spinal cord injury. A single segment (not a range of segments) is designated on the worksheet for each of these. The single NLI is the most rostral of these 4 levels, and is used during the classification process. Paraplegia 1969;7(3):179–192 [PubMed] [Google Scholar]9. The term is used in referring to cauda equina and conus medullaris injuries, but not to lumbosacral plexus lesions or injury to peripheral nerves outside the neural canal.Tetraparesis and paraparesis: Use of these terms is discouraged, as they describe incomplete lesions imprecisely, and incorrectly implies that tetraplegia and paraplegia should only be used for neurologically complete injuries. The instruction to the patient should be "squeeze my finger as if to hold back a bowel movement". The segments at which normal function is found often differ by side of the body and in terms of sensory and motor testing. While a dermatome usually represents a discrete and contiguous skin area, most roots innervate more than one muscle, and most muscles are innervated by more than one root.Spinal cord injury (SCI) affects conduction of sensory and motor signals across the site(s) of lesion(s), as well as the autonomic nervous system. The sacrum consists of 5 embryonic sections that have fused into one bony structure with 5 distinct nerve roots that exit via the sacral foramina. These elements are used in determining the sensory/motor/neurological levels, in generating scores to characterize sensory/motor functioning and in determining completeness of the injury. The most caudal segment with some sensory and/or motor function defines the extent of the sensory and motor ZPP respectively and are documented as four distinct levels (R-sensory, L-sensory, R-motor, and L-motor).The International Standards examination used for neurological classification has two components (sensory and motor), which are separately described below. Cervical roots of C1-C7 are named according to the vertebra above which they exit (i.e. C1 exits above the C1 vertebra, just below the skull and C6 nerve roots pass between the C5 and C6 vertebrae) whereas C8 exists between the C7 and T1 vertebra; as there is no C8 vertebra. This can reflect the degree of neurological impairment associated with the SCI.Motor scores (see worksheet; Appendix 1): This term refers to a numerical summary score of motor function. Notice at the bottom of that page attests to the permission granted by ASIA for duplication, but alteration of this form in any manner is prohibited without permission from ASIA.Copyright © The Academy of Spinal Cord Injury Professionals, Inc. If sensation is intact on one side for light touch and pin prick at all dermatomes C2 through S4-S5, the sensory level for that side should be recorded as "INT" that indicates "intact", rather than as S5.Sensory scores: Required testing generates scores for each dermatome for pin prick and light touch that can be summed across dermatomes and sides of body to generate two summary sensory scores: Pin prick and Light touch. Motor sacral sparing includes the presence of voluntary contraction of the external anal sphincter upon digital rectal examination.Complete injury: This term is used when there is an absence of sensory and motor function in the lowest sacral segments (S4-S5) (i.e. no sacral sparing)14.Zone of partial preservation (ZPP): This term, used only with complete injuries, refers to those dermatomes and myotomes caudal to the sensory and motor levels that remain partially innervated. The intensity may be greater or lesser than the feeling on the face.The following key points are to be tested bilaterally for sensitivity from C2-S4/5 dermatomes (see Fig. 1 and diagram on the worksheet (Appendix 1).C2 –At least 1 cm lateral to the occipital protuberance (alternatively 3 cm behind the ear)C3 –Supraclavicular fossa (posterior to the clavicle) and at the midclavicular lineC4 –Over the acromioclavicular jointC5 –Lateral (radial) side of the antecubital fossa (just proximal to elbow crease)C6 –Thumb, dorsal surface, proximal phalanxC7 –Middle finger, dorsal surface, proximal phalanxC8 –Little finger, dorsal surface, proximal phalanxT1 –Medial (ulnar) side of the antecubital) fossa, just proximal to the medial epicondyle of the humerusT2 –Apex of the axillaT3 –Midclavicular line and the third intercostal space (IS) found by palpating the anterior chest to locate the third rib and the corresponding IS below it*T4 –Fourth IS (nipple line) at the midclavicular lineT5 –Midclavicular line and the fifth IS (midway between T4 and T6)T6 –Midclavicular line and the sixth IS (level of xiphisternum)T7 –Midclavicular line and the seventh IS (midway between T6 and T8)T8 –Midclavicular line and the eighth IS (midway between T6 and T10)T9 –Midclavicular line and the ninth IS (midway between T8 and T10)T10 –Midclavicular line and the tenth IS (umbilicus)T11 –Midclavicular line and the eleventh IS (midway between T10 and Tl2)T12 –Midclavicular line and the mid-point of the inguinal ligamentL1 –Midway distance between the key sensory points for Tl2 and L2L2 –On the anterior-medial thigh at the midpoint drawn connecting the midpoint of inguinal ligament (T12) and the medial femoral condyleL3 –Medial femoral condyle above the kneeL4 –Medial malleolusL5 –Dorsum of the foot at the third metatarsal phalangeal jointS1 –Lateral heel (calcaneus)S2 –Mid point of the popliteal fossaS3 –Ischial tuberosity or infragluteal foldS4–5 –Perianal area less than one cm. Waring WP, III, Biering-Sorensen F, Burns S, et al. "Sacral Sparing" refers to the presence of sensory or motor function in the most caudal sacral segments as determined by the examination (i.e. preservation of light touch or pin prick sensation at the S4-5 dermatome, DAP or voluntary anal sphincter contraction). Lovett RW: The treatment of Infantile Paralysis. Subsequent sections cover sensory and motor scores, the AIS classification, and clinical syndromes associated with SCI. In such cases, sensory and motor scores for the affected side of the body, as well as total sensory and motor scores, cannot be generated at that point in treatment. Thus, up to four different segments may be identified in determining the neurological level, i.e., R(ight)-sensory, L(eft)-sensory, R-motor, L-motor. If any of these or other factors impedes standardized muscle testing, the muscle function should be graded as not testable (NT). Email: moc.baher-relssek@mulbhsriksThe authors are the members of the International Standards Committee of ASIA.Copyright 2011 American Spinal Injury Association. J Spinal Cord Med. This is because the motor level presumably at C4 is not considered normal (since the C4 dermatome is not normal), and the rule of all levels rostral needing to be intact is not met.Similar rules apply in the lower extremity where L2 is the first key muscle function. By systematically examining the dermatomes and myotomes, as described within this booklet, one can determine the cord segments affected by the SCI. The value of postural reduction in the initial management of closed injuries of the spine with paraplegia and tetraplegia. In order to continue enjoying our site, we ask that you confirm your identity as a human. (Note: there is no specific portion for this to be recorded on the worksheet except for the comments section). Kirshblum3University of Washington School of Medicine, Seattle, WashingtonFind articles by Stephen P. Testing will generate up to four sensory levels per dermatome: R-pin prick, R-light touch, L-pin prick, L-light touch. There is a maximum score of 25 for each extremity, totaling 50 for the upper limbs and 50 for the lower limbs. Additional details regarding the examination and e-Learning training materials can also be obtained from the website15.Tetraplegia (preferred to "quadriplegia"): This term refers to impairment or loss of motor and/or sensory function in the cervical segments of the spinal cord due to damage of neural elements within the spinal canal. Brunnstrom F, Dennen M: Round table on muscle testing. In some cases, this may be very difficult to clinically distinguish from a cauda equina injury. 3rd ed Philadelphia Saunders, 1972 [Google Scholar]8. No part of this publication may be modified, reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, photocopying, recording or otherwise, without written permission of ASIA. Injury to the nerve roots, which are, by definition, lower motor neurons, will classically produce a flaccid paralysis of the muscles of the lower limbs (muscles affected depend upon the level of the injury), and areflexic bowel and bladder. Improper positioning and stabilization can lead to substitution by other muscles, and will not accurately reflect the muscle function being graded.The strength of each muscle function is graded on a six-point scale1,6,7,9 0 = total paralysis.1 = palpable or visible contraction.2 = active movement, full range of motion (ROM) with gravity eliminated.3 = active movement, full ROM against gravity.4 = active movement, full ROM against gravity and moderate resistance in a muscle specific position.5 = (normal) active movement, full ROM against gravity and full resistance in a muscle specific position expected from an otherwise unimpaired person.5* = (normal) active movement, full ROM against gravity and sufficient resistance to be considered normal if identified inhibiting factors (i.e. pain, disuse) were not present.NT= not testable (i.e. due to immobilization, severe pain such that the patient cannot be graded, amputation of limb, or contracture of >50% of the range of motion).Plus and minus scores are not used when the International Standards examination is applied in a research setting and not recommended when comparing data across institutions.In cases of a muscle function whose ROM is limited by a contracture, if the patient exhibits ≥50% of the normal range, then the muscle function can be graded through its available range with the same 0–5 scale. This may be different for the right and left side of the body.Motor level: The motor level is determined by examining a key muscle function within each of 10 myotomes on each side of the body and is defined by the lowest key muscle function that has a grade of at least 3 [on manual muscle testing (MMT) in the supine position], providing the key muscle functions represented by segments above that level are judged to be intact (graded as a 5 on MMT). At each of these key points, two aspects of sensation are examined: light touch and pin prick (sharp-dull discrimination).Appreciation of light touch and pin prick sensation at each of the key points is separately scored on a three-point scale, with comparison to the sensation on the patients' cheek as a normal frame of reference: 0 = absent1= altered (impaired or partial appreciation, including hyperesthesia)2 = normal or intact (similar as on the cheek)NT = not testableLight touch sensation is tested with a tapered wisp of cotton stroked once across an area not to exceed 1cm of skin with the eyes closed or vision blocked.Pin prick sensation (sharp/dull discrimination) is performed with a disposable safety pin that is stretched apart to allow testing on both ends; using the pointed end to test for sharp and the rounded end of the pin for dull. Examination of the metric properties of the motor score indicate that it should be separated into two scales, one composed of the 10 upper limb muscle functions, and one of the 10 lower limb muscle functions, with a maximum score of 50 each10.Neurological level of injury (NLI): The NLI refers to the most caudal segment of the cord with intact sensation and antigravity muscle function strength, provided that there is normal (intact) sensory and motor function rostrally.The sensory and motor levels are determined for the right and left side, based upon the examination findings for the key sensory points and key muscle functions. Someone without a SCI does not receive an AIS grade.**For an individual to receive a grade of C or D, i.e. motor incomplete status, they must have either (1) voluntary anal sphincter contraction or (2) sacral sensory sparing (at S4/5 or DAP) with sparing of motor function more than three levels below the motor level for that side of the body. However, if these factors do not prevent the patient from performing a forceful contraction and the examiner's best judgment is that the muscle function would test normally (a supine MMT grade of 5) were it not for these factors, it may be graded as 5*.For those myotomes that are not clinically testable by a manual muscle exam, i.e., C1 to C4, T2 to L1, and S2 to S5, the motor level is presumed to be the same as the sensory level if testable motor function above (rostral) that level is normal as well. 2011:doi 10.1179/107902611X13186000420242The spinal cord is the major conduit through which motor and sensory information travels between the brain and body. The most caudal segment with some sensory or motor function defines the extent of the sensory or motor ZPP respectively, and should be recorded for the right and left sides and for sensory and motor function. A score of 2 for each of the 28 key sensory points tested on each side of the body would result in a maximum score of 56 for pin prick, 56 for light touch, and a total of 112. Burns4Clinic for Spinal Cord Injuries, Rigshospitalet, and Faculty of Health Sciences, University of Copenhagen, DenmarkFind articles by Fin Biering-Sorensen5University of Texas, Houston, TexasFind articles by William Donovan6University of KentuckyFind articles by Daniel E. Motor function is preserved below the neurological level**, and more than half of key muscle functions below the single neurological level of injury have a muscle grade less than 3 (Grades 0–2).D = Motor incomplete. For a single sensory level, the most rostral of all is taken.If sensation is abnormal at C2, the sensory level should be designated as C1. Innhold og annonser som er personlig tilpasset, inkluderer blant annet mer relevante søk og anbefalinger, en tilpasset YouTube-startside og annonser som er skreddersydd til interessene dine.Klikk på «Tilpass» for å gjennomgå alternativer, inkludert kontroller for å avvise bruken av informasjonskapsler for personlig tilpasning og informasjon om kontroller på nettlesernivå for å avvise noen eller alle informasjonskapsler for andre bruksområder. This score can reflect the degree of neurological impairment associated with the SCI.Incomplete injury: This term is used when there is preservation of any sensory and/or motor function below the neurological level that includes the lowest sacral segments S4-S5 (i.e. presence of "sacral sparing"). A full-size version for photocopying and use in patient records has been included as an enclosure and may also be downloaded from the ASIA website (www.asia-spinalinjury.org). The intact dermatome level located immediately above the first dermatome level with impaired or absent light touch or pin prick sensation is designated as the sensory level.Since the right and left sides may differ, the sensory level should be determined for each side. Please refer to the InSTeP training or the muscle function testing downloads for details for grades 0–3 testing15.C5 –Elbow flexed at 90 degrees, arm at the patient's side and forearm supinatedC6 –Wrist in full extensionC7 –Shoulder is neutral rotation, adducted and in 90 degrees of flexion with elbow in 45 degrees of flexionC8 –Full flexed position of the distal phalanx with the proximal finger joints stabilized in a extended positionT1 –Full abducted position of fingersL2 –Hip flexed to 90 degreesL3 –Knee flexed to 15 degreesL4 –Full dorsiflexed position of ankleL5 –First toe fully extendedS1 –Hip in neutral rotation, neutral flexion/extension, and neutral abduction/adduction, the knee is fully extended and the ankle in full plantarflexionIn a patient with a potentially unstable spine, care must be taken when performing any manual muscle testing. Graves7Craig Hospital, Englewood, COFind articles by Amitabh Jha7Craig Hospital, Englewood, COFind articles by Mark Johansen8Geron Corporation, Menlo Park, CA, USAFind articles by Linda Jones9International Collaboration on Repair Discoveries, Vancouver, British Columbia, CanadaFind articles by Andrei Krassioukov10Shriners Hospital for ChildrenFind articles by MJ Mulcahey12Medical College of Wisconsin, Milwaukee, WisconsinFind articles by William WaringAuthor information Copyright and License information Disclaimer1UMDNJ/New Jersey Medical School2Kessler Institute for Rehabilitation3University of Washington School of Medicine, Seattle, Washington4Clinic for Spinal Cord Injuries, Rigshospitalet, and Faculty of Health Sciences, University of Copenhagen, Denmark5University of Texas, Houston, Texas6University of Kentucky7Craig Hospital, Englewood, CO8Geron Corporation, Menlo Park, CA, USA9International Collaboration on Repair Discoveries, Vancouver, British Columbia, Canada10Shriners Hospital for Children11Magee Rehabilitation Hospital, Philadelphia, PA12Medical College of Wisconsin, Milwaukee, WisconsinCorrespondence to: Steven Kirshblum MD. (eds): Sunnybrook cord injury scales for assessing neurological injury and neurological recovery in early management of acute spinal cord injury. From the International Standards examination several measures of neurological damage are generated, e.g., Sensory and Motor Levels (on right and left sides), NLI, Sensory Scores (Pin Prick and Light Touch), Motor Scores (upper and lower limb), and ZPP. It does not include brachial plexus lesions or injury to peripheral nerves outside the neural canal.Paraplegia: This term refers to impairment or loss of motor and/or sensory function in the thoracic, lumbar or sacral (but not cervical) segments of the spinal cord, secondary to damage of neural elements within the spinal canal. In testing for pin prick appreciation, the examiner must determine if the patient can correctly and reliably discriminate between sharp and dull sensation at each key sensory point. For example, if no activity is found in the C7 key muscle function and the C6 muscle function is graded as 3, then the motor level for the tested side of the body is C6, providing the C5 muscle function is graded 5.The examiner's judgment is relied upon to determine whether a muscle function that tests as less than normal (5) may in fact be fully innervated. The section that follows describes the recommended International Standards examination, including both sensory and motor components. Alexander MS, Biering-Sorensen F, Bodner D, et al. Annual Conference of American Physical Therapy Association, Federation of Crippled and Disabled, Inc 1931: 1–12 [Google Scholar]7. This may occur when full effort from the patient is inhibited by factors such as pain, positioning and hypertonicity or when weakness is judged to be due to disuse. Sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-S5, AND no motor function is preserved more than three levels below the motor level on either side of the body.C = Motor incomplete. There may be 0, 1, or 2 coccygeal nerves but they do not have a role with the International Standards examination in accordance with the International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI).Each root receives sensory information from skin areas called dermatomes. Adopted and reprinted with permission.The only portion of this reprint to which this prohibition of modification, reproduction, storage in a retrieval system or transmission in any form does not apply is the "Standard Neurological Classification of Spinal Cord Injury" worksheet. Normal strength is assigned a grade of 5 for each muscle function. Examples will help clarify.Example 1: If the sensory level is C4, and there is no C5 motor function strength (or strength graded 3.E = Normal. International standards to document remaining autonomic function after spinal cord injury. In determining the motor level, the next most rostral key muscle function must test as 5, since it is assumed that the muscle(s) will have both of its two innervating segments intact. This is determined by a grade of 2 (normal/intact), in all dermatomes beginning with C2 and extending caudally to the first segment that has a score of less than 2 for either light touch or pin prick. Sacral reflexes i.e. bulbocavernosus and anal wink will be absent.Conus Medullaris Syndrome may clinically be similar to the Cauda Equina Syndrome, but the injury is more rostral in the cord (L1 and L2 area), relating to most commonly a thoraco-lumbar bony injury. The C1 nerve root does not have a sensory component that is tested on the International Standards Examination.The thoracic spine has 12 distinct nerve roots and the lumbar spine consists of 5 distinct nerve roots that are each named accordingly as they exit below the level of the respective vertebrae. In a case of where the motor, sensory, and therefore NLI is T4, with sparing of some sensation at the left T6 dermatome, T6 should be entered for the left sensory ZPP, but the box for motor ZPP should remain T4. The motor score cannot be calculated if any required muscle function is not tested.Although in the past a total motor score of 100 for all extremities was calculated, it is no longer recommended to add the upper limb and lower limb scores together. At that point, move slightly lateral to palpate the second rib and continue to move in a caudal direction to locate rib three and the corresponding intercostal space just below it.Deep Anal Pressure (DAP): DAP awareness is examined through insertion of the examiners index finger and applying gentle pressure to the anorectal wall (innervated by the somatosensory components of the pudendal nerve S4/5). If the ROM is limited to

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