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Musculoskeletal Anatomy
PED 301 01

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Lecture/Lab: 8:30-9:20 MW
8:30-10:20 TR


An Illustrated Atlas of the Skeletal Muscles, 2nd Ed., Bradley S. Bowden and Joan M. Bowden

Please note: Students in need of academic or medical accommodation should contact Judi Holevatz, R.N., @ ext. 1340, Rm. 206 of the Ponzio Center.

Overview

This specialized course will consist of an in-depth study of the human skeletal system, articular (joint) system, and the system of skeletal muscles (structure, function, and interaction). It is designed to meet the needs of students in the Coaching Minor, the Therapeutic and Universal Design Major, the sciences, and preparatory programs in Occupational Therapy, Physical Therapy, Nursing, and Medicine. As the course progresses, the student will find that this particular grouping of topics provides for a very logical progression and that mastery of each successive topic will enhance learning of the next.

Your instructor believes that each academic discipline develops its own system of thought that is the basis for understanding all existing information as well as synthesis of new ideas in that field. More than anything else, it is his wish to use the information and ideas presented in this course to foster an understanding among his students of the system of thought in this particular field. While retention of the specific information presented in this class will be short term (unless it is reinforced by frequent use), the concepts and ideas that constitute the "system of thought" will persist and will enable the student to recover the forgotten specifics, explore and understand other related information, and to remain current, active, and creative in this field.

The instructor will attempt at all times to help students to develop concepts from the information taught, to learn anatomy rather than memorize it, and to relate the material taught to familiar life experiences and to future application in a vocational setting.

It is imperative that the student understands that this information is truly alive and useful and does not merely represent an attempt on the part of the college to make his or her life difficult. Mastery of this material will help the student to analyze motion, diagnose movement and technique errors, test for injury and disability, understand mechanisms of injury, design prophylactic and rehabilitative exercises, understand the impact of disabilities affecting the musculoskeletal system, and be an intelligent and informed consumer of the professional and popular literature in the student’s field.

What follows should be understood to represent a general progression of the class. Content and timing will vary according to the needs and interests of the class.
Lecture Schedule

Week 1
Lecture—Introduction, basics, terminology, planes, axes, anatomic regions
Read chap. 1, Brunnstrom's 5th.

Week 2
Lecture—Nature of bones, types, make-up, parts, bone growth (longitudinal)
Read chap. 2, Brunnstrom's 5th.

Week 3
Lecture—Overview bone formation and remodeling, cartilage—types and nature, characteristics of joints, types of joints
Read Handouts and chap. 4, Brunnstrom's 5th.

Week 4
Lecture—Levers and leverage, planes, axes, movements, muscle fiber arrangement, roles in which muscles can act, types of contraction
Read chap. 4, and pp. 31—35, Brunnstrom's 5th.

Week 5
Structure and musculature of the shoulder girdle
Read chap. 7, Brunnstrom's 5th.

Week 6
Shoulder girdle, shoulder structure and musculature
Read chap. 7, Brunnstrom's 5th.

Week 7
Shoulder musculature, structure of the radio-ulnar joint, wrist and hand, musculature of the wrist
Read chaps. 7 and 5, Brunnstrom's 5th.

Week 8
Radio-ulnar joint, wrist and hand, cont.
Read chaps. 5 and 6, Brunnstrom's 5th.

Week 9
Wrist and hand cont.
Read chaps. 5 and 6, Brunnstrom's 5th.

Week 10
Structure and musculature of the spine
Read chap. 11, Brunnstrom's 5th.

Week 11
Spinal musculature cont., structure and musculature of the pelvis and hip
Read chaps. 11 and 8, Brunnstrom's 5th.

Week 12
Structure and musculature of the knee
Read chap. 9, Brunnstrom's 5th.
Thanksgiving break

Week 13
Knee cont., structure and musculature of the ankle and foot
Read chaps. 9 and 10, Brunnstrom's 5th.

Week 14
Structure and musculature of the ankle and foot
Read chap. 10, Brunnstrom's 5th.

Lab Schedule
The course laboratories will focus on skeletal structure. Students will learn the skeleton segment by segment. The procedure for each segment will be as follows:
Lecture presentation on the skeletal segment
2, one half hour student study sessions per segment (negotiable according to student progress)
A visual/written quiz on each segment

The emphasis will be on gaining an understanding of the naming system, relating the names to the structure and functions of the bony features, and learning the names rather than memorizing them. This professor prefers to base the rate of progress through the skeletal segments on student readiness rather than a predetermined schedule. Therefore, a schedule will not be detailed here.

Further, we will deviate from the standard grouping of bones according to their membership in the Axial or Appendicular skeletal segments, preferring to mix and match with the muscular systems being discussed in lecture.

The segments of the skeleton will be covered in the following order:

- Skull and Jaw
- Clavicle, ribs, sternum, scapula
- Arm, forearm, hand
- Spine
- Pelvis
- Thigh, leg, foot

Lecture Exams
Lecture exams will take the form of a series of guided investigations (take-home exams) the nature of which will be explained in class. The pervasive theme will be application of the information in question to solve problems that are practical and relevant to the future work and play of the students in the class.

Lab Equipment
Required: one human brain per student. You will not be expected to remove it from your head.

Grading
Grades in this class will be calculated on a straight percentage basis. This is accomplished by dividing the number of points earned by the total number of points possible. I do not grade on improvement except to the extent that improved scores will bolster the student’s overall point total. Full and enthusiastic class participation is expected of all students and should not be viewed as something extra that can be counted on to compensate for poor performance on written assignments.

The grading scale is as follows: 93-100 A; 90-92 A-; 87-89 B+; 83-86 B; 80-82 B-; 77-79 C+; 73-76 C; 70-72 C-; 67-69 D+; 60-66 D; 0-59 F.

Attendance
Due to increasing problems with inattendance, it has become necessary to restate and reassert the attendance policy for this class. Understand that a grade in a class, in effect, certifies that the student has been exposed to the curriculum as described in the syllabus, has participated in all activities associated with the class, and has completed all assignments to a degree reflected in the final grade. In other words, you must attend the class, in order to pass the class!

That being said, the policy for attendance and late assignments with respect to grading is as follows:

Attendance in this class does count with 1 point being deducted from your final point total for each hour of unexcused absence. Excused absences include such things as illness, certain family obligations, and certain school sponsored activities and trips. Studying for an exam for another class is not an excused absence on the basis of it being a school sponsored activity. Misses can be made up by writing and submitting a paper which covers the material covered in class on the day in question. Under no circumstances should a student assume that by merely submitting a paper, they have made up for 100% of the class missed. In order to be considered equivalent, the paper must be of adequate length, substance, and quality based on the judgment of the course professor.

Because this professor has had students run a doctor’s appointment scam as a means to generate excused absences, he will expect students to schedule medical appointments outside of class time. Exceptions will be made for emergencies and extenuating circumstances.

In this class, attendance is taken with an attendance sheet. Any forgeries of signatures (another scam) will result in the hour being counted as an unexcused absence for both the forger and the person for whom the forgery was attempted.
Late Work
It is the instructor’s policy to allow the class to negotiate due dates for out of class assignments to some degree. That being said, assignments must be turned in on time. There will be a penalty of –5% per day late. Any exceptions must be negotiated in advance.

Bibliography

The following relevant titles are part of the Dexter Library collection:


Functional Anatomy in Sports, by Jurgen Weineck


Living Anatomy, by Joseph E. Donnelly

Color Atlas of Surface Anatomy, by Kenneth M. Backhouse and Ralph T. Hutchings—living subjects (not dissections), something a little different—will help you to locate deep structures from surface features

Physical Examination of the Musculoskeletal System, by Melvin Post

Clinical Examination of the Injured Knee, by Cross & Crichton (an excellent book by Australian authors)

Limb Prosthetics, 6th ed., by A. Bennett Wilson Jr., -- Therapeutic and Universal Design majors are encouraged to consult this text on a regular basis as we work on various limb segments. This will be an ideal opportunity to compare prosthetic function to normal function and appreciate the logic of the prosthetic design.

Internet Resources

Wheeless Textbook of Orthopaedics
http://www.wheelessonline.com/
This is an outstanding anatomy site. It offers depth, breadth, and quality. It is an outstanding, free, adjunct resource for this course.

Anatomy on the Internet
http://anatomy.med.umich.edu/home.html Medical Gross Anatomy Learning Resources--University of Michigan Med. School
http://64.233.167.104/search?q=cache:SSurYXsVzlIJ:web.uvic.ca/anth/451/orientations.PDF+anatomic+%2B+planes&hl=en Anatomical planes and axes, etc. Click on the link at the top of the page to view this presentation as a PDF document
http://64.233.167.104/search?q=cache:g2LbbKxqQalJ:www.me.berkeley.edu/ME176/Anatomy.pdf+anatomic+%2B+planes&hl=en Click on the link at the top of the page to view this presentation as a PDF document
http://www.meddean.luc.edu/lumen/MedEd/GrossAnatomy/cross_section/
http://www.meddean.luc.edu/lumen/MedEd/GrossAnatomy/learnem/learnit.htm

Orthopaedics On the Internet
Ulnar Collateral Ligament Reconstruction In Baseball Pitchers (Tommy Johns Procedure, etc.)

Bone Quiz Study Aids
Site home page
http://www.meddean.luc.edu/lumen/MedEd/GrossAnatomy/learnem/learnt.htm
**Bone Formation Links**
http://www.douglas.bc.ca/ossification/index.html Nice animations
http://health.yahoo.com/centers/bone_health/203
http://erl.pathology.iupui.edu/HISTO/GENER21.HTM

**Biomechanics**
http://www.per.ualberta.ca/biomechanics/bwwframe.htm
http://www.uni-stuttgart.de/External/isbs/
http://www.health.uottawa.ca/biomech/csb/
http://www.biomech.jhu.edu/
http://www.engin.umich.edu/dept/meam/brl/
http://www.biomech.com/search.shtml
Swimming Biomechanics and Injury Prevention

University of Washington Department of Radiology, Radiology Exhibits
http://www.rad.washington.edu/anatomy/
Nice site with M.R.I. images

Healthweb Anatomy--University of Chicago John Crerar Library
http://www.healthweb.org/browse.cfm?categoryid=185
This site contains some interesting images including full color, cross sectional anatomical views.
--Their homepage
http://www.healthweb.org/browse.cfm?subjectid=25
--Parent site—Healthweb
http://www.healthweb.org/

Health Oasis: Mayo Clinic
http://www.mayohealth.org/home

Exercise Physiology: The Methods and Mechanisms Underlying Performance, by Stephen Seiler
http://home.hia.no/~stephens/exphys.htm
This is a superb site combining excellent content and depth with clear explanations.

**Hand Resources**
http://moon.ouhsc.edu/gsharp/namics/hand.htm
http://bphc.hrsa.gov/nhdp/ANATOMIC_MECHANICS_HAND_STUDIES_RR.htm
http://courses.washington.edu/hubio553/
http://www.ptcentral.com/muscles/musclearms.html
http://www.eatonhand.com/fas/fas059.htm

**Core Stabilization**
http://www.whiplash101.com/psoas1.htm
http://www.cofc.edu/~futrellm/back.htm
http://www.performbetter.com/catalog/matriarch/
OnePiecePage.asp Q PagelID_E_78_A PageName_E_ArticleClarkLowBackPain
http://www.unc.edu/depts/our/2001abstracts/styers.html
http://www.gofit.net/healthyeating-helpfultips.html
http://homeexerciseprogram.com/Download-95HEP.html Follow the links at the bottom of the page
http://homeexerciseprogram.com/back-pain.html
http://webcenter.health.webmd.netscape.com/hw/health_guide_atoz/zt1227.asp
http://www.kerlanjobe.com/index.php?practicedId=1052&dir=article&lib=Article&articleId=10067

Functional Training Click on the link at the top of the page to view the PowerPoint version
http://www.nasm.org/ContinuingEducation/Articles/LowBackPainFunctionalPerspective.aspx
Achieving Core Stability Click on the link at the top of the page to view the PDF version
Awakening Core Stabilization of the Lumbar Spine