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Faculty of Medicine
School of Medical Sciences

ANAT3141

FUNCTIONAL ANATOMY
OF THE LIMBS



Term 3, 2020

CRICOS Provider Code 00098G



ANAT3141: FUNCTIONAL ANATOMY OF THE LIMBS

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It is your responsibility to make sure that you read and sign the **Student Risk Assessment Form** included in this outline before you attend your first prac in the dissecting room. Keep the signed form in your prac manual and bring it to classes with you. It is not necessary to give it to your tutor or Course Convenor).

Please read this outline in conjunction with the following pages on the [School of Medical Sciences website](#):

- [Advice for Students](#)
- [Learning Resources](#)

(or see "STUDENTS" tab at medalsciences.med.unsw.edu.au)

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If you would like an appointment with the teaching staff, please arrange this via email.

Units of Credit and Hours of Study

This course is worth six units-of-credit (6 UOC).

This is a learning course delivered online and consists of 7 hours per week of scheduled learning activities. These comprise two hours of recorded lectures, two hours online practicals and two hours tutorials (including a one-hour team-based learning session), and at least one hour of a self-study activity each week.

Students are expected to attend all scheduled learning. Please note that for a 6 UOC course, UNSW recommends 150 hours of study and learning activities. The scheduled learning activities in this course consists of approximately 68 hours throughout the term and students are expected to contribute the remaining number of hours in self-directed learning and study.

What is Anatomy?

Anatomy is derived from the Greek words '*ana*' (meaning to *separate, apart from*), and '*temnein*' (meaning to *cut up, cut open*). Anatomy, therefore, is the study of body structure or morphology. Anatomy is one of the earliest of the medical sciences and has a colorful and prestigious recorded history that spans some 4000 years, with the earliest documents found in Egypt (the Edwin Smith Papyrus, dated 1600BC).

Many of the earliest known medical scientists and physicians were devoted to understanding anatomy including the Greek physician Hippocrates (460-377BC) who first discovered the tricuspid valve of the heart. This was around the same time that cadavers were first used in anatomical research by Herophilus and Erasistratus in Alexandria, Egypt (4BC) and when the Sushruta Samhita, an Ayurvedic medical text including detailed anatomy descriptions was compiled in India. But by far the most notable of the early anatomists is Galen (2AD) who also compiled much of the anatomical knowledge known to date into what is probably **the** first anatomy textbook that reigned unchallenged for almost 1500 years - most of this text was destroyed during the Dark Ages.

Anatomy really flourished around the 17th and 18th centuries largely due to the invention of the printing press that facilitated the exchange of ideas. Because anatomy was based on observations and drawings, the best anatomists were usually excellent artists (*au fait* with Latin) who attended dissections and published their drawings for money – these included, Michelangelo, Rembrandt and Da Vinci.

Today, anatomy is the bedrock of medicine and of an array of allied health disciplines. Anatomical research today is diverse and focuses on understanding anatomical function from that of a single cell to through to the inter-relation of systems and function, biomechanics and movement, and embryology and development. This is done via techniques in cell and molecular biology, dissection as well as the use of clinical and radiological techniques.

The privilege of studying from cadaveric specimens is the cornerstone of this course and will provide you with an appreciation of the anatomy of the musculoskeletal system and its adaptation to function.

Course Aims

This course covers the musculoskeletal anatomy of the **Limbs** focusing on its function and role in movement. It includes a study of the functional aspects of muscles and joints, and consideration of the mechanical properties of tissues. Laboratory classes involve study of prosected specimens, radiography and surface anatomy images.

The course aims to:

1. provide students with an understanding of the organisational structure of the upper and lower limbs, and its embryological and evolutionary development
2. develop students understanding of the functional principles underpinning joint movements and muscle actions of the upper and lower limbs
3. develop students understanding of the variations in limb anatomy and its application to medical imaging
4. apply organisational structure of limb anatomy to develop an understanding surface/living anatomy

How the Course Relates to Other Courses?

ANAT3141, *Functional Anatomy of the Limbs*, covers the musculoskeletal anatomy of the limbs, and directly relates to and complements the Level III course, *Functional Anatomy of the Head, Neck and Back* (ANAT3131) and complements the other level III anatomy courses: *Visceral Anatomy* (ANAT3121) and *Neuroanatomy* (ANAT3411).

These courses build on the Level II anatomy course offerings: *Anatomy for Medical Science* (ANAT1521), *Histology: Basic and Systematic* (ANAT2241) and *Embryology* (ANAT2341).

More generally, anatomy courses complement the subjects offered by other areas within the School of Medical Sciences (i.e. Physiology, Pharmacology, Pathology and Exercise Physiology) as well as courses taught in biological science, biomolecular science and genetics, psychology, biomechanics, vision science, food science and nutrition, medical microbiology and immunology, and engineering.

Pre Requisite

ANAT2111 or ANAT1521 or ANAT2511

Student Learning Outcomes

The course focuses on the organization and structure of the musculoskeletal system that underpins function especially in movement. Student engagement particularly through the anatomy practical sessions will equip them to be able to identify the anatomical features of each of the joints and their related muscles studied on dissected human specimens, bones and models, as well as apply these to discussions of functional and applied aspects of the

musculoskeletal system.

At the end of the course, the student should:

1. Demonstrate knowledge of the anatomy of the upper limbs, and apply this to understand the principles related to joint movement and biomechanics
2. Demonstrate and apply knowledge of the anatomy of the lower limbs and apply this to understand the principles related to joint movement and biomechanics
3. Demonstrate an understanding of the development of the limbs, and their evolutionary adaptations for function
4. Apply knowledge of limb organisation to interpretation of medical imaging data
5. Demonstrate an understanding of the surface/living anatomy of the limbs

In addition to these, the University of New South Wales (UNSW) has developed a list of attributes that its graduates should possess upon graduation – these are referred to as the '**Graduate Attributes**'. *'Graduate attributes are the qualities, skills and understandings a university community agrees its students should develop during their time with the institution. These attributes include, but go beyond, the disciplinary expertise or technical knowledge that has traditionally formed the core of most university courses. They are qualities that also prepare graduates as agents for social good in an unknown future'* (Bowden et al., 2000). These generic graduate attributes for UNSW can be found at:

<https://teaching.unsw.edu.au/graduate-capabilities>

In addition to these, the **graduate attributes for Science students** are:

- Research, enquiry and analytical thinking abilities.** Technical competence and discipline specific knowledge. Ability to construct new concepts or create new understanding through the process of critical analysis, problem solving, research and inquiry.
- Capability and motivation for intellectual development.** Capacity for creativity, critical evaluation and entrepreneurship. Ability to take responsibility for and demonstrate commitment to their own learning, motivated by curiosity and an appreciation of the value of learning.
- Ethical, Social and Professional Understanding.** Ability to critically reflect upon broad ethical principles and codes of conduct in order to behave consistently with a personal respect and commitment to ethical practice and social responsibility. Understanding of responsibility to contribute to the community. Respect and value social, multicultural, cultural and personal diversity.
- Communication.** Effective and appropriate communication in both professional (intra and inter disciplinary) and social (local and international) contexts.
- Teamwork, collaborative and management skills.** Ability to recognise opportunities and contribute positively to collaborative scientific research, and to perceive the potential value of ideas towards practical applications. Demonstrate a capacity for self-management, teamwork, leadership and decision making based on open-mindedness, objectivity and reasoned analysis in order to achieve common goals and further the learning of themselves and others.
- Information literacy.** Ability to make appropriate and effective use of information and information technology relevant to their discipline.

Course Structure and Attendance

It is strongly recommended that students attend all lectures as they provide the basis for the practical and subsequent classes. In order to satisfy the requirements of the course you are expected to attend **at least 80% of practical classes** and failure to do so (without good reason) may result in a fail.

THE CLASS SCHEDULE CAN BE FOUND ON PAGE 13

Teaching Rationale and Strategies

Student interaction and engagement with the content of the course underpins all learning activities. Students are initially introduced anatomical region in the form of lectures incorporating multimedia-learning tools. With this knowledge in hand, students engage in learning activities during the laboratory sessions where the teacher/tutor guides the student and encourages each student to actively participate in their learning.

Students are always encouraged to question, observe and share knowledge and experiences that help their learning and that of their peers. The anatomy laboratory is a wonderful and fascinating environment for discovery and students are given every opportunity to explore cadaveric specimens, participate in active discussions and find answers for themselves.

Lectures – This approach is used to present relatively large amounts of information within a given time on specific topics throughout the course. Lecture notes will be available online (see below in COURSE RESOURCES section) prior to or after each lecture, so you should be able to think about and develop an understanding of the lecture concepts as they are presented, rather than writing voluminous notes. However, there will be information and explanations presented in lectures in addition to those covered in the notes that you should take down if they help you to understand the material.

The lecturer will also try to allow some time for interaction and activities in each lecture to provide you with an opportunity to clarify or reinforce the ideas that have been presented. You should take these opportunities to think about the information that has been presented and ask questions to enhance your understanding.

Online laboratory practical sessions – The purpose of the practical sessions is to give students first-hand experience of the content covered. These sessions offer the best opportunity to learn anatomy and a wonderful virtual place of privilege, discovery and discussion. The resources in these small group sessions allow students to explore images of prosected specimens of the musculoskeletal system. Although, the tutor is present to guide you through the activities in these sessions, these sessions are meant to be led by students working in groups of 3-4.

Online tutorials – These sessions are designed for you to apply the concepts that you have learnt in the course. In these sessions, you will work in small groups of about 5 students each. You will be presented with discussion questions based on case studies or movement analysis images, surface anatomy applications and you will work in these groups to find solutions to these.

Virtual Anatomy Adaptive Tutorials (VAnAT) – The VAnAT will be made available to students periodically via a link in Moodle during this course. These are virtual tutorials based on high quality images of prosected specimens. The tutorials are a series of interactive questions based on applying the content covered in lectures and practical sessions, and are a useful resource in consolidating and revised course content. Sessions are structured to encourage student participation in these activities and to enhance your learning. You will benefit most if you do these tutorials consistently. Some of these tutorials will also be done during allocated time within the course timetable. The focus of these tutorials will be to apply the principles of functional anatomy of the limbs.

Independent study – There is insufficient time in the lectures, tutorials and practicals for you to develop a deep understanding of the concepts covered in this course. In order for you to achieve the learning outcomes that will be assessed, you will need to revise the material presented in the course regularly. You will probably also need to do additional reading beyond the lecture materials in order to learn effectively. Relevant additional resources, including textbook chapters, will be cited in lecture and practical sessions.

Recommended Texts and Other Resources

See also [Learning Resources](#).

In addition to the **course manual**, you will need a textbook **AND** an atlas of human anatomy for this course

Recommended Text

1. Moore K.L., & Agur A. M. R., Dalley A.F. (2013) **Clinically Oriented Anatomy**. (7th ed.). Lippincott Williams & Wilkins: Baltimore

OR

Drake, R.L., Vogl, W., Mitchell, A.W.M. & Gray, H. (2015). **Gray's Anatomy for Students**. (3rd ed.). Philadelphia; London: Elsevier/Churchill Livingstone.
(Available online through the library or via the course Moodle site)

Recommended Atlas

2. Tank P.W. and Gest T.R. (2009) **Atlas of Anatomy**. Lippincott, Wilkins and Williams
(note: This comes as a bundle with *Clinically Oriented Anatomy from the UNSW bookshop*)

OR

Abrahams, PH, Spratt, JD, Loukas M, and van Schoor A-N (2013) **McMinns & Abrahams' Clinical Atlas of Human Anatomy** (7th ed.). Elsevier Health

Other useful textbooks are:

3. Hamill, J. & Knutzen, K.M. (2009). **Biomechanical Basis of Human Movement**, 3rd Edition, Lippincott, Williams & Wilkins. ISBN: 0781734053 (*Library call no. 612.76/177*)
4. Rohen J.W., Yokochi, C, Lutjen-Drecoll, E. (2006). **Colour Atlas of Anatomy: A Photographic Study of the Human Body**. 6th ed. Lippincott Williams & Wilkins: Philadelphia

Online resources

5. Virtual Anatomy Adaptive tutorials – accessed via the course Moodle site
6. Anatomy videos – accessed via UNSW Box
7. Acland's anatomy videos – accessed via the university library
8. Arnold's Glossary of Anatomical Terms

Revision Facilities (if you are on campus)

1. Anatomy Museum is located on the ground floor of the Wallace Wurth East. The museum contains a variety of bottled anatomical dissections. Please do not remove museum jars from shelves. The museum also contains computers loaded with Anatomy software and Internet access. Access to the museum is by swipe card and is restricted to only anatomy students, between 8.30 a.m. and 5.30 p.m. Monday to Friday. NO photography is allowed in the Anatomy Museum.
2. Rooms G06/G07 in Wallace Wurth East contain computers with a variety of anatomical software and can be used to access the Virtual Adaptive Anatomy Tutorials (VAnATs). Students may use them, provided **the rooms are not required for other classes**. Again these are accessible by swipe card only.

Assessments

a. Continuous Assessment	20%
b. Spot Test 1	20%
c. Spot Test 2	20%
c. Theory Exam	40%

Continuous assessment (a)

In these assessments, you will need to:

- demonstrate a thorough knowledge of the functional anatomy of the limbs
- analyse and evaluate the involvement of muscles in movement
- understand the link between functional anatomy and biomechanics
- demonstrate practical laboratory skills in anatomy and an understanding of the ethics of working with human remains questions.

Continuous assessments are usually in the form of short tests consisting of multiple choice question (MCQ) given at the beginning of practical sessions, in the form of team activities during the tutorial sessions.

Spot test

In addition to the above, spot tests assess your ability to identify and correctly name significant structures in the images of prosected human specimens, models and radiographs. In addition, it examines the ability to answer relevant short theory questions.

In a spot test, students will have an online test featuring images and will be asked to identify labeled structures on the specimen and answer questions related to these structures. Theory questions may be included at some stations as well. Your course convener will provide you with information on the number of stations and time allowed at least two weeks before the assessment.

Spot test 1 will covers all of the upper limb.

Spot test 2 will covers all of the lower limb.

Theory examination

The purpose of this exam is to test your understanding of the concepts covered in the ENTIRE COURSE and to assess deeper learning (i.e. the ability to inter-relate information and concepts) and critical thinking. This is one 2-hour paper written during the examination period. The final examination will consist of multiple-choice questions and short answer questions. Final exam period for Term 3 2020 is 27 November to 10 December 2020.

Supplementary Examinations

It is intended that supplementary exams for the School of Medical Sciences in Term 3, 2020 will be held between the 11th and 15th January 2021. If you are eligible for these, you will be notified of the exact date and time as soon as possible after final exam marks have been resolved. Please note, supplementary and deferred examinations may have a significant oral component.

Enrolment and Administrative Help

Staff in SoMS student administration are available to help with problems with enrolment and scheduling, and should be the first point of contact for administrative problems. They can be contacted online via the UNSW Student Portal Web Forms: <http://unsw.to/webforms>

Official Communication

All communicate will be via your official UNSW email please see [Advice for Students-Official Communication](#) for more details.

Attendance Requirements

For details on the Policy on Class Attendance and Absence see [Advice for Students](#) and the [Policy on Class Attendance and Absence](#).

Attendance at practical classes and tutorials is compulsory, and must be recorded in the class roll at the start of each class. Arrival more than 15 minutes after the start of the class will be recorded as non-attendance. It is your responsibility to ensure that the demonstrator records your attendance and no discussions will be entered into after the completion of the class. Satisfactory completion of the work set for each class is essential. It should be noted that non-attendance for other than documented medical or other serious reasons, or unsatisfactory performance, for more than 1 practical class during the session may result in an additional practical assessment exam or ineligibility to pass the course. Students who miss practical classes due to illness or for other reasons must submit a copy of medical certificates or other documentation to the course coordinator.

Practical Classes

The practical class is an opportunity for students to develop graduate attributes by behaving in an ethical, socially responsible and professional manner within the practical class.

Students must take due care with biological and hazardous material and make sure all equipment is left clean and functional. In the interests of safety, special attention should be paid to any precautionary measures recommended in the notes. If any accidents or incidents occur they should be reported immediately to the demonstrator in charge of the class who will record the incident and recommend what further action is required.

For more details see [Advice for Students-Practical Classes](#)

Special Consideration

Please see [UNSW-Special Consideration](#) and [Student Advice-Special Consideration](#)

If you unavoidably miss any assessment, you must lodge a Special Consideration application online via myUNSW. If your request for consideration is granted an alternative assessment may be organised that may take the form of a supplementary exam.

Student Support Services

- Transitioning to Online Learning <https://www.covid19studyonline.unsw.edu.au/>
- Guide to Online Study <https://student.unsw.edu.au/online-study>
- UNSW Student Life Online <https://student.unsw.edu.au/hub#main-content>
- Equitable Learning Services <https://student.unsw.edu.au/els>

Details of the available student support services can be found at [Student Advice-Student support services.](#)

Appeal Procedures

Details can be found at [Student-Advice-Reviews and Appeals](#)

Academic Integrity and Plagiarism

The [UNSW Student Code](#) outlines the standard of conduct expected of students with respect to their academic integrity and plagiarism.

More details of what constitutes plagiarism can be found [here](#)

Feedback

This is a challenging course. The course convener will endeavor to make this course interesting, relevant and a rewarding learning experience for you. Problem based questions have been included at the end of each practical in your course manuals – you are encouraged to work through these to provide yourself with feedback on your progress through the course.

During the practical sessions, you will also have an opportunity to try some practice spot-test-style questions. Answers for these will be provided as feedback to you on your progress. The continuous assessment MCQ is designed to give you continuous feedback on your progress. Answers to these will be discussed immediately following the assessment. In addition, the virtual adaptive anatomy tutorials will be made available via a link in Moodle. These will provide you with immediate feedback and are to be used as a formative assessment tool.

Course Evaluation and Development

Student feedback is welcome and taken seriously. A Student Experience survey will be provided in the final weeks of the course to formally gather student feedback. The feedback received is used to enhance the course.

There will also be opportunities for representatives from this course to meet with the course convener at regular intervals during the course. This will provide you with an opportunity to discuss (via thee reps) how the course is progressing and any issues that have arisen or difficulties in concepts etc. As Student Experience Surveys are usually at the end of the course, this student the representative panel is an opportunity for issues to be addressed, corrected or amended while the course is still progressing so that it is rewarding and engaging to the current cohort of students.

Ethical Behaviour and Human Remains

A central form of learning in this course is to study of images of prosected (i.e. professionally dissected) human anatomical specimens. These are prepared from the remains of people who have generously donated their bodies to UNSW so that you and your peers can study the human body. This is an extraordinary generous act of these donors and their families, and is a special and wonderful privilege. Treating these remains with the utmost care and great respect is mandatory and is our responsibility to these donors and their families – it is also a good ethical practice and is mandated by law. The Anatomy Act (1977) issues a license that allows the Department of Anatomy to provide students the opportunity to study from prosections. In order to retain this license, the department must comply to the directives of this Act.

ANAT3141 Course Schedule – T3 2020

Week	Date	Seminar, Recorded	Laboratory Practical, Wednesday 2-4 pm	Tutorial, Thursday 2-4 pm
1	14/09	Pectoral and Shoulder Regions: Bones, Joints and Muscles	Pectoral and Shoulder Regions	Shoulder
2	21/09	Axilla and Arm Regions: Muscles, Spaces; Elbow Region: Cubital Fossa and Joints	Arm and Elbow Regions	Elbow
3	28/09	Forearm: Muscles	Forearm Region	Wrist
4	05/10	Wrist Region: Bones, Joints & Spaces; Hand	Wrist and Hand Regions	Hand
5	12/10	Upper Limb Innervation and Vasculature	Nerves and Vessels (UL)	Nerve Lesions (UL)
6	19/10	Mid-Term Break		
7	26/10	Pelvic Girdle and Gluteal Region: Bones, Joints and Muscles	Practical Test 1 / Gluteal Region & Hip Joint	Hip
8	02/11	Thigh Regions: Bones, Joints and Muscles, Femoral Triangle; Knee Joint	Thigh Region	Kneed
9	09/11	Leg Region: Compartments and Muscles; Ankle Joint and Foot	Leg, Ankle and Foot Regions	Ankle
10	16/11	Lower Limb Innervation and Vasculature; Gait	Nerves & Vessels (LL)	Nerve Lesions (LL)
	27/11-10/12	Exam period: Practical Test 2 and Theory Exam		