17th – 19th December 2025

Anatomical Society Winter Meeting 2025

Anatomy and its role in society: Application and Impact

Anglia Ruskin University, Bishop's Hall Lane, Chelmsford, Essex, UK. CM1 1SQ

Anatomy and its role in society: Application and Impact

This meeting will focus on the role anatomy and anatomical knowledge has within our society, with a focus on its wider application and impact. Subthemes within the meeting will include:

- Anatomical education and the impact this has on learners of anatomy
- Anatomical outreach and public engagement and the impact this has on the public
- Anatomical research and the impact of this, under further subthemes of human interfaces and ergonomics, development, technology, EDI and clinical/ surgical applications
- The current landscape of ethics in anatomy

#AnatSocWinter25 #AnatSocARU

Thanks to the Team

Dr Samantha Goodchild, Dr Dan Robbins, Dr Thomas O'Mahoney, Mrs Rebecca Brand, Miss Lauren Murphy, Miss Tendayi Hove, Associate Professor Jocelyn Pryce, Dr Muhammad Javaid

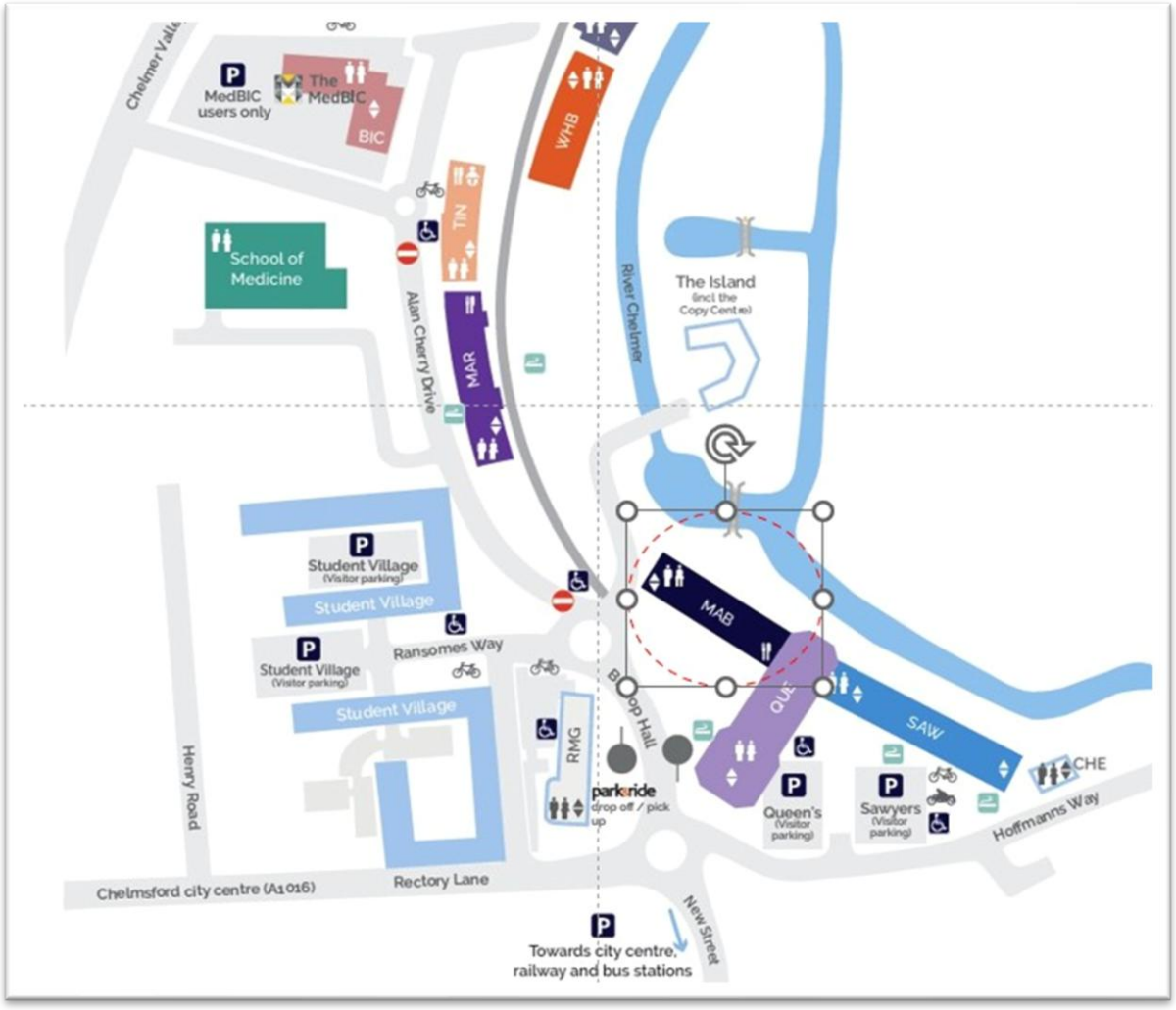
Dr Eilidh Ferguson - Meetings Officer

Hannah Webb- Anatomical Society Meetings Administrator

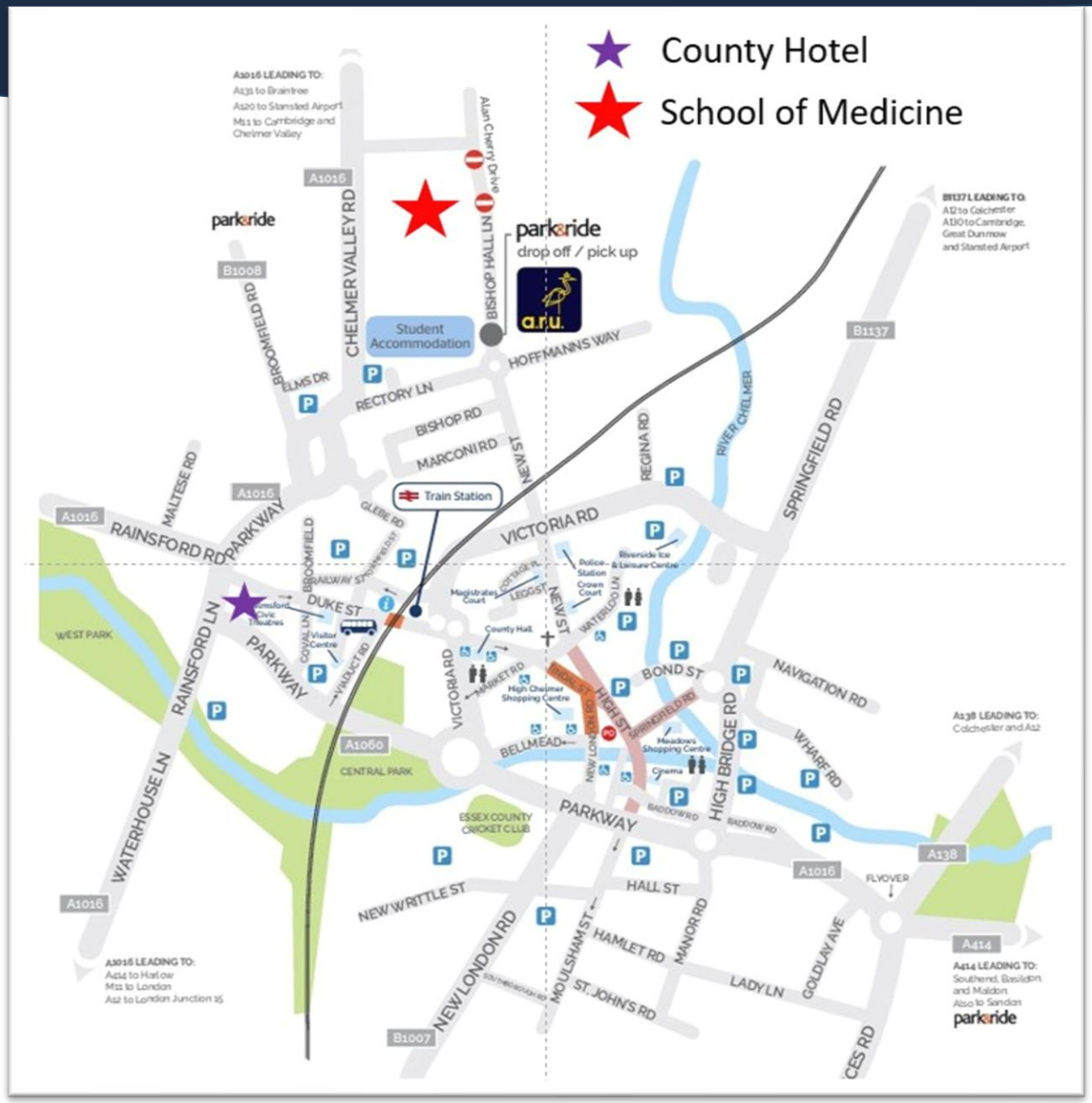
anatomicalsocietymeetings@gmail.com

Location

Lord Ashcroft Building (MAB),
Anglia Ruskin University,
Bishop's Hall Lane,
Chelmsford, Essex,
UK.
CM1 1SQ



Chelmsford


County Hotel
School of Medicine
park&ride
drop off / pick up
Student Accommodation
a.r.u.
Train Station
CHELMER VALLEY RD
BISHOP HALL LN
HOFFMANNS WAY
RECTORY LN
BISHOP RD
MARCONI RD
NEW ST
REGINA RD
RIVER CHELMER
SPRINGFIELD RD
VICTORIA RD
RAINSFORD RD
PARKWAY
MALTESE RD
BROOMFIELD RD
ELMS DR
GLEBE RD
BROADWAY
DUKE ST
WEST PARK
COVEL LN
VIADUCT RD
WATERHOUSE LN
CENTRAL PARK
A1016
B1008
B1137
A1060
B1007
A138
A414
BOND ST
NAVIGATION RD
WHARF RD
HIGH BRIDGE RD
BELLMEAD
HIGH ST
MARKET RD
SPRINGFIELD RD
BADDOW RD
ESSEX COUNTY CRICKET CLUB
NEW WRITTLE ST
NEW LONDON RD
HALL ST
HAMLET RD
MANOR RD
LADY LN
GOLDLAY AVE
ST JOHN'S RD
MOULSHAM ST
FLYOVER
A1016 LEADING TO:
A131 to Braintree
A120 to Stansted Airport
M11 to Cambridge and Chelmer Valley
B1137 LEADING TO:
A12 to Colchester
A130 to Cambridge, Great Dunmow and Stansted Airport
A138 LEADING TO:
Colchester and A12
A414 LEADING TO:
Southend, Basildon and Maldon
Also to Sandon
A1016 LEADING TO:
A414 to Harlow
M11 to London
A12 to London Junction 15

Pre conference workshops: Wednesday 17th December 10-12pm

The Anatomy of an Advance HE Fellowship Application

The AS Education Committee are facilitating this interactive workshop for anatomy educators at all career stages to support them in developing compelling, evidence-based applications for Advance HE fellowship at the level of Associate Fellow (AFHEA), Fellow (FHEA), or Senior Fellow (SFHEA). Together, participants will unpack what effective practice looks like in anatomy education, how to evidence this across all PSF2023 dimensions, and how to enhance evaluative and methodological approaches. Attendees will gain actionable strategies, peer insights, and a clear plan for advancing their professional development and strengthening their fellowship application. **Facilitators:** Dr Lauren Clunie, Dr Kat Sanders & Dr Paul McKeegan

Exploring the Functional Anatomy of the Upper Limb using Ultrasound Imaging

Collecting and interpreting ultrasound images is a vital skill for clinical practitioners, but can often be challenging. This workshop will allow participants to gain hands on experience in collecting ultrasound images of the upper limb and identifying key anatomical features, as well as better understand the clinical importance associated with upper limb ultrasound imaging. **Facilitator:** Professor Bhaskar Dasgupta MBE is a Consultant Rheumatologist and Visiting Professor at ARU.

Oral Presentations

Ask at the reception desk for who to hand your slides to.

Poster Presentations

Posters will be on display throughout the conference in the MAB foyer. Please make time to visit them during your breaks.

In- Conference Workshop. Thursday 18th December 11-12pm

Qualitative Bites: A Taster Menu of Research Methods. MAB 221

In this practical workshop, participants will work with existing qualitative data to sample a range of analytic approaches. From thematic analysis to discourse-focused techniques, you'll get a hands-on feel for how different methods shape interpretation and insight.
Facilitator: Professor Gabrielle Finn.

3D Morphometrics with SlicerMorph. Venue TBC

This hands-on workshop introduces anatomists to SlicerMorph, an open-source extension of 3D Slicer for 3D morphometric analysis. Participants will explore landmarking, semi-landmarks, and automated workflows and analysis using provided datasets. **Please bring your own laptop** (recent i5/i7 or equivalent with 16gb ram running windows 10/11, or a mac with M2 processor or above. Participants should install slicer from https://slicer.org prior to the workshop). **Please note this workshop is first come, first serve and will run alongside the Educational workshop in Session 4.** 3D slicer and SlicerMorph workshop signup
Facilitator: Dr Thomas O'Mahoney

Anatomical Society Young Investigator best talk prize

Awarded for the best oral presentation by an attendee, normally of relatively junior status at the AS winter meeting. The work presented shall have been carried out while the first author was an undergraduate or postgraduate student and presented within 1 year of the award of the Doctorate.

Film Screening: Wednesday 17th December 5pm

A medical student's first dissection can be an emotional experience: ethical and esistential anxiety mixed with awe, wonder and morbid fascination. 'Anatomy of a Doctor' is a performance, based on interviews with medical students, that explores this complex rite of passage and its implications for future patients. This screening of the performance will be followed by a panel discussion including the creator Dr Alex Mermikides a student researcher involved with the project and one other.

Dr Alex Mermikides is the D'Oyly Carte Senior Lecturer in Arts and Health at GKT School of Medical Education, King's College London, developing and delivering arts-based learning for medical students. Her research, which includes making performances, focuses on performance in relation to health and medicine. Recent publications include the *Routledge Companion to Performance and Medicine* and *Performance, Medicine and the Human*.

Wine reception and Art Exhibition: Wednesday 17th December 6:30pm MAB Foyer.

Miss Kate Jenkins, Medical and Anatomical Artist

Early Career and Student Social

The early career and student social event will meet in the MAB foyer at 7:15pm and located at the Slug and Lettuce. This event is hosted by the early career team at Anatomical Society. Casual drinks and a few fun social activities to help you get to know others in a similar position in their careers. Everyone is welcome.

Gala dinner details: Thursday 18th December 6:30pm

The Gala dinner will be held at the County Hotel. Tickets were reserved during the registration process.

Starter
Parsnip soup

Main
Roast Turkey or Veggie Wellington

Dessert
Fruit crumble and custard

Day 1: Wednesday December 17th

10:00-12:00	**Pre Conference Workshops** The Anatomy of an Advance HE Fellowship Application – Dr Lauren Clunie, Dr Kat Sanders and Dr Paul McKeegan Exploring the Functional Anatomy of the Upper Limb using Ultrasound Imaging – Professor Bhaskar Dasgupta	School of Medicine
12:00	Registration Opens	MAB Foyer
12:00-13:00	Welcome Lunch	MAB Foyer
13:00-14:40	**Session 1: General /Applied Anatomy** Welcome and Introduction **Keynote Talk:** Professor Joanna Wakefield-Scurr. Anatomy and its role in Society: Why is a bra important? *40mins* Benedict Falana. Apoptotic protein expression and Biochemical Investigations in human cervical carcinoma squamous cell (SiHa) cells exposed to TLD. *10mins* Lauren Murphy. Anatomical Variations of the Lumbar Plexus: A Human Cadaveric Study. *10mins* Monisha Premkumar. Distal Multi-Insertion Variant of the Gantzer Muscle: A Human Cadaveric Case with Implications for Nerve Compression and Hand Surgery. *10mins* Enya Costin. Mapping of the posterior cutaneous nerve of the forearm for lateral elbow denervation surgery: A human cadaveric study. *10mins* Sponsor talk. Revolutionising Anatomy Education with Brahmarsive by Theo Zirogianis *10mins*	MAB 221
14:40-15:00	Break/ Sponsors/ Posters	MAB Foyer
15:00-16:45	**Session 2: Clinical Anatomy** Vikas Khanduja. From Shape to Symptoms: The Hip as a Model for Disease. *40mins* Vinesh Mistry. Anatomical Insights into Slipped and Lost Extraocular Muscles: A Human Cadaveric Study on Surgical Implications for Strabismus Repair. *10mins* Brandon Boyer. Neuroanatomy of cranial dural vessels: implications for dural arteriovenous fistula (DAVF) embolization. *10mins* **Keynote Talk:** Mr Timothy Parratt. Current limb alignment concepts in knee surgery. *40mins*	MAB 221

16:45-17:00	Break/ Posters/ Sponsors	MAB Foyer
17:00-18:30	Film Screening 'Anatomy of a Doctor' and Q&A with Dr Alex Mermikides and Ali Gibson.	MAB 221
18:30 onwards	Wine Reception and Art Exhibition: Miss Kate Jenkins, Medical and Anatomical Artist	MAB Foyer
19:15 onwards	Early Career Social (Meet in MAB Foyer-) Slug and Lettuce	

Day 2: Thursday December 18th

8:00-9:00	Tea, Coffee and Pastries	MAB Foyer
9:00-10:45	**Session 3: Education /Flash Talks**	MAB 221

Keynote Talk: Professor Gabrielle Finn. New methods, new meanings: Reframing education research for impact. *40mins*

Michelle Welsh. Embedding Equity, Diversity, and Inclusion in Anatomy Education: Global Reflections and Strategies, and a Call to Action. *5mins*

Lucy Cowperthwaite. Uncovering the face of the hidden curriculum in anatomy through a Supported Introduction to Death intervention. *5mins*

Lauren Clunie: A Novel Advance HE-Accredited Anatomy Education Module: Design, Delivery, and Early Impact. *5mins*

Anthony Bright: Assessing with AI: an examination technique that allows both AI and student understanding. *5mins*

Deborah Merrick: Hands-On or Hands-Off: Student Perspectives and Assessment Outcomes in Dissection-Based versus Prosection-Based Anatomy Learning. *5mins*

Education Innovation Award Talk: Dr Aaron Beger and Dr Eva Sweeney. Implementing virtual escape rooms in education: Insights and innovations from two institutions. *40mins*

10:45-11:00	Break/ Posters/ Sponsors	MAB Foyer
11:00-12:00	**Session 4: In-Conference Workshops**	
	Education Workshop- Prof Gabrielle Finn. Qualitative Bites: A taster menu of research methods.	MAB 221
	3D Morphometrics with SlicerMorph Workshop – Dr Thomas O'Mahoney	TBC
12:00-14:00	Lunch	MAB Foyer
12:30-14:00	Anatomical Society AGM	MAB 221
14:00-15:30	**Session 5: Technology**	MAB 221

Keynote Talk: Dr Joseph Harris. Artificial Intelligence for Ultrasound: Progress and pitfalls of real-time anatomical segmentation. *40mins*

Paula Vickerton: ChatGPT, Co-pilot and Claude take an anatomy spotter. *10mins*

	Benhamin Crockett: Faculty Perspectives On Reflectance Transformation Imaging In Human Osteology Education. *10mins* Jason Ha: Revolutionising Anatomy Education: The Impact of Virtual Reality Workshops on Anatomy Teaching. *10mins* Jay F Roebuck: Improving medical education through rapid prototyping of anatomical models. *10mins* **Susan Standring for Elsevier**: A brief history of Gray's Anatomy from the 1st edition to the newly published 43rd edition. *10mins*	
15:30-16:00	Break/ Posters/ Sponsors/ Mentorship scheme mixer	MAB Foyer
16:00-17:50	**Session 6: Development and Aging** **Keynote Talk**: Dr Bernadette De Bakker. The Dutch fetal Biobank: A 3D window into human development. *40mins* Iain Keenan: Exploring Embryology in Medical Education. *10mins* Primal Pictures: sponsor talks. 1- Anatomy Learning outcomes for medicine quizzes. 2- 3D Read-time Embryology Upgrade. *10mins + 10mins* **Aging Cell Best Paper Prize Talk:** Dr Taylor Russo: Lipid accumulation drives cellular senescence in dopaminergic neurons. *40mins*	MAB 221
18:30 onwards	Gala Dinner: County Hotel	

Day 3: Friday December 19th

8:30-9:30	Tea, Coffee and Pastries	MAB Foyer
9:30-10:45	Session 7: Ethics Workshop	MAB 221
10:45-11:05	Break/ Posters/ Sponsors	MAB Foyer
11:05-13:00	**Session 8: Education and Outreach**	MAB 221

Rohan O'Hare: A Pilot Study of Near-Peer Anatomy Teaching in a UK Undergraduate Medical Curriculum using Human Prosections. *10mins*

Jiayi Zhang: Exploring 3D Anatomy: A Free Online Course Supporting Novice Learner Inquiry and Spatial Conceptualisation. *10mins*

Mason Frudd: Developing a Resource for Equality, Diversity and Inclusion in Head and Neck Anatomy Teaching. *10mins*

Millie Patel: 'We're censoring ourselves:' Evaluating Student Experiences While Learning Pelvic Anatomy. *10mins*

Yerokhina Viktoriia: World Anatomy Day at the University of Lancashire: inspiring public engagement through anatomical outreach. *10mins*

11:55-12:10	Break/ Sponsors	MAB Foyer
12:10-13:00	**Session 9:**	MAB 221

Journal of Anatomy Best Paper Prize: Dr Helge Rask-Andersen: Microanatomy of the human tunnel of Corti structures and cochlear partition-tonotopic variations and transcellular signalling. *40mins*

Prizes and Conference Close

13:00 onwards	Lunch to Go and Departure	MAB Foyer

Thank you to our sponsors

KEYNOTE SPEAKER

Anatomy and its' role in society: Why is a bra important

Professor Joanna Wakefield-Scurr

Research Group in Breast Health, University of Portsmouth

Due to the lack of intrinsic support within the breast, movement of the torso generates forces on the breast and the breasts move. This movement can be considerable. The movement of the breasts is driven by the movement of the torso, which moves differently in different activities. The forces that act on the breast during daily and sporting activities were relatively unknown. The Research Group in Breast Health at the University of Portsmouth were the first to establish robust methods to monitor the movement and forces on the breast during a variety of activities and in a variety of populations. If unsupported, excessive breast movement has a number of negative consequences including breast pain, potential tissue damage, functional adaptations and embarrassment. Our research has investigated each of these areas and applied this knowledge and data to the bra sector to help reduce breast pain, tissue damage, functional changes and embarrassment.

Joanna Wakefield-Scurr, also known as thebraprofessor.com, is a Professor of Biomechanics and the Founder of the Research Group in Breast Health at the University of Portsmouth (port.ac.uk/breastresearch). The Research Group is renowned for research on the biomechanics of the breast. The Group has been conducting fundamental and applied research into breast biomechanics since 2005 when it developed and published the first procedure to establish dynamic breast movement in three dimensions. During this time, the breast biomechanics of thousands of women have been assessed in a variety of conditions, contributing to a unique database of the forces acting through the breast tissue and the support requirements of the breast. Joanna is well known within the commercial sector, with research projects informing clinical practice and breast support design around the world. More recently, Joanna and her team have worked with elite athlete groups, such as the Lionesses and England netball in the lead up to major championships, improving athlete breast and bra knowledge, reducing breast pain and providing performance benefits.

YOUNG INVESTIGATOR

Apoptotic protein expression and Biochemical Investigations in human cervical carcinoma squamous cell (SiHa) cells exposed to TLD

Benedict A. Falana[1,2], Chinyerum S. Opuwari[2], Anthony Adefolaju[3]

1,2. Anatomy Unit, Brighton and Sussex Medical School Teaching Building, University of Sussex Brighton East Sussex, BN1 9PX; 2.Department of Medical Biosciences, Faculty of Natural Sciences, University of the Western Cape, Bellville, South Africa; 3. Department of Applied Anatomy, Medical School, Edge Hill University, Fac. of Health, Social Care & Medicine, St Helens Road, Ormskirk, Lancashire, L39 4QP

@Anatomyguy13 On Youtube

This preliminary study investigated the morphological effects of TLD on human cervical cancer cells (SiHa) treated with TLD. The study examined the antiproliferative mechanisms of the antiretroviral combination using immunohistochemical methods. Immortalized SiHa cell were treated with TLD at concentrations of 0.03, 0.3, and 7.5ug/L for 24 hours. Cell viability was assessed using the 3-(4,5-dimethylthiazol-2-yl) 2,5-diphenyltetrazolium bromide (MTT) assay. Cell cycle progression and apoptosis were evaluated through immunocytochemistry. Survivin expression was detected using anti-survivin primary antibody with Alexa Fluor-conjugated secondary antibody. TLD significantly inhibited SiHa cell viability at concentrations of 200 and 400 mg/L after 24 and 48 hours of treatment ($P<0.05$) compared to control groups in a concentration–dependent manner. Immunohistochemical analysis revealed DNA fragmentation and evidence of apoptotic cell death. (TDF+FTC+DTG) antiretroviral combination demonstrated significant antiproliferative effects on SiHa cervical cancer cells in vitro, characterized by distinct morphological alterations, reduced cell viability and induction of apoptosis. These findings suggest potential therapeutic applications of this drug combination in cervical cancer treatment and warrant furtherinvestigations into the underlying molecular mechanisms.

YOUNG INVESTIGATOR

Anatomical Variations of the Lumbar Plexus: A Human Cadaveric Study

Lauren Murphy, Samantha Goodchild

Anglia Ruskin University, Chelmsford, England. Anglia Ruskin University, Chelmsford, England.

The lumbar plexus is a network of nerves closely related to psoas major, positioned between vertebral levels T12 to L4. A growing body of research has demonstrated many anatomical variations of each contributing nerve in isolation, with new variations still being identified. This study aimed to contribute to the anatomical understanding of variations of the lumbar plexus as a whole and identify any interrelationships between variations from both a unilateral and bilateral perspective. This cadaveric study involved bilateral dissection of the lumbar plexus of 9 Thiel-embalmed cadavers. To allow for comparison between donors, a standardised dissection protocol was used. Psoas major was first isolated, then each contributing nerve root was identified in a superior to inferior approach. The route of each nerve was traced until the pelvic brim and images taken at pre-determined checkpoints. Qualitative data was collected regarding nerve route and positioning relative to anatomical landmarks, allowing categorisation of variations and subsequent statistical analysis. Every plexus in this study displayed at least one anatomical variation, with no specimen completely matching the textbook normal. A contribution from T12 was seen in only 16.7% of donors (3/18). The genitofemoral nerve was highly variable in origin and termination, with only 22.2% of plexi resembling textbook anatomy (4/18). Early bifurcation of nerve roots L2, L3 and L4 was seen regularly, resulting in additional branches of the obturator and femoral nerves. Despite no recognition in anatomical textbooks, the furcal nerve was identified in 72.2% of plexi (13/18). The use of Thiel-embalming enabled realistic preservation of tissue colour and biomechanical properties, proving advantageous in studying nerve branching and the interrelationships between surrounding soft tissues. This study highlighted the highly variable nature of the lumbar plexus, allowing for increased understanding regarding mechanisms behind atypical nerve block distributions, management for atypical neuropathies and the need for increased awareness to prevent iatrogenic nerve damage. All donors included had given consent and were provided by ARU Anatomy Centre which follows the HTA Code of Practice C. Ethical approval was granted by the Human Biological Material Committee (HBMC) and ARU HeMS Faculty Research Ethics Panel (FREP).

YOUNG INVESTIGATOR

Distal Multi-Insertion Variant of the Gantzer Muscle: A Human Cadaveric Case with Implications for Nerve Compression and Hand Surgery

Monisha Tarini Premkumar, Aliya Bhabha, Siobhan Downey, Maria Gavrila, Olwen Smith, Abduelmenem Alashkham

Edinburgh Medical School, Department of Anatomy, University of Edinburgh, Edinburgh, UK

The Gantzer muscle is an accessory head in the anterior forearm that may originate from the flexor digitorum superficialis or common flexor origin and typically inserts into flexor pollicis longus or flexor digitorum profundus. Though often asymptomatic, its presence is clinically significant as it may compress the anterior interosseous nerve, contribute to unexplained forearm or hand symptoms, and influence surgical procedures, including tendon graft harvesting. Despite its relevance, detailed morphometric descriptions, particularly of distal multi-insertion variants, remain limited. During routine dissection of an 87-year-old male cadaver in the Anatomy Department, University of Edinburgh, conducted under the Human Tissue (Scotland) Act 2006, a bilateral Gantzer muscle was identified. On the left side, the muscle originated from the common flexor origin and inserted into the flexor pollicis longus. Morphometric analysis revealed the muscle belly lay 153.49 mm from the wrist joint, measuring 67.86 mm in length, 8.87 mm in width, and 5.21 mm in thickness. In contrast, the right forearm revealed a rare distal multi-insertion variant: the muscle originated from the medial epicondyle along the ulnar head of flexor digitorum superficialis, coursed beneath the flexor tendons and median nerve within the carpal tunnel, and inserted into four distinct sites, including the first tendon of flexor digitorum profundus, flexor pollicis longus, flexor pollicis brevis and adductor pollicis. Morphometric analysis revealed that the muscle belly extended to 10.84 mm from the wrist, with a length of 69.42 mm, a width of 6.43 mm and a thickness of 2.40 mm. This unusually distal course and multi-site insertion may predispose to anterior interosseous nerve compression, complicate surgical planning in the distal forearm, and affect tendon graft selection. Recognition of this variant is therefore essential for anatomists, hand surgeons, and radiologists to prevent iatrogenic injury and optimise clinical outcomes. Documentation of such morphologically distinct variants fills an important gap in anatomical literature, emphasising the value of detailed cadaveric studies for improving surgical precision and patient care. Ethical Approval: The cadaver was obtained from the Anatomy Department at the University of Edinburgh, conducted under the Human Tissue (Scotland) Act 2006.

YOUNG INVESTIGATOR

Mapping of the posterior cutaneous nerve of the forearm for lateral elbow denervation surgery: A human cadaveric study.

Enya Costin, Danya Stone and Luke Reid

Department of Medical Education, Brighton and Sussex Medical School, Brighton, BN1 9PX, UK.

X: @EnyaCostin Insta: @EnyaCostin1

Surgical denervation of the lateral epicondyle is a highly effective treatment for refractory lateral epicondylitis, which targets the posterior branch of the posterior cutaneous nerve of the forearm (PPCNF). Little is known about the location, course and variation of the PPCNF in relation to lateral elbow denervation. Therefore, this study aims to characterise the anatomical variation of the posterior cutaneous nerve of the forearm (PCNF) and its branches and relate its position to bony landmarks of the lateral elbow. Seven formalin-embalmed upper limbs (3 female) were dissected. The PCNF, PPCNF and its branches were identified, and the position of PCNF hiatus, course, and branching nodes relative distance to the lateral epicondyle (LE) and interepicondylar line (IEL) were recorded. All measurements were normalised to IEL length for standardised comparisons. Photographic imaging facilitated computer assisted surgical anatomy mapping (CASAM) to visualise the PCNF distribution and generate a heatmap of its positional variance. The results showed the PCNF typically coursed anterior to the LE, with the branches running posteriorly towards the LE. The number of PPCNF branches ranged from 1-4, often originating proximal to IEL. The PCNF demonstrated several sites of positional consistency, namely the area proximal to the LE where there were 12 areas of nerve overlap, but considerable variation was identified. The results showed the distance from the IEL to the first branching node varied widely (0.45 ± 0.41; mean normalised distance ±SD), and a similar but smaller variation is observed to the second branching node (0.14±0.37), ranging from slightly distal to moderately proximal to the IEL. Also, variation was seen from the PCNF hiatus to the PPCNF (0.56±0.32), showing the PCNF splits into an anterior and posterior branch can occur 0.04 distal to 0.96 proximal to the hiatus. Despite these variations, heatmap analysis revealed regions of nerve overlap, showing specific areas of increased nerve density across the sample. The findings demonstrate significant anatomical variability in branching pattern of the PCNF, which require further investigation in a larger sample to support their identification during surgical procedures. Dissections performed under the HTA licence for Anatomical Examination at Brighton and Sussex Medical School.

Sponsor talk

Revolutionising Anatomy Education with Brahmarsive

Theo Zirogiannis

KEYNOTE SPEAKER

From Shape to Symptoms: The Hip as a Model for Disease

Mr Vikas Khanduja
Cambridge University Hospitals NHS Foundation Trust

Femoroacetabular impingement (FAI) exemplifies how variations in skeletal shape can initiate disease, making the hip an ideal model to link morphology with symptoms and structural degeneration. FAI arises from abnormal femoral head–neck or acetabular morphology—classically cam, pincer, or mixed types—that disrupts normal hip joint mechanics. These shape abnormalities alter load distribution and joint motion, producing repetitive contact between the femur and acetabulum during physiological activities. Over time, this mechanical conflict leads to labral injury, cartilage damage, and progressive joint degeneration, often in young and otherwise healthy individuals. Importantly, FAI demonstrates that disease can precede radiographic osteoarthritis by many years, with symptoms emerging from a complex interaction between anatomy, movement, and tissue response rather than from end-stage structural failure alone. Advances in imaging, computational modeling, and motion analysis have clarified how specific morphological features correlate with patterns of tissue injury and clinical presentation. However, not all individuals with FAI morphology develop symptoms, highlighting the modifying roles of activity, biomechanics, and biological susceptibility. By tracing a continuum from shape variation to mechanical dysfunction, tissue damage, pain, and eventual osteoarthritis, FAI provides a unifying framework for understanding musculoskeletal disease as a process rather than a static diagnosis. Studying FAI as a model condition offers broader insights into how subtle anatomical differences can drive pathology, inform early diagnosis, and support targeted, mechanism-based interventions aimed at altering disease trajectories before irreversible joint damage occurs.

Prof. Khanduja is a Consultant orthopaedic surgeon specializing in sports surgery and young adult arthroplasty at Addenbrooke's - Cambridge University Hospital. He was instrumental in setting up the tertiary referral service for young adults with hip pathology in Cambridge for the East of England and leads the service. In addition to his clinical practice, he also leads the Cambridge Young Adult Hip Research Group, which is focused on the use of technology in the assessment and improvement of outcomes in young adults with hip pathology. He is an Affiliate Professor at the University of Cambridge, Visiting Professor at University of Ghent and was awarded the Hunterian Professorship by the RCS England in 2021. He also has a wealth of editorial and leadership experience as former Associate & Speciality Editor to Bone and Joint Journal, Associate Editor in Chief to JISAKOS and currently Executive Editor to JBJS (Am). He is also a Past President to the British Hip Society, Founder Chair to the ESSKA European Hip Preservation Associates (EHPA), Past Chair of Non Arthoplasty Hip Registry (NAHR) and is currently on the Executive Board of the British Orthopaedic Association, ISHA and is the President to SICOT.

YOUNG INVESTIGATOR

Anatomical Insights into Slipped and Lost Extraocular Muscles: A Human Cadaveric Study on Surgical Implications for Strabismus Repair

Vinesh Mistry, Naila Ali , Karuna Katti
University of Birmingham, School of Medicine, Birmingham, UK (at time of study); Anglia Ruskin University, School of Medicine, Chelmsford, UK (current)

Understanding the detailed anatomy of extraocular muscles is critical for successful strabismus surgery, particularly when managing slipped or lost muscles. Subtle anatomical variations between populations may influence surgical precision, yet existing specific morphometric data are largely limited to cohorts of alternate ethnicity. This dissection study aimed to characterise the spatial relationships and insertional patterns of extraocular muscles in a Caucasian sample and to compare these findings across ethnic groups to identify surgically relevant variations. Six orbits from three formalin-embalmed Caucasian cadavers (aged 86–92 years) were dissected at the Human Anatomy Unit, University of Birmingham. Each globe was inflated with ultrasound gel to restore orbital contour, and extraocular muscle parameters (muscle length, insertion width, limbal distance) were measured using a string-and-ruler technique. Relative significance was assessed through comparison with published Thai, Mexican, Indian, and Taiwanese datasets. As a previously under-examined parameter, inter-recti spacing was also quantified during dissection. All statistical comparison was completed using Welch's t-tests ($P < 0.001$-0.05). The muscle length hierarchy of the Caucasian orbits followed inferior rectus (IR) < inferior oblique (IO) < medial rectus (MR) < lateral rectus (LR) < superior rectus (SR) < superior oblique (SO). The IR and LR were significantly shorter in Caucasians than in Thai counterparts ($P < 0.05$), while IR insertion width was markedly narrower than both Thai and Mexican cohorts ($P < 0.001$). The SR, IR and MR insertion was positioned more posteriorly relative to multiple compared ethnic datasets ($P < 0.05$). Inter-recti spacing showed distinct ordering (MR-IR < IR-LR < SR-MR < SR-LR) with notable observational differences relative to existing literature. These findings refine the morphometric understanding of extraocular muscles within a Caucasian cohort and emphasise that ethnicity-linked variations in recti positioning and insertion geometry may affect surgical orientation. Integrating such data into planning and training could enhance precision and safety during strabismus correction. All cadaveric specimens were obtained through the University of Birmingham Human Anatomy Unit in accordance with the UK Human Tissue Act (2004). Donors had provided informed written consent for the use of their bodies for research and education.

YOUNG INVESTIGATOR

Neuroanatomy of cranial dural vessels: implications for dural arteriovenous fistula (DAVF) embolisation

Brandon Boyer[1,3], Hamed Nejadhamzeeigilani[2,3], Peter Bazira[3], Emily Hunter[3], Paul McKeegan[3]

1-Anglia Ruskin University, Chelmsford, UK, 2-Leeds General Infirmary, Leeds Teaching Hospitals NHS Trust, Leeds, UK, 3-Hull York Medical School, Kingston-upon Hull, UK

This study evaluated whether middle meningeal artery (MMA) vs non-MMA supply, endovascular approach and cortical venous reflux (CVR) are predictors of dural arteriovenous fistula (DAVF) success and recurrence rates following endovascular embolisation. It also assessed complication rates, evolving trends in microcatheter selection and liquid embolic agent use over time. A single-centre, retrospective cohort study design was used. The study population was comprised of patients with confirmed cases of DAVFs undergoing ≥1 attempted endovascular embolisation between February 2007–April 2025. Ethical approval was obtained from the Leeds Teaching Hospitals Trust Ethics Committee (Reference No: LOC1745). Primary outcome metrics included recurrence and complications; secondary outcomes included procedural changes and technological advancements over time. Statistical analysis included Chi-squared test, Fischer's exact test and Bonferroni's correction. 97 patients were included in this study (mean age, 56.1 years (SD, 15.3 years); 67% male). MMA supply was associated with lower recurrence (18.7%) than non-MMA supply (30.3%, p = 0.211), however this was not statistically significant. MMA supply was associated with significantly higher success rates (96.9%) than non-MMA supply (78.8%, p = 0.0067) following final endovascular embolisation attempt, however this was not statistically significant following Bonferroni's correction. The transarterial approach demonstrated significantly lower recurrence (16.7%) and complication rates (1%) compared with transvenous approach (50%, 14.3%), however statistical significance was lost after Bonferroni's correction. CVR was present in 92.8% of our cohort yet showed no statistically significant relationship with recurrence rates (p = 0.506). From 2020 onwards, dual lumen balloon microcatheter usage increased by 31.9%, leading to fewer stuck microcatheter complications. Although CVR was not found to be an independent predictor of DAVF recurrence, MMA supply and the transarterial approach were associated with more favourable outcomes. Technological advancements also appear to have improved procedural safety.

KEYNOTE SPEAKER

Current limb alignment concepts in knee surgery

Mr Timothy Parratt
Consultant Orthopaedic Surgeon, ESNEFT

Partial and total knee replacements, along with soft tissue realignment procedures, are good operations which help to restore patients' function, decrease pain levels and provide improved quality of life. However, not all patients are satisfied after these procedures, up to 20% in total knee replacement (TKR). This talk explores patient heterogeneity when approaching these procedures along with techniques to potentially optimise outcomes with respect to that individual's anatomy.

Tim is a consultant hip, knee and trauma surgeon based at Colchester hospital and the Essex and Suffolk Elective Orthopaedic Centre (the country's newest and largest orthopaedic unit). He is the head of knee surgery there as well as being an Honorary Senior Lecturer at ARU helping to set up The Institute of Excellence in Robotic Surgery (TIERS). Tim's clinical interests include primary hip surgery and specialist knee surgery including revision and robotic procedures. He is a national expert in robotics and is frequently involved in training and research on this modality. His current research interests are around patient specific alignment, endoprosthetic replacement of bone and bone cutting techniques.

KEYNOTE SPEAKER

New Methods, New Meanings: Reframing Education Research for Impact

Professor Gabrielle Finn
University of Manchester

This presentation will guide the audience through approaches to educational research, with a focus on love and breakup methodology, longitudinal research, and poetic inquiry.

Gabrielle Finn is Professor of Medical Education at the University of Manchester. She previously served as Associate Vice-President and Vice-Dean for Teaching, Learning and Students the University of Manchester. She was Founding Director of the Health Professions Education Unit at Hull York Medical School. Her research spans assessment, professionalism, widening participation, gender discrimination, curriculum design, and anatomy pedagogy. She has published over 150 works and secured significant research funding. She is Associate Editor for two major journals. Professor Finn is a National Teaching Fellow (2019), Principal Fellow of the HEA, and KIPRIME Fellow, and is the Chair of the Association for the Study of Medical Education (ASME).

Embedding Equity, Diversity, and Inclusion in Anatomy Education: Global Reflections and Strategies, and a Call to Action

Amanda J. Meyer[1], Eiman Abdel-Meguid[2], Rosemary Bassey[3], Şahi Nur Kalkişim[4], Sarun Koirala[5], Haley L. Nation[6], Michelle Welsh[7]

1 Disciple of Anatomy and Pathology, College of Medicine and Dentistry, James Cook University, Townsville, Queensland, Australia; 2 School of Medicine, Dentistry and Biomedical Sciences, Queen's University Belfast, Belfast, UK; 3 Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, Hempstead, New York, USA; 4 Department of Anatomy of Health Sciences, Karadeniz Technical University, Vocational School of Health Science, Trabzon, Türkiye; 5 Department of Anatomy, B.P. Koirala Institute of Health Sciences, Dharan Sub-Metropolitan City, Koshi Province, Nepal; 6 Department of Cell Systems and Anatomy, UT Health San Antonio, San Antonio, Texas, USA; 7 School of Medicine, Dentistry and Nursing, University of Glasgow, Glasgow, Scotland, UK.

This project aimed to explore current global approaches to embedding equity, diversity, and inclusion (EDI) in anatomy education. It sought to identify shared successes and challenges, share reflections from multiple institutional contexts, and provide practical strategies to support educators to enhance EDI within their teaching. Authors from six countries reflected on EDI initiatives within their respective teaching contexts (acknowledging their positionality) and institutions. These reflections were synthesised to identify shared themes of successes and challenges. Drawing from this synthesis and relevant literature, the authors developed a practical evidence-based checklist of actionable strategies for anatomy educators, alongside curated links to open-access resources to support anatomy educators. The authors' reflections revealed shared successes including the use of inclusive pedagogical practices, increased use of representative anatomical imagery and resources, and efforts to reform curricula and assessments. Shared challenges identified a lack of diverse anatomical imagery, variability in professional development and institutional support, and wider systemic and cultural constraints. The resulting checklist presents a series of targeted recommendations planning inclusive curriculum design, teaching practice and delivery, representation and visibility, institutional advocacy, community partnerships, and access to targeted resources and professional support. A coordinated, global commitment is needed to address structural barriers and ensure sustainable progress in EDI across anatomy education. The authors propose collaborative cross-institutional initiatives, advocacy for EDI curricula reform, and partnerships with underrepresented communities. Educators are encouraged to adopt these strategies and join collective efforts to shape a more equitable and representative future for anatomy education. No ethical approval required; No funding to declare.

Uncovering the face of the hidden curriculum in anatomy through a Supported Introduction to Death intervention

Lucy C. Cowperthwaite[1], Steph J. Busby[2,3], Paul Houghton[1], Kat A. Sanders[3,4]
1. School of Healthcare, Faculty of Health Sciences, University of Hull, Hull, UK; 2. Sydney School of Health Sciences, Faculty of Medicine and Health, University of Sydney, Australia; 3. School of Healthcare, Faculty of Health Sciences, University of Hull, Hull, UK; 4. School of Medical Sciences, Faculty of Medicine and Health, University of Sydney, Australia.

Learning from human body donors is considered the gold standard in anatomy education, offering students a unique chance to observe real anatomical variation. For many, it is also their first encounter with death, a profound experience that remains largely unaddressed in formal curricula and instead forms part of anatomy's "hidden curriculum". This study explores the impact of a 'Supported Introduction to Death' intervention, which unhides the hidden curriculum of death in anatomy education, and explores how such an intervention may explicitly promote paramedicine students' preparedness for clinical practice. The intervention was piloted with two cohorts of BSc Paramedicine students (n=83) at the University of Hull in 2023 and 2024. Prior to formal anatomy teaching, students attended a preparatory briefing and completed a pre-intervention survey which explored their expectations for the intervention. The following week, they were introduced to a full (undissected) body donor. Immediately afterwards, students participated in small focus groups to reflect on the experience. A follow-up survey structured around a reflective model was completed the next week, along with a restorative supervision session (not included in data collection). Data were drawn from pre- and post-intervention surveys and focus group discussions and thematically analysed. This study was approved by the local institutional ethics committee and all participants provided informed consent. Findings were grouped into three key themes: 1) Confrontation - students reflected on their expectations versus the reality of seeing a donor, particularly regarding appearance. 2) Application to Practice - participants felt the intervention demystified death and enhanced their confidence in dealing with it professionally. 3) Processing - peer discussions helped normalise emotional responses, creating a safe space to share and feel understood. The results of these pilot sessions with Hull-based paramedic students demonstrated the SITD intervention was successful in positioning anatomy as an ideal space for exploring death in a safe and supportive environment, with clear relevance to students' future professional practice in healthcare. Is it time to formally add death education to anatomy curricula? Ethical approval was sought and approved by the Faculty of Health Sciences Ethics Committee at the University of Hull.

A Novel Advance HE-Accredited Anatomy Education Module: Design, Delivery, and Early Impact

Lauren Clunie[1], Kat A Sanders[2,1], Paul J McKeegan[1]

1- Hull York Medical School, Faculty of Health Sciences, University of Hull, UK; 2-School of Medical Sciences, Faculty of Medicine and Health, University of Sydney, Australia.

Discipline-specific professional development that maps explicitly to the Professional Standards Framework (PSF2023) remains uncommon in anatomical education, despite the distinct pedagogical and professional demands of the discipline. At Hull York Medical School (HYMS), a level-7, 20-credit Advance HE–accredited module, Professional Practice in Anatomy Education (PPAE), was developed to address this training gap. PPAE is explicitly designed to support anatomy educators in evidencing all 15 PSF2023 dimensions to Fellow level (Descriptor 2, FHEA). The integration of anatomy-specific pedagogical training to a formally accredited module provides a novel, structured approach to professional development, embedding reflective teaching practice, advanced discipline knowledge (including work with human donor material), and scholarly engagement within an MSc-level programme. To evaluate module design and its impact on participant experience, focus groups were conducted with students from the inaugural 2024-25 cohort (n=8), transcribed before undergoing thematic analysis. Analysis highlighted participant perceptions of module impact on professional development, teaching philosophy, methodological and reflective confidence, and in evidencing PSF2023 dimensions. Participants also valued the flexible delivery structure, mentorship, peer observation, and collaborative learning. Suggestions for improving future iterations of the module focussed primarily on logistical improvements. This presentation will outline the design, delivery, and evaluation of the PPAE module, including focus group findings, examples of portfolio case studies mapped to PSF dimensions, and reflections on the operational successes and challenges encountered during its first run. Triangulation of focus group data, assessment artefacts, and module evaluation will illustrate how the module supports participants to evidence reflective, evidence-informed practice, and develop skills required for the award of Advance HE Fellow. The PPAE module offers a novel discipline-specific, Fellow-aligned model for professional development. Combining accredited professional recognition pathways with anatomy-specific training provides a unique mechanism for elevating teaching quality and strengthening professional identity within the discipline. We invite discussion on scaling, sustainability, and cross-institutional collaboration to support wider adoption and adaptation. Ethical approval was granted by the Hull York Medical School Research Ethics Committee (HYMS-25-26-001).

Assessing with AI: an examination techinque that allows both AI and student understanding

Anthony Bright, Natasha Noel-Barker, Rudolf Billeter-Clark
University of Nottingham, Nottingham, United Kingdom

Within the continuous increase in artificial intelligence use amongst students, higher education assessments have begun to need to be reshaped to account for this extra level of ease students have, both when learning, and in open-book examinations. The Sports and Exercise Science course at the University of Nottingham currently includes a second-year module focussing on the functional musculoskeletal system and its clinical relevance. When teaching this module, a high level of activity based learning is used, including wax modelling, elastic force line models, and cadaveric human material to get a deeper understanding from the students of their functional anatomy in relation to sports. Objective Structured Practical Examinations (OSPEs) are commonly used in anatomical courses and modules, as they allow for the 3D aspect of anatomy to be seen in a time-based setting. However, they usually only allow for memorisation, with possible discussions with an examiner. At UoN, a new assessment was proposed for the functional anatomy module, which was formatted to allow open-book resources, including AI, Google, and Complete Anatomy software, but still measured the students' level of understanding. This was accomplished by having a 45 minute writing portion of the exam, with application based questions using images of activity scenarios, cross-sections, and MeshLab models, for students to have to answer about the sporting scenario by referencing muscles from the cross-sections and digital models. Within this time, they also were to prepare answers to a second type of question, regarding a clinical sporting injury, where after the 45 minutes, they would have a 15 minute oral examination to assess what they'd found. The combination of open-book resources, mimicking real-life work, and the oral component to assess understanding, this allowed an assessment that utilised AI, without compromising student learning. This was reflected in their 2024/25 module evaluation scores that ended with an 88.0% aggregate satisfaction (compared to an average module % of 81%), based on multiple questions including those about the exam. Quotes from this survey included: "Examination process for module is really well structured focusing on testing application rather than how well you remember information" and "It is the best organised exam structure".

Hands-On or Hands-Off: Student Perspectives and Assessment Outcomes in Dissection-Based versus Prosection-Based Anatomy Learning

Deborah Merrick[1], Godwin Sokpor[2], Natasha Noel-Barker[1], Liam Hyland[3], Marie Kokolski[1]
1 University of Nottingham, Nottingham, UK; 2 University of Lincoln, Lincoln, UK; 4 Department of Otorhinolaryngology, Queen's Medical Centre, Nottingham

Cadaveric dissection has traditionally been regarded as the gold standard in anatomy education, offering students hands-on experience to enhance three-dimensional and spatial awareness of the human body. However, many institutions have moved away from full-body dissection, citing cost and time constraints as limiting factors. Pre-dissected cadaveric specimens (prosections) are increasingly used to deliver authentic anatomical teaching within limited curriculum time, though often considered less interactive. The University of Nottingham employs both dissection and prosections to teach anatomy to early-year medical students across two campuses: Nottingham (dissection and prosections) and Lincoln (prosections). Both cohorts follow an identical curriculum, learning outcomes, and assessments, providing a unique opportunity to compare the impact of each teaching modality and revisit the longstanding debate regarding relative effectiveness. Quantitative (summative examination marks) and qualitative (student perception survey) data were collected from medical students over a two-year period (2022-2024). First- and second-year students who did not carry out dissection achieved statistically lower average marks in anatomy spotter-like examinations ($p=0.0034$ and $p=0.0022$, respectively). Further analysis revealed that students exposed to dissection performed significantly better in prosection-based, diagnostic imaging and functional anatomy questions, whereas no significant differences were observed in other question types, such as osteology and surface anatomy. Qualitative responses (n=413) showed that 65% of students agreed that the mode of anatomy teaching influenced their decision to apply to the Medicine course at Nottingham or Lincoln. Students were positive about both teaching modes. Dissection was described as more interactive, memorable, and realistic, with students perceiving that this approach improved their visualisation and engagement. Prosection-based teaching was valued for its time efficiency, preparation quality, and focused content comprehension. Ultimately, dissection and prosection-based teaching modalities each offer unique benefits that shape students' learning experiences and inform their decisions when applying to courses. These findings suggest that clinically related topics (particularly diagnostic imaging and functional anatomy) benefit from the deeper engagement provided by dissection. However, further research is needed to explore, in greater granularity, how teaching modality influences specific aspects of anatomical understanding. Ethical approval was received from the University of Nottingham School of Life Sciences Ethics Committee (F140923DM).

Education innovation award talk summary

Aaron Beger and Eva Sweeney (co-presenting)
Queen's University Belfast, Belfast, Northern Ireland

The virtual escape room (ER) is a format of gamified learning that utilizes puzzles and riddles to expose learners to content in new, creative ways. Exploring different designs and formats could help determine how best to implement ERs into medical curricula, particularly from the learner's perspective. This study explores the development and deployment of anatomy-themed virtual ERs at two institutions, Queen's University Belfast (QUB) and Edward Via College of Osteopathic Medicine (VCOM). Using Google Workspace as the foundational platform, each ER incorporated 3D anatomical models created either via photogrammetry or the Virtual Human Dissector software (www.toltech.net). QUB participants engaged in a team-based, in-person virtual ER, while VCOM participants completed the activity individually and remotely. Feedback from pilot evaluations at QUB (n = 9) and VCOM (n = 8) was collected through anonymous surveys and a focus group, revealing high levels of engagement and enjoyment. A comparative analysis highlighted the strengths and limitations of different design structures (linear vs. nonlinear), delivery formats (in-person vs. remote), and participation modes (team-based vs. individual). This cross-institutional experience offers practical insights for educators interested in adopting virtual ERs in anatomy curricula. Future work should include larger cohorts to more robustly evaluate educational outcomes and optimize design frameworks for enhanced learning.

KEYNOTE SPEAKER

Artificial Intelligence for Ultrasound: Progress and Pitfalls of Real-Time Anatomical Segmentation

Dr Joseph Harris

Anaesthesia Resident and Research Fellow, UCLH

AI tools can now augment grayscale ultrasound images by segmenting sono-anatomical structures in real time. Despite early promise, barriers exist to the widespread utilisation of these tools, particularly to clinical environments. Here we consider the possibilities of this emerging technology for educators and clinicians, as well as the obstacles ahead.

Dr Joseph Harris is an anaesthesia resident at University College London Hospital where he holds the post of Innovation Fellow in Anaesthesia and Honorary Research Fellow at University College London. His research interests lie in the clinical application of AI across perioperative medicine, considering how technology will shape the delivery of surgery and anaesthesia in the future. His recent review on the use of AI in ultrasound scanning for regional anaesthesia considers the state of play, opportunities and challenges of this emerging technology.

ChatGPT, Co-pilot and Claude take an anatomy spotter

Karishma Behera[1], Geetika Ail[2], Paula Vickerton[2]

1. Royal London hospital, Whitechapel Rd, London E1 1FR; 2. Institute of Health Sciences Education, Queen Mary University of London, Mile End Rd, London E1 4NS

ChatGPT has made headlines for its surprising proficiency to pass high profile written examinations, such as the medical licensing exams and law exams. Since 2023 ChatGPT has had an image analyser which could prove a valuable tool in image-based education. Anatomy is an inherently visual subject and is usually tested in image-based spotter examinations. 50 image-based anatomical questions were written by an anatomist and a clinician, and reviewed by a second anatomist for quality control. The questions were input into GPT-4Plus, GPT-5Plus, Co-pilot and Claude between July 22nd and September 20th. Each input was repeated a second time. Answers were graded as correct or incorrect. Written outputs from ChatGPT were qualitatively assessed by the authors and given an accuracy grading ranging from 0 to 5. The overall scores for GPT-4 were 54% and 48% and for GPT-5, 50% and 56%. Co-pilot scored 36% and 40%, and Claude scored 32% and 32%. Of the 50 questions asked, 3 questions were answered consistently correctly across the 3 chatbots (6%). ChatGPT performed significantly worse in interpreting cross-sectional images than 3D images (p=0.005), whilst Claude performed significantly worse in interpreting 3D images (p=0.028). ChatGPT and Co-pilot showed no significant difference in questions requiring identification or application of knowledge, but Claude performed significantly worse on identification questions (p=0.0004). The accuracy grade for GPT-4 had a mean of 3.14 (out of 5). For the correct answers only, this grade rose to 4.65. The range of grades for correct answers was 3-5. The outputs from GPT-5 received a mean accuracy grading of 2.74 (out of 5). This rose to 4.26 for correct answers. The range of accuracy grading for correct outputs was 1-5. ChatGPT is currently answering anatomical image-based questions correctly as frequently as it is answering incorrectly, it also shows a high level of inconsistency. Co-pilot and Claude showed far lower levels of accuracy. It is important that both educators and students understand the limitations of these tools as AI-based image analysers continue to develop a footprint in medical education. This study did not require ethical approval.

Faculty Perspectives On Reflectance Transformation Imaging In Human Osteology Education

Benjamin A. Crockett, Amanda K. Burbage
North Central Michigan College, Petoskey, USA, Eastern Virginia Medical School, Norfolk, USA

Osteology is a uniquely difficult and integral portion of human anatomy curricula across the world. Students have traditionally studied skeletal elements and landmarks from cadaveric remains. This educational practice is becoming more challenging due to the limited availability of skeletons and contemporary ethical concerns. Photography and computer models are not entirely effective at capturing the shape and texture of bone, therefore options for visualizing skeletal tissue remain limited. Reflectance Transformation Imaging (RTI), a technique that fuses multiple digital images under varied lighting conditions, is a promising technology for meeting these specific challenges. The purpose of this study was to explore faculty perspectives on the application of RTI with osteological specimens. The study employed a User Experience Questionnaire (UEQ) to quantify faculty User Experience and semi-structured interviews to identify their perceptions of a newly-created RTI osteology resource. The quantitative results showed that RTI performed well on the User Experience dimensions of attractiveness, perspicuity, efficiency, and novelty. The qualitative analysis supported these findings, revealing faculty enthusiasm for RTI's potential to improve the teaching of complex osteological structure. RTI holds potential for advancing osteology education and its adoption will require resolving issues related to accessibility, cost, and its suitability for different educational domains and levels. Ethical approval was granted for this research by the Institutional Review Board of Eastern Virginia Medical School, Norfolk, United States.

Talk 3

YOUNG INVESTIGATOR

Revolutionising Anatomy Education: The Impact of Virtual Reality Workshops on Anatomy Teaching

Jason Ha[1], Florence Chang[2], David Owens[3], Jeremy Mortimer[4], Jagtar Dhanda[5]
1. University of Bristol, Bristol, UK; 2. Cardiff University, Cardiff, UK; 3. University Hospital of Wales, Cardiff, UK; 4. University of Edinburgh, Edinburgh, UK; 5. Queen Victoria Hospital, East Grinstead, UK

Traditional anatomy teaching faces challenges such as limited hands-on opportunities, difficulty visualising complex structures, and variability in teaching quality due to reliance on cadavers. Virtual Reality in Medicine and Surgery (VRiMS), a national organisation, aims to address these issues through immersive virtual reality (VR) experiences that complement traditional methods. This study assessed the educational impact of VR in anatomy education and explored its potential advantages over conventional approaches. Two anatomy workshops were delivered in Bristol and Cardiff, focusing on upper and lower limb musculoskeletal anatomy and ENT anatomy, respectively. Each workshop included 30 minutes of didactic teaching delivered by a consultant surgeon or anatomy lecturer, during which the instructor's VR headset view was screen-shared to a projector or large display. This was followed by 30 minutes of independent exploration, where participants used VR to interact with 3D anatomical models and examine nerves, vessels, and muscle layers. Pre- and post-workshop questionnaires assessed participant confidence and anatomy knowledge using Likert scales and a 10-question best-of-five multiple-choice test. These were compared using Mann-Whitney U tests. Data from 36 participants showed only 22% had prior experience with VR for anatomy learning. In workshop 1, anatomy test scores improved from 6.42/10 to 8.08/10 (1.67 ± 1.50, $p = 0.004$) and confidence from 2.50/5 to 4.50/5 (2.00 ± 1.21, $p < 0.0001$). In workshop 2, test scores increased from 6.17/10 to 7.00/10 (0.83 ± 1.93, $p = 0.048$) and confidence from 2.46/5 to 3.96/5 (1.50 ± 1.06, $p < 0.0001$). Participants reported a significant improvement in their ability to visualise 3D anatomical structures after both workshops. In Workshop 1, the average rating increased from 2.50/5 to 4.58/5 (2.08 ± 1.08, $p < 0.001$), and in Workshop 2, from 2.67/5 to 4.33/5 (1.67 ± 1.13, $p < 0.001$). Across the 2 workshops, participants rate VR anatomy teaching to be $4.36/5 \pm 0.64$ as effective as traditional teaching in enhancing spatial understanding. To conclude, VR-based workshops significantly enhanced anatomy knowledge and confidence, highlighting its potential as a powerful adjunct to traditional methods. Ethical approval for this study was granted by the Brighton and Sussex Medical School (BSMS) Research Governance and Ethics Committee (RGEC), reference number ER/BSMS9GYI/1, in accordance with the Declaration of Helsinki and UK GDPR regulations. Participation was voluntary with participants providing informed consent, after reading the participant information sheet, for their data to be used towards this research study.

YOUNG INVESTIGATOR

Improving medical education through rapid prototyping of anatomical models

Jay F Roebuck[1], Laura Gorman[1], Lucy McKenna[1], Tomas Breslin[2], Christian Myles[1], James Jones[1]

1- School of Medicine, University College Dublin, Ireland; 2- Emergency Department, The Mater Hospital Dublin, Ireland

Anatomical models have a long and illustrious history in medical education. They serve as teaching and orienting aids for students struggling with complex 3D anatomy. The static nature of conventional physical models constrains educators in refining or modifying the form of the object. However, the advent of rapid prototyping (3D printing) offers the possibility for rapid and continuous evolution of teaching aids. This study highlights how rapid prototyping may accelerate the evolution of more effective anatomical models. Each successive cycle of innovation is tested for its impact on learning gain and educator opinion. One example of rapid prototyping (cardiac ultrasound model) is offered to illustrate the process. As Point of Care Ultrasound (POCUS) is increasingly being implemented in the hospitals and academia, there is an increased demand for better sonographic teaching in medical education. The development of these cardiac models hopes to achieve that aim. The research describes 10 cardiac prototypes (manufactured over 2 years) with the models being employed in lessons with feedback collection, SAQ assessments, physician opinion and public outreach. Each new iteration of the model was modified in response to feedback and student scores. The largest step improvement was seen between prototypes 6 and 7. These models introduced spatially orientating features suggested by thematic analysis of incorrect SAQ answers to sonographic anatomy trials of the Parasternal Long Axis View (PLAX) and confirming with POCUS Physicians. The first SAQ trials found no significant difference between control and model group answers (Mann-Whitney, $p=0.3520$, $n=112$), whereas the second SAQ trials found a significant interventional improvement (Wilcoxon, $p<0.0001$, $n=92$) with student scores increasing from a failing to passing grade on average. Further research is planned to test the efficacy of models with prospective multicentre trials. Ethical approval was gained for the included low-risk study by UCD HREC (LS-C-24-189-Roebuck-Jones). Approval was not required for the feedback as this was deemed part of normal teaching feedback practices.

Sponsor talk

A brief history of *Gray's Anatomy* from the 1st edition (1858) to the newly published 43rd edition (2025)

Susan Standring MBE

Gray's Anatomy was first published in 1858 and has remained in continuous publication since then: the 43rd edition was published in November 2025. The text of the first edition was written by a young surgeon, Henry Gray and most of the illustrations were prepared by his colleague, Henry Vandyke Carter. Their book, entitled *Anatomy, Descriptive and Surgical*, was an immediate success - much of that acclaim acknowledged the impact of Carter's illustrations. Later editions expanded to keep pace with new anatomical research; *Gray's Anatomy* became the official title (27th edition); colour printing, X ray plates and electron micrographs were added during first half of the 20th century; an extensive e-book now accompanies the print version. The 35th edition, published in 1973, was bigger and bolder than any of the previous editions and enthusiastically embraced contemporary evidence-based research. Since the 39th edition, published in 2005, anatomy has been presented regionally rather than systemically, under the strapline *The Anatomical Basis of Clinical Practice*. The 43rd edition continues to describe anatomy regionally, supported by 2D and 3D videos, including 10 new embryology videos, state of the art imaging and specially commissioned expert Commentaries that discuss new and emerging topics related to clinical anatomy.

KEYNOTE SPEAKER

The Dutch Fetal Biobank: A 3D window into human development

Bernadette S. de Bakker, MD PhD Assistant professor in Human Embryology and Fetal Imaging
Amsterdam UMC location University of Amsterdam, Department of Obstetrics and Gynecology, Meibergdreef 9, Amsterdam, The Netherlands; Amsterdam Reproduction and Development research institute, Amsterdam, The Netherlands; Erasmus MC – Sophia Children's Hospital, University Medical Center Rotterdam, Department of Pediatric Surgery, The Netherlands

Understanding human development in its full complexity remains one of the greatest challenges in biomedical science. To bridge the knowledge gap between early embryogenesis and later fetal organ maturation, a unique and expanding resource has been established: the Dutch Fetal Biobank. Over the past years, 550 intact human specimens have been collected, ranging from 4 to 24 weeks gestation, with informed consent following pregnancy termination, ectopic pregnancy, or preterm labor. Each sample is comprehensively documented and categorized into three equally represented groups: anatomically normal, with genetic variants, and with structural anomalies, including ultra- rare conditions such as sirenomelia and conjoined twins. Specimens are preserved intact, enabling high-resolution imaging, anatomical dissection, and molecular sampling. The 3D Embryo Atlas (0–10 weeks) and the new, unpublished 3D Fetal Atlas (10–24 weeks) provide interactive reconstructions of key organs and systems, generated using ex vivo micro-CT, synchrotron imaging, and correlative 3D ultrasound. These atlases serve not only as foundational tools in developmental biology, but also as ground truth datasets for AI-based solutions in prenatal screening. By training algorithms to detect congenital anomalies on clinical ultrasound, these models contribute to earlier and more accurate diagnoses, enhancing the information available to expectant parents. Beyond research, this work is translated into widely accessible educational tools. Through platforms such as 3Dembryoprints.com and in collaboration with Primal Pictures, real-time, interactive 3D embryology is now integrated into global biomedical education and outreach initiatives.

Dr. Bernadette de Bakker is a medical doctor and assistant professor at Amsterdam UMC, specialising in human development and high-resolution postmortem imaging. Following her PhD on 3D human embryology, she founded the Dutch Fetal Biobank and established three independent research lines in 3D human development, postmortem imaging and innovative high-resolution imaging. Her work, including the 3D-Embryo Atlas published in *Science*, has received international recognition, awards and major media coverage. She leads a multidisciplinary team, supervises numerous PhD candidates, and aims to advance Micro-CT-based virtual autopsy to improve diagnostics and care for families affected by pregnancy loss.

Exploring Embryology in Medical Education

Ahmed Elemraid, Aoife Armstrong, Nicci Jones-Anderson, Iain D. Keenan
Newcastle University, Newcastle upon Tyne, UK

@prof_keenan_

Embryology has anecdotal notoriety as a complex, abstract, and challenging topic to learn. Having conducted a systematic review of the embryology education literature, we then aimed to investigate medical student views of the subject, to explore the basis, extent, and nature of this reputation, and to identify solutions to pedagogical challenges. Additionally, we sought to investigate the potential of a new commercial digital resource for supporting embryology learning. Male (n=34) and female (n=20) medical students at our Newcastle (n=44) and Malaysian (n=7) campuses participated. Respondents (n=54) completed a free-text and 7-point Likert-type (7=strongly agree; 1=strongly disagree) questionnaire, analysed by semi-quantitative content analysis and descriptive statistics. Students provided summarised perceptions of embryology (~3 words/participant, n=141 words), creating themes of abstract conceptualisation (n=46;32.6%), curricular delivery and relevance (n=16;11.3%), engagement and workload (n=41;29.1%), and subject difficulty (n=38;26.9%). Participants agreed that complexity ($\bar{x}$=5.6±1.3), volume ($\bar{x}$=5.9±1.3), and the unfamiliar ($\bar{x}$=5.5±1.5) and disconnected ($\bar{x}$=4.8±1.7) nature of content made embryology learning challenging. Students agreed that unusual terminology ($\bar{x}$=5.0±1.5), dynamic temporal changes ($\bar{x}$=5.5±1.4), three-dimensional complexity ($\bar{x}$>5.6±1.3), and their inability to directly observe ($\bar{x}$>5.1±1.8) or physically interact with ($\bar{x}$>5.2±1.9) embryos, were barriers to learning. Students perceived interactive seminars ($\bar{x}$=5.1±1.6) and self-sourced online resources ($\bar{x}$=5.3±1.6) as being significantly ($p<0.05$) more effective than lectures ($\bar{x}$=3.0±1.6), VLE tutorials ($\bar{x}$=3.8±1.8) or educator-sourced resources ($\bar{x}$=4.4±1.6). Participants reported significantly ($p<0.05$) higher levels of confidence in their understanding of neurulation (taught in interactive seminars) than other early developmental processes (delivered as asynchronous/lecture-based learning). A self-selected group of questionnaire participants (24%, n=13) attended focus groups. Preliminary inductive thematic analysis highlighted general themes around conceptual challenges, strategic learning, applications to clinical practice, and curricular integration. In each focus group, Primal Pictures '3D Real-time Embryology' was demonstrated to participants as a possible learning solution and received comprehensive approval. Participants noted potential of the resource to overcome embryology learning challenges through reducing cognitive load and supporting understanding through intuitive interfaces and interactive functionality, and recommended future enhancements. This work will provide insights and implications for educators seeking to enhance embryology education for their students. Approval for this work was granted by the Newcastle University Faculty of Medical Sciences Ethics Committee.

Sponsor talks

Anatomy Learning Outcomes for Medicine Quizzes

Presenter: Naomi Senior, Product Owner, Primal Pictures

In partnership with the Anatomical Society Education Committee, Primal is launching a new integrated assessment feature for its medical education module. Featuring nearly 800 questions aligned to specific learning outcomes, each rigorously reviewed by experts, the new quizzes help facilitate a comprehensive evaluation of student progress.

3D Real-time Embryology Upgrade

Presenter: Alexis van Breda, Channel Manager, Primal Pictures

Explore this interactive resource that brings embryo development to life from Carnegie stages 7-23. Developed in partnership with Amsterdam UMC and the Dutch Fetal Biobank, the module recently added additional models, new instructional text, and language translations.

PRIMAL PICTURES
POWERING ANATOMY.TV

The SATB1-MIR22-GBA axis mediates glucocerebroside accumulation inducing a cellular senescence-like phenotype in dopaminergic neurons

Taylor Russo[1,2]*, Benjamin Kolisnyk[3]*, Aswathy B. S[1,2]*., Jonathan Plessis-Belair[1,2], Tae Wan Kim, Jacqueline Martin[1,2], Jason Ni[3], Jordan A. Pearson, Emily J. Park, Roger B. Sher[1,2], Lorenz Studer, Markus Riessland[1,2] * contributed equally.

1- Department of Neurobiology and Behaviour, Stony Brook University, Stony Brook, New York, USA 2-Center for Nervous System Disorders, Stony Brook University, Stony brook, New York, USA; 3-Laboratory of Molecular and Cellular Neuroscience, The Rockefeller University, New York, USA; 4-Center for Stem Cell Biology, Memorial Sloan-Kettering Cancer Center, New York, USA; 5-Developmental Biology Program, Memorial Sloan-Kettering Cancer Center, New York, USA; 6-Medical Scientist Training Program, Stony Brook University Renaissance School of Medicine, Stony Brook University, Stony Brook, New York, USA; 7-Stem Cells and Regenerative Medicine, Center for Cell and Gene Therapy, Department of Molecular and Cellular Biology and Dan L. Duncan Comprehensive Cancer Center, Baylor College of Medicine, Houston, Texas, USA.

Idiopathic Parkinson's disease (PD) is characterized by the loss of dopaminergic neurons in the substantia nigra pars compacta, which is associated with neuroinflammation and reactive gliosis. The underlying cause of PD and the concurrent neuroinflammation are not well understood. In this study, we utilize human and murine neuronal lines, stem cell-derived dopaminergic neurons, and mice to demonstrate that three previously identified genetic risk factors for PD, namely SATB1, MIR22HG, and GBA, are components of a single gene regulatory pathway. Our findings indicate that dysregulation of this pathway leads to the upregulation of glucocerebrosides (GluCer), which triggers a cellular senescence-like phenotype in dopaminergic neurons. Specifically, we discovered that downregulation of the transcriptional repressor SATB1 results in the derepression of the microRNA miR-22-3p, leading to decreased GBA expression and subsequent accumulation of GluCer. Furthermore, our results demonstrate that an increase in GluCer alone is sufficient to impair lysosomal and mitochondrial function, thereby inducing cellular senescence. Dysregulation of the SATB1-MIR22-GBA pathway, observed in both PD patients and normal aging, leads to lysosomal and mitochondrial dysfunction due to the GluCer accumulation, ultimately resulting in a cellular senescence-like phenotype in dopaminergic neurons. Therefore, our study highlights a novel pathway involving three genetic risk factors for PD and provides a potential mechanism for the senescence-induced neuroinflammation and reactive gliosis observed in both PD and normal aging.

YOUNG INVESTIGATOR

A Pilot Study of Near-Peer Anatomy Teaching in a UK Undergraduate Medical Curriculum using Human Prosections

Rohan O'Hare, Scott Border, Eilidh Ferguson
School of Medicine, Dentistry and Nursing, University of Glasgow, Glasgow, Scotland, UK

Anatomy teaching in UK medical schools is in decline, highlighting the need for novel teaching methods. Near-peer teaching (NPT) is defined as when senior students use their experience to aid the learning of junior students within the same (or related) course. Current research has found it enhances academic performance, builds self-confidence, and improves team-working. Senior students also benefit though development of their communication, teaching and leadership skills. The aim of this study was to evaluate whether NPT in undergraduate medical anatomy education adds value to students' learning experiences. Voluntary revision sessions were held for 1st and 2nd year students whereby they received teaching using prosection stations created and delivered by trained 4th and 5th year students. Pre-and post-session questionnaires asked participants to rate their confidence when identifying structures, explaining their clinical relevance and teaching these to fellow students. Feedback was also collected on session value and suggested improvements. Statistical analysis to assess normality (using Shapiro-Wilke testing) and compare averages (using Wilcoxon Signed Rank testing) was completed using IBM SPSS 29.0.2.0. Eight tutors (including the first author) and 37 students took part, with n=7 tutors and n=23 students completing both questionnaires. Average baseline confidence (measured out of 5) was higher in the tutor group for identifying anatomical structures (3.4 vs 3.0, p=0.144), explaining their clinical relevance (4.0 vs 3.0, p=0.136) and teaching these (3.4 vs 2.3, p=0.109). Following the sessions, the aforementioned areas improved for both students (3.0 vs 3.7, p=1.000, 3.0 vs 3.9, p=0.715, and 2.3 vs 3.5, p=0.686) and tutors (3.4 vs 4.3, p=0.893, 4 vs 4.4, p=1.000, 3.4 vs 4.4, p=0.109). When asked, 22/23 students and all tutors found the sessions valuable and would recommend them to colleagues. Positive feedback centred on the high-quality teaching from fellow students in small groups. Some students felt there was insufficient time at each station. The positive results of this study highlight the potential benefits of NPT. Further research to address the high survey attrition rate is warranted to better elucidate its place in future curricula. Ethical approval was granted by the University of Glasgow MVLS College Ethics Committee (project number: 200230264).

Talk 2

YOUNG INVESTIGATOR

Exploring 3D Anatomy: A Free Online Course Supporting Novice Learner Inquiry and Spatial Conceptualisation

Jiayi Zhang[1], Moksh Sachdeva[1], Calum McCaig[1], Leonard Shapiro[2], Iain D. Keenan[1]
1 Newcastle University, Newcastle upon Tyne, UK; 2 University of Cape Town, Cape Town, S.Africa.
@prof_keenan_

An understanding of three-dimensional anatomy is vital for patient examination, diagnosis, and treatment, and is therefore crucial in medical and healthcare education. Furthermore, critical observation and spatial awareness are essential skills for learner comprehension of three-dimensional anatomical structures and spatial relationships. However, logistical and curricular barriers often limit explicit teaching and development of these skills within taught programmes. This study explored learner experiences of Exploring 3D Anatomy (E3DA), an open-access online course designed to develop three-dimensional spatial awareness remotely through utilising household items and art-based learning. The course, which we collaboratively developed at Newcastle University, UK and University of Cape Town, South Africa is delivered free of charge throughout the world via the Canvas VLE platform. E3DA is informed by pedagogical principles of multimodal, modality-appropriate, experiential, and social learning, and focuses on skills development in critical observation and visualisation. E3DA is underpinned by evidence-informed art-based approaches including 'Haptico-visual observation and drawing' and 'Observe–reflect–draw–edit–repeat'. A qualitative phenomenological study was conducted to investigate learner perceptions of the pedagogical, social, and practical aspects of the course. Undergraduate medical students at Newcastle University (n=8) participated in two focus groups. Data were inductively analysed using interpretative phenomenological analysis to investigate student experiences by constructing meaning from their comments. A nested set of four themes were identified, each representing a spectrum or dichotomy of viewpoints between opposing sub-themes: Inquiry (Strategic–Exploratory), Dialogue (Knowledge–Understanding), Cognition (Compartmental–Conceptual), and Experience (Novice–Advanced). Each theme reflected a shift between surface-level engagement and deeper conceptual understanding and provided insights into how and why our art-based and experiential activities may enhance spatial reasoning and appreciation of anatomical relationships. Our findings suggest that remote, creative, and accessible approaches can effectively support the development of key spatial and observational skills in anatomy education. E3DA provides a flexible and inclusive model for supporting three-dimensional understanding in anatomy beyond traditional classroom or donor-based teaching, with valuable implications for integrating multimodal, art-based learning into modern healthcare curricula. Approval for this work was granted by the Newcastle University Faculty of Medical Sciences Ethics Committee.

YOUNG INVESTIGATOR

Developing a Resource for Equality, Diversity and Inclusion in Head and Neck Anatomy Teaching

Mason Frudd[1,2], Hope Gangata[3], Cecilia Brassett[1]

1-Human Anatomy Centre, Department of Physiology, Development and Neuroscience, University of Cambridge, Cambridge, UK, 2-Jesus College, University of Cambridge, Cambridge, UK, 3-Faculty of Health and Life Sciences, University of Exeter, Exeter, UK

Over the past decade, numerous studies have confirmed that there is a significant lack of diversity in most traditional anatomy teaching resources across ethnicity, age, body type and sex. Inspired by the online resource entitled "Mind the Gap: A Handbook of Clinical Signs in Black and Brown Skin" by Mukwende et al. which highlighted the importance of recognising that certain clinical signs may not present the same way on darker skin, we aimed to produce a resource outlining clinically relevant or otherwise noteworthy differences in anatomy between the overrepresented Caucasian population and the many underrepresented populations within the UK. This resource specifically focuses on regions in the head and neck, to correspond to the teaching sessions within our own curriculum for second year preclinical medical students at the University of Cambridge. In selecting the topics to be included in the resource, we decided to include anatomical variations and differences that students might encounter in clinical practice, as well as those with important implications for management. For the nose, we highlighted ethnic variations in shape and structure that would affect nasendoscopy; culturally specific considerations for rhinoplasty; and sex differences in features such as olfactory identification and epistaxis. For the auditory system, we described the effects of anatomical variation based on sex and age, as well as congenital variations in pinna structure. For the larynx, we discussed the sex differences in voice production and pitch, with considerations for transgender individuals; and how ageing affects swallowing. For the skull and paranasal sinuses, we explored sex differences in size and shape, and ethnic craniofacial differences that may affect conditions such as obstructive sleep apnoea. Lastly, for the visual system, we described anatomical differences in the upper eyelid, and the red reflex in different ethnicities. Our plan is to collect feedback on this resource from the current cohort of students, to see what improvements should be made for future years. This resource is also designed to complement other similar resources being produced by the EDI committee of the Anatomical Society, which can then be shared with the wider anatomy teaching community.

YOUNG INVESTIGATOR

'We're censoring ourselves:' Evaluating Student Experiences While Learning Pelvic Anatomy

Millie Patel[1], Faarina Sheikh[2], Aisha Ali[2], Lauren Clunie[2]
1-Hull York Medical School, Hull, UK and University of Leicester, Leicester, UK; 2- Hull York Medical School, Hull, UK,

Pelvic anatomy is a major component of the medical undergraduate curriculum, and associated diseases are frequently encountered clinically. Students are expected to consult and examine patients with pelvic conditions on clinical placement and must graduate with competency in this area. However, pelvic anatomy is commonly viewed as a 'sensitive' topic. This can lead to clinicians feeling uncomfortable and underprepared, which has been shown to result in poor communication practices. This may pose a risk to patients, who have already been found to avoid health-seeking when presenting with stigmatised pelvic symptoms. This study aims to evaluate the student experience of studying this so-called 'sensitive' topic, and the factors affecting this experience, from the students' perspectives, using an interpretivist approach and a reflexive thematic analysis methodology. This included perceptions of learning using different materials, any feelings of discomfort, and the influence of peers. Focus groups were conducted at Hull York Medical School using participants from the MSc Clinical Anatomy and Education (N=8) and Y1 MBBS programmes (N=49). Results were analysed inductively using reflexive thematic analysis and were corroborated by second analysts. Five main themes were determined from the data which broadly include the following key findings: (1) exposure and experience facilitate comfort; (2) relationships influence student experiences; (3) the environment and context impact student experiences (from both during and prior to medical school); (4) students employ multiple strategies to manage discomfort, including desensitisation, humour and avoidance; (5) discomfort is multifaceted. Discomfort was found to be due to socio-cultural factors, sexual connotations, and lack of experience or knowledge. The significant, consistent finding that exposure and experience help to alleviate discomfort has implications for the design and delivery of pelvic anatomy content. Educators should provide recurrent and measured exposure to pelvic anatomy and must confront these areas of discomfort directly. This study has found that educators must consider and create a supportive environment, ensuring the production of comfortable and competent clinicians, which is essential to ensure competency in sexual or reproductive health. Ethical approval for this study was obtained from the HYMS Ethics Committee before data collection, on 24/04/2025.

World Anatomy Day at the University of Lancashire: inspiring public engagement through anatomical outreach

Yerokhina Viktoriia

School of Medicine and Dentistry, *University of Lancashire, Burnley, United Kingdom*

@vi_histo

Public engagement in anatomy plays a vital role in fostering scientific curiosity, improving anatomical literacy, and strengthening the connection between universities and their local communities. The University of Lancashire has successfully organised World Anatomy Day celebrations for two consecutive years (2024 and 2025) at its Burnley Campus, showcasing an effective model of anatomical outreach and its positive educational impact. The most recent event took place on 18th October 2025 in the Anatomy and Veterinary Laboratories. The day was divided into two sessions (10:00–12:00 and 13:00–15:00) and followed a station-based format, encouraging participants to move freely between interactive activities. In total, 78 visitors attended, reflecting strong community interest and engagement. Activities included anatomy-based games such as Anatomy Beetle, Organ and Function Matching, and Label the Bone, alongside technology-enhanced learning using augmented reality apps on iPads and the Anatomage Table for virtual dissection. In the Veterinary Laboratory, participants explored microscopy and cell craft activities. A popular attraction was the DNA model-making station, where visitors built DNA helices using marshmallows and toothpicks, captivating both children and adults. Additional creative experiences included building playdough skeletons and facial muscles on the skull, and designing paper brain hats highlighting functional brain zones. The event primarily attracted children and families, although several independent adult visitors attended out of personal interest. Support from Medical Sciences staff, student ambassadors, and second-year BMedSci volunteers ensured that all activities were engaging, inclusive, and informative. Upon registration, visitors received lottery tickets for a prize draw featuring anatomy-themed souvenirs such as T-shirts, notebooks, bone-shaped pens, stickers, and skeleton toys. A collaboration with the School of Art and Media further enhanced the outreach. With participant consent, media students conducted short interviews with staff and visitors, producing a video that captured the event's atmosphere and educational value. Overall, World Anatomy Day at the University of Lancashire exemplifies how interactive and creative approaches can inspire public engagement, promote lifelong interest in anatomy, and strengthen the relationship between higher education and the wider community. No ethical approval was required.

JOURNAL OF ANATOMY BEST PAPER PRIZE TALK

Microanatomy of the human tunnel of Corti structures and cochlear partition-tonotopic variations and transcellular signaling

Dina Giese[1], Hao Li[1], Wei Liu[1], Karin Staxäng[2], Monika Hodik[2], Hanif M. Ladak[3], Sumit Agrawal[4], Anneliese Schrott-Fischer[5], Rudolf Glueckert[5], Helge Rask-Andersen[1]
1-Department of Surgical Sciences, Otorhinolaryngology and Head and Neck Surgery, Uppsala University, Uppsala, Sweden; 2-The Rudbeck TEM Laboratory, BioVis Platform, Uppsala University, Uppsala, Sweden; 3-Department of Medical Biophysics, Western University, London, Ontario, Canada, Department of Electrical and Computer Engineering, Western University, London, Ontario, Canada; 4- Department of Otolaryngology-Head and Neck Surgery, Western University, London, Ontario, Canada; 5- Inner Ear Laboratory, Department of Otorhinolaryngology, Medical University Innsbruck, Innsbruck, Austria

Auditory sensitivity and frequency resolution depend on the optimal transfer of sound-induced vibrations from the basilar membrane (BM) to the inner hair cells (IHCs), the principal auditory receptors. There remains a paucity of information on how this is accomplished along the frequency range in the human cochlea. Most of the current knowledge is derived either from animal experiments or human tissue processed after death, offering limited structural preservation and optical resolution. In our study, we analyzed the cytoarchitecture of the human cochlear partition at different frequency locations using high-resolution microscopy of uniquely preserved normal human tissue. The results may have clinical implications and increase our understanding of how frequency-dependent acoustic vibrations are carried to human IHCs. A 1-micron-thick plastic-embedded section (mid-modiolar) from a normal human cochlea uniquely preserved at lateral skull base surgery was analyzed using light and transmission electron microscopy (LM, TEM). Frequency locations were estimated using synchrotron radiation phase-contrast imaging (SR-PCI). Archival human tissue prepared for scanning electron microscopy (SEM) and super-resolution structured illumination microscopy (SR-SIM) were also used and compared in this study. Microscopy demonstrated great variations in the dimension and architecture of the human cochlear partition along the frequency range. Pillar cell geometry was closely regulated and depended on the reticular lamina slope and tympanic lip angle. A type II collagen-expressing lamina extended medially from the tympanic lip under the inner sulcus, here named “accessory basilar membrane.” It was linked to the tympanic lip and inner pillar foot, and it may contribute to the overall compliance of the cochlear partition. Based on the findings, we speculate on the remarkable microanatomic inflections and geometric relationships which relay different sound-induced vibrations to the IHCs, including their relevance for the evolution of human speech reception and electric stimulation with auditory implants. The inner pillar transcellular microtubule/actin system's role of directly converting vibration energy to the IHC cuticular plate and ciliary bundle is highlighted.

Poster 1

YOUNG INVESTIGATOR

Role of VR in Anatomy

Subhan Ashraf, Syn Yue Tiffany Cheung
St George's, University of London, United Kingdom

Anatomy teaching has been ceaselessly evolving for many years, relying greatly on cadaveric dissection, a method that demands significant logistical and financial resources. However, over the last decade, many other teaching modalities have developed to bridge the gaps in learning and teaching anatomy. Among which, Virtual Reality (VR) has emerged to become a powerful teaching tool used in anatomy education. VR offers immersive, interactive 3D visualizations that present anatomical structures in a dynamic, lifelike context, enhancing student engagement and comprehension beyond conventional approaches. Research highlights VR's capacity to create safe, repeatable, and accessible learning environments unconstrained by time or physical availability. Despite these advantages, challenges such as high initial costs, potential motion sickness, and the absence of tactile feedback persist. The purpose of this essay is to review current evidence out there on VR as an additional teaching method and the impact of VR as a tool to improve student participation when teaching anatomy.

Poster 2

How feasible is human macroscopic brain staining within an anatomical teaching space?

Anthony Bright, Edward Phillips, Mihira Mehrotra
University of Nottingham, Nottingham, United Kingdom

Macroscopic brain staining is currently rarely used within anatomical education institutions within the UK. This is due to the declining body donation programmes and reduction in cadaveric-based classes. However, neurophobia (the fear of learning neuroscience!) is a large struggle within medical education, as many of the anatomical internal structures are difficult to visualise, such as the basal ganglia nuclei. The main reason for difficulty in identification of these structures is due to the fading of brain grey matter over time from sliced specimens, which is a crucial tool in being able to read neuroimages. This study experimented with using 4 different staining techniques on 10-11mm coronal brain slices, that have previously been visualised macroscopically: Alston's, Mulligan's, Prussian blue and Robert's. Even though these have been visualised, they are not commonly used within a teaching laboratory, and the restrictions that these types of labs have mean that they are difficult to reproduce. At the University of Nottingham, staining was performed on coronal brain slices, with varying levels of time between solutions, to factor in penetration depth of larger width slices. Then these stains were used in a Neuroscience class to gather feedback from students, that concluded in the Alston's stain being the most visually clear amongst the stains, but there were inaccuracies that meant a non-stained, freshly sliced section was clearer. Another factor of this project was measuring margin length of specific internal nuclei of the brain slices over time, comparing Alston's and non-stained slices over 6-12 weeks to visualise the rate of deterioration between the grey and white matter differentiation. As expected, the stained slices kept their margins throughout the 6 weeks. In conclusion, staining is an important process when factors such as specimen longevity and clarity are considered, but need the extra step of following protocols to create the stains within a teaching laboratory. Currently, at UoN, brains are sliced within the Medicine neuroanatomy sessions for the most clarity. However, this will not be feasible in the long run for creating long-term specimens that can have a high impact on a larger number of cohort years. Ethical approval for all human tissue was granted via the University of Nottingham Anatomical Education License (12085).

Poster 3

A systematic review exploring the use of human tissues in anatomy teaching and how this may prepare undergraduate students to experience death in clinical practice

Lucy C. Cowperthwaite[1], Kat A. Sanders[2], Steph J. Busby[3]
1- School of Healthcare, Faculty of Health Sciences, University of Hull, UK; 2- School of Medical Sciences, Faculty of Medicine and Health, University of Sydney, Australia; 3- Sydney School of Health Sciences, Faculty of Medicine and Health, University of Sydney, Australia.

Anatomy education is fundamental to healthcare training, and it also has the potential to play a crucial role in preparing students for clinical practice, especially when encountering death. Whilst using human donor tissue for teaching is commonly used in medical education, its integration into other health professions can be limited in some countries, despite its potential to develop professional readiness through building emotional resilience and empathy. This paper presents the findings from a systematic review that aimed to answer the following research question: What role does using human body donors in anatomy education play in supporting undergraduate health professions students to consider death and dying in their future clinical practice? A structured search was conducted across ten databases and papers screened against criteria aligned with the research question. There were many studies that found students considered death and dying from personal perspectives when studying anatomy from human body donors. Only eleven studies, however, reported results that demonstrated that these thoughts about death and dying were applied towards what this might mean for their future practice as healthcare professionals. The Mixed Methods Appraisal Tool was used to critically appraise these eleven includes studies, and thematic analysis was used to theme and synthesise the data. Three key themes were identified from these papers: 1) holistic professional identity formation - anatomy education enables healthcare students to develop a comprehensive professional identity, marked by empathy and ethical understanding. 2) adaptive emotional strategies - Students' emotional responses evolve over time, transitioning from initial discomfort to a more profound acceptance of death. 3) reflections on death, dying and mortality - reflective practices, including memorial ceremonies and personal reflections better preparing them for the emotional challenges of clinical environments. While the findings indicate that anatomy education can play a role in preparing students to consider death and dying in their future clinical practice, this has not yet been an explicit focus of research. Insights from the included studies highlight the importance of structured educational frameworks that encourage reflection and sustain compassion while supporting students in developing professional resilience. No ethical approval was required for this study.

Systematic Review on the Use of Virtual Technology in Teaching Human Anatomy in Medical Schools

Abdelhadi Elsayed[1], Khalid Mohamed[2], Eram Yousif[2], Mohamed Abdelrahim[3]
1-University Hospitals Dorset NHS Foundation Trust, Poole, UK; 2-Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield, UK 2St. George's University, St. George, Grenada, 3St. George's University, St. George, Grenada

Human anatomy, a cornerstone of medical education traditionally taught through cadaveric dissection and textbooks, is increasingly enhanced by virtual technologies (VT) such as three-dimensional (3D) visualization, Virtual Reality (VR), and Augmented Reality (AR). This systematic review evaluated the effectiveness of these modalities compared with conventional anatomy teaching methods.Following PRISMA 2020 guidelines, 27 randomized controlled trials (RCTs) involving 3D visualization, VR, AR, and Mixed Reality (MR) were included. Comparators comprised cadaveric dissection, anatomical atlases, and two-dimensional imaging. Study quality was assessed using the Cochrane Risk-of-Bias 2 (RoB-2) tool. Owing to methodological heterogeneity, a qualitative (narrative) synthesis was performed.Overall, VT produced comparable or superior outcomes relative to traditional methods. The greatest benefits were observed in topics requiring high spatial comprehension—such as neuroanatomy, cardiac anatomy, and the middle and inner ear—where immersive or interactive 3D tools significantly improved conceptual understanding and test performance. Immersive VR for cardiac anatomy produced a 26.4% improvement in visual–spatial content ($p < 0.001$), and interactive 3D computer models for middle ear anatomy resulted in a significantly higher mean score (65.1% vs 32.4%) ($p<0.001$). MR achieved outcomes equivalent to cadaveric dissection while reducing required teaching time by approximately 40% (3.6 h vs 6 h), indicating greater instructional efficiency. Students with lower visual–spatial ability particularly benefited from stereoscopic 3D and immersive displays, achieving learning outcomes comparable to peers. Although findings on long-term knowledge retention were mixed, several studies reported slower score decline among VT learners.Across all modalities, virtual technologies consistently outperformed traditional methods in subjective outcomes, including engagement, motivation, and spatial clarity, with some studies recording 80% of students reporting VT is more useful than traditional methods. Most included trials demonstrated moderate to high methodological quality (12 low risk, 11 some concerns, 4 high risk).In conclusion, advanced virtual technologies represent effective, efficient, and engaging complements to conventional anatomy teaching. They provide measurable advantages in visualizing spatially complex regions, enhance learner motivation, and support more inclusive and resource-sparing anatomy education. This study involved no primary data collection and did not require ethical approval.

Poster 5

A pilot: simulating the multidisciplinary team in undergraduate medicine anatomy teaching

Claire Fitton, Natalie Courtney, Sharon Sheddon, Ourania Varsou, Michelle Welsh
University of Glasgow, Glasgow, Scotland, UK

Students on professional clinical degrees will be required to work effectively within multidisciplinary teams (MDT) once in employment – this is imperative for high quality patient care. Providing opportunities to simulate the MDT within the curriculum allows students to develop the necessary skills such as leadership, collaboration, and communication. Within undergraduate medicine, the dissection room provides an excellent opportunity to simulate a clinical environment. However, the main focus in this learning environment has previously been on the anatomical content, the dissection process itself, and the ethical consideration for example rather than fully capitalising on the opportunity for students to develop other professional skills. Furthermore, continually increasing student numbers can result in lots of students per human donor, causing reduced engagement from those not actively dissecting. The aim of this project was to shift focus in the dissection room to a team-based student-centred approach, simulating the MDT, and increasing student engagement. An in-house 'student-roles' approach to the dissection experience was developed and implemented: each student took on a team based role and check-out sheets were implemented. Quantitative and qualitative data were gathered from 184 medical students via a questionnaire with multiple choice and open-ended questions to assess engagement. 89% of students felt more engaged with their learning because of the roles system; 82% of students felt a sense of accountability to their group and preferred the approach to previous dissections without the roles; and 93% of students felt that they enjoyed this learning approach. 89% of students indicated that having checkout sheets was useful for their learning whilst 70% indicated that having a whiteboard for drawing was useful for their leaning. Students sometimes found a disconnect between theory and practical-based roles. Whilst impact on learning has not been quantified, overall, the approach has been successful for improving engagement within the session and improved the student experience of dissection. Feedback has enabled iterative modifications of the approach to make roles and reflections more effective. However, the disconnect shows that greater emphasis on collaboration between roles is required to become an effective 'MDT'. Ethical approval was granted for this project from the MVLS ethics committee, University of Glasgow.

YOUNG INVESTIGATOR

Anatomy in the Digital Age: Evaluating Virtual Dissection in a Human Cadaver-Based Curriculum

Keryn Glennie*, Orla Vennard*, Tessa Yau*, Hubaira Khan and Asha Venkatesh
*These authors contributed equally to this work
Department of Anatomy, School of Medicine, Medical Sciences and Nutrition, University of Aberdeen, Aberdeen, Scotland, UK

While anatomical teaching using bequeathed cadavers is considered the gold standard for the study of Anatomy, digitised virtual reality platforms such as Anatomage® are becoming an increasingly popular resource amongst students and educators. A novel approach has been evaluated at our institution using the Anatomage® table (AT) as an adjunct to traditional prosection-based and dissection-based teaching. Short exercises ('presets') paired with self-directed workbooks were created for two cohorts of undergraduate students enrolled in the BSc in Biomedical Science (Anatomy) course: 46 Year 2 students using AT with a cadaveric prosection-based module (head, neck and reproductive anatomy) and 24 Year 3 students using AT with dissection-based modules (bone and joint anatomy). Students rotated in small groups and were allocated 20 minutes at the AT during scheduled class time. Data was collected using 5-point Likert scale questionnaires and anecdotal observations during the learning activity. The prosection cohort also completed pre- and post-activity quizzes to evaluate the impact of the AT on knowledge retention. Objectively, knowledge post-test scores ($M = 6.16$, $SD = 1.55$) in the prosection group were higher than pre-test scores ($M = 5.32$, $SD = 2.27$), $t(30) = -2.81$, $p = 0.007$, indicating a statistically significant improvement in students' short-term knowledge retention. Amongst students in the dissecting cohort, 91% agreed Anatomage was worthwhile as a preparatory activity. Across both groups, students felt the AT improved their spatial understanding and was a fun, engaging experience. The workbooks made the table more user-friendly and served as effective revision guides. Overall, our findings suggest pairing the AT with structured guidance enhances engagement, confidence and anatomical understanding. For optimal integration, groups of 4 students completing 20-minute sessions would be most effective. This combined approach complements cadaveric teaching while alleviating pressure on faculty resources and reducing staff dependence. As this was a service evaluation, no ethical review was deemed necessary.

Highlighting the relevance of clinical anatomy: The design and creation of an intra-operative video atlas for use as a learning tool

Joseph Gough, Hannah Swainson
Faculty of Medical Sciences, Newcastle University, Newcastle, UK

A strong understanding of clinically relevant anatomy is fundamental to safe and effective medical practice, yet there is limited evidence supporting the educational effectiveness of surgical video-based learning resources. Although previous studies suggest that clinical anatomy curricula and surgical case videos can enhance student engagement and performance, there remains a lack of research evaluating their direct impact on knowledge acquisition. This study aimed to design an intra-operative surgical video atlas and assess its value as a learning tool for undergraduate medical students. We developed short, annotated videos showcasing three common laparoscopic procedures and provided them to Stage 2 and Stage 3 MBBS students. Participants were randomly allocated to either an experimental group, which received access to the video atlas, or a control group, which received standard PowerPoint-based resources covering the same procedures. Knowledge acquisition was evaluated using pre- and post-tests, which were reviewed for equivalence in difficulty. To further explore student perceptions, participants also completed questionnaires and were invited to take part in focus groups. Students who engaged with the video atlas demonstrated modest improvement in post-test scores. However, the small sample size limited the strength of the quantitative findings. The control group showed a larger improvement, though this was associated with a substantially lower pre-test baseline, suggesting that the apparent difference may reflect sampling artefact rather than a meaningful educational effect. Qualitative data offered valuable insights into the strengths of the video-based approach. Students reported that the clinical context provided by intra-operative footage enhanced their understanding of anatomical structures and improved the relevance of their learning. Many found the videos engaging and expressed a preference for resources that link anatomy directly to real surgical practice. Participants also recommended the inclusion of preparatory materials to enhance accessibility and maximise learning outcomes. Overall, the study highlights the potential of intra-operative video resources as useful adjuncts to clinical anatomy education. These materials are now being introduced into the Newcastle MBBS Stage 1 curriculum, providing an opportunity for broader implementation and a more robust evaluation of their impact.

Poster 8

YOUNG INVESTIGATOR

Forming Attitudes Towards Death: Medical Student Reflections from Early Anatomy Experiences

Mitchell Hickey-James[1], Faarina Sheikh[1], Lara Lewis[2,1], Lauren Clunie[1], Amy Tomlinson[1]
1- Hull York Medical School, Hull, UK; 2- University of Leeds, Leeds, UK

Anatomy labs are often a medical student's first meaningful encounter with death, making them a powerful, yet frequently overlooked, site of emotional learning. Early exposure to human donors does more than teach anatomy: it shapes students' initial perceptions of mortality, professionalism, and the emotional labour required in clinical practice. To understand how students perceive and experience death, and the perceived impact of their formative experiences in anatomy, Year 3, 4 and 5 students from one UK medical school were invited to complete an anonymous online survey. Using a combination of yes/no and open-ended questions, the survey explored key areas such as students educational and clinical experiences of death, reflections from their time in the anatomy lab (including a formal introduction to a donor), and perceptions of the support available. Data were analysed using a six-step reflexive thematic analysis and independently reviewed to minimise researcher bias. Fifteen students participated. Two dominant themes were identified: (1) initial emotional and cognitive responses to body donors and (2) developing coping strategies and support networks. Students described varied emotional responses to death, influenced by the availability and clarity of support structures. Peer support was valued but typically occurred informally outside anatomy lab spaces. Students also reported conforming to perceived expectations of professionalism within the lab, which limited help-seeking behaviours. The findings highlight the importance of structured introductory sessions, embedded reflective activities, and facilitated peer networks within anatomy curricula. Enhancing support at this early stage may improve students' coping strategies and professional identity formation. Future research should examine cross-institutional approaches to emotional engagement with death and evaluate the impact of facilitated discussions embedded directly within anatomy labs. Ethical approval was obtained from the Hull York Medical School Ethics Committee (HYMS-24-25-061), and participation was voluntary with informed consent.

Poster 9

YOUNG INVESTIGATOR

Prevalence, location and malignancy risk: a literature review of ectopic breast tissue of the axilla and breast

Gursimran Jandu[1], Brandon Boyer[1], Harun Thomas [2]

1- Anglia Ruskin University, Chelmsford, UK, 2- Mid and South Essex NHS trust, Southend University Hospital, Southend-on-sea, UK

Polymastia refers to the presence of ectopic breast tissue (EBT) in addition to normal pectoral breasts. Affecting approximately 0.4–6% of women and 1–3% of men with an increased prevalence among Japanese populations, it presents along the embryological mammary ridges, extending from the axilla to the inguinal region. Failed involution of these ridges between the 6th and 10th week of embryogenesis leads to EBT formation. EBT possesses identical histological and hormonal characteristics to normal breast tissue, predisposing it to similar physiological and pathological changes, including carcinoma. This review aims to explore current literature on the prevalence, anatomical variation and malignant potential of EBT. A literature review was conducted across five databases: ARU Library, PubMed, CINAHL, Medline, and PsychINFO. Search terms were formulated and used in conjunction with one another as Boolean operators. The terms included supernumerary breast, ectopic breast, accessory breast, incidence, anatomical location, and malignan*. Inclusion criteria comprised studies published from 2003 onwards, in English, addressing anatomical variation, prevalence, or malignant potential of EBT. Polymastia was found to occur in 0.22–6% of the general population with a higher prevalence among females. Approximately 67% of EBT cases occur along thoracoabdominal remnants of the mammary ridges, with the axilla accounting for ~20% of cases and rare cases being observed in the vulva and inguinal canal. The axilla was identified as the most frequent site for both benign and malignant lesions. Ectopic breast carcinoma accounted for 0.3–0.6% of all breast cancers, though some studies suggested rates as high as 2.7%. Invasive ductal carcinoma was the most common histological subtype, typically presenting at a mean age of 54 years, slightly younger than in pectoral breast cancer. Prognosis is considered comparable to pectoral breast carcinoma, although delayed diagnosis and anatomical challenges can result in higher nodal involvement and poorer outcomes. EBT represents an underdiagnosed developmental anomaly with potential for malignant transformation. Lack of standardised diagnostic criteria and treatment protocols contributes to clinical uncertainty. Greater awareness among clinicians, linear definitions and multicentre research, is essential to improve early recognition, establish management pathways, and optimise outcomes for patients with ectopic breast disease.

Poster 10

Anatomical literacy and disease understanding in the Welsh general population: implications for targeted public engagement and health education

Leah Jones[1], Elinor Chapman[2], Shahrzad Mirza Torabi[1], Nahla Tadrous[1], Nia Jones[1]
1-North Wales Medical School, Bangor University, Bangor, Wales, UK; 2- Institute of Systems, Molecular and Integrative Biology, University of Liverpool, Liverpool, England, UK
Instagram: MedicalBangor

Understanding how adults relate human anatomy to disease processes is central to health literacy, timely symptom recognition, and effective use of healthcare services. Despite this, anatomical literacy within the general population in Wales remains underexplored. This study investigates how accurately adults can locate key organs and link them to common diseases and clinical presentations informing public health and education initiatives. A large-scale, anonymous cross-sectional survey will be conducted with adults (≥18 years) across Wales, recruited through various outreach events held at the university as well as national events such as the Eisteddfod (Welsh festival of literature, music and performance).The short survey includes demographic items, a body-map task localising 11 key structures, multiple-choice questions on organ-disease associations, and self-rated confidence in anatomical knowledge plus interest in further learning. Ethical approval was granted by the Bangor University Research Ethics Committee (Reference number: 0650). Participation is voluntary, all questions are optional, the survey is available bilingually in Welsh and English, and informed consent will be obtained. Data will be analysed descriptively, with exploration of associations between knowledge, demographics, language, anatomy-exposure in daily life, confidence and learning interest. Primary outcomes will include accuracy scores for organ localisation, disease–organ matching, and their variation across demographic, educational and language groups. Secondary analyses will examine associations between anatomical knowledge and specific clinical presentations, self-reported confidence, prior exposure to anatomy education and interest in further learning. These data will identify specific knowledge gaps and priority groups for targeted anatomical education strategies, including the impact of language on anatomical literacy. Mapping anatomical literacy, confidence and learning preferences in this population will provide an evidence base for designing accessible, anatomy-focused public engagement resources. By addressing identified gaps, these findings will inform targeted public health initiatives to strengthen foundational anatomical understanding, enhance symptom recognition and support earlier, more appropriate healthcare-seeking behaviour and enhanced community health literacy.

Poster 11

YOUNG INVESTIGATOR

Comparison of Fixation Techniques for Immunohistochemistry and Basic Staining of Human Post-Menopausal Ovarian Tissue

Katherine Kurth, Caroline Allen
School of Medicine, Dentistry and Nursing, University of Glasgow, Glasgow, UK

Fixation of tissue samples/biopsies is the first step in preparing tissue for histological analysis, preventing autolysis/putrification and preserving normal tissue architecture. Ovarian tissue contains high levels of hyaluronic acid (HA) and is highly sensitive to different fixatives, making it difficult to preserve normal tissue architecture. Previous investigations have shown the potential of formalin with 5% acetic acid (Form-Acetic) for fixation of ovarian tissue from humans of reproductive age. The addition of 5% acetic acid stabilizes nuclear proteins, potentially enhancing preservation of HA-rich tissues, in comparison to commonly used fixatives including neutral-buffered formalin (NBF). This study aimed to evaluate effectiveness of Form-Acetic vs NBF when fixing postmenopausal ovaries from fresh-frozen cadavers for basic staining and immunohistochemistry (IHC). Four pairs of postmenopausal ovaries (70-96 yo) were collected. One ovary fixed in NBF and the other in Form-Acetic for 24 hours, sectioned at 7µm and imaged. H&E staining was performed and percentage of shrinkage quantified using ImageJ. Area of white space was measured, and statistical analysis performed using a paired t-test in R studio. Form-Acetic resulted in 0.9% ± 0.5 (SEM) shrinkage vs NBF with 0.4% ± 0.3 (SEM) ($p>0.05$). Though shrinkage was higher in Form-Acetic, this is less than 1% shrinkage overall and minimal considering tissue size. Ovarian age could have caused Form-Acetic's higher shrinkage, as decreased HA in postmenopausal ovaries disrupts ability for liquid retention, increasing dehydration. To assess the fixatives' ability to preserve antigenicity during IHC with DAB detection, expression of vimentin and FOXL2 was compared. Vimentin was used to visualize stroma and overall structural integrity, and FOXL2 to visualize granulosa cells. Both Vimentin and FOXL2 expressions were darker with Form-Acetic despite the same amount of time for DAB development, which suggests better antigenicity preservation with Form-Acetic. The comparatively low percentage of shrinkage and increased antigenicity suggests Form-Acetic provides a better option for preservation of postmenopausal ovarian tissue for future research. Further research may provide insights into whether age impacts choice of fixative. Consent for research obtained via University of Glasgow Body Donation Programme and was conducted in accordance with the Anatomy Act (1984), and Human Tissue Act (Scotland) 2006.

Poster 12

YOUNG INVESTIGATOR

Contextualised learning: Are Medical Contexts beneficial to multi-media-based learning in Anatomy and Physiology?

Lara Lewis[1,2], Paul J McKeegan[1], Aisha Ali [1,3], Faarina Sheik [1], Mitchel Hickey-James [1]
1) Hull York Medical School, University of Hull, Hull, East Riding of Yorkshire, UK; 2) School of Medicine, University of Leeds, Leeds, West Yorkshire, UK; 3) School of Medicine, University of Warwick, Warwick, UK

Medical education is experiencing a dynamic shift, with more teaching shifting online. Many UK medical schools are also embracing early clinical exposure into their curricula as well as teaching styles such as problem-based learning. These shifts are introducing medical students to clinical context earlier on in their medical school journey, therefore there is a demand for earlier context exposure in the online content available for early year medical students. To assess the value of contextualisation of medical education videos for students, two videos were made covering hepatobiliary system anatomy and physiology. Both were aligned to the Anatomical Society and Physiological Society syllabi for undergraduate medicine. However, video A had no clinical context, whereas video B included clinical context. Gateway to Medicine MBBS students were shown video A (n=15 participants) or B (n=16). Immediate impact on learning was assessed through pre- and a post-test, and student preferences and experiences collected through semi-structured focus groups. Qualitative focus group data was analysed using reflexive thematic analysis, and quantitative data analysed with STATA.19. Students viewing video B had improved test scores after watching the video (p=0.047), whereas group A had no change between pre- and post-test scores. Student feedback revealed that concise videos, with varied media sources used and clear explanations were most effective, whilst the addition of context was welcomed by most, being described as a motivating factor and the most interesting area of the video. This study concluded that medical context tends to be preferred by medical students, with potential improvements to motivation, engagement and learning. Therefore, this study recommends that clinical contexts are included in the development of videos covering the anatomy and physiology of an organ system from the early phases of their medical training. This study was approved by the Hull York Medical School (HYMS) Ethics Committee (HYMS:Ref: 24-25-041)

Poster 13

YOUNG INVESTIGATOR

Bridging Tradition and Technology: A Two-Year Journey Towards VR-Enhanced Education for First-Year Biomedical Sciences Students at the University of Oxford

Mingwan Lin[1], Yiran Wang[1], Sharmila Rajendran[2]

1 School of Medicine and Biomedical Sciences, Medical Science Division, University of Oxford, Oxford, UK; 2 Department of Physiology, Anatomy & Genetics, Medical Science Division, University of Oxford, Oxford, UK

Instagram: @M1ngwan, @xyrwang

Recent advances in virtual reality (VR) are changing how students learn human anatomy by providing an interactive digital environment. At Oxford University, we have progressively incorporated these tools into the Year-1 Biomedical Sciences (BMS) program through a hybrid teaching model that combines VR with Dissection Room (DR) stations using prosected specimens. Building on our 2023/2024 pilot study, which evaluated how VR-enhanced learning can complement traditional methods in studying cardiovascular and respiratory anatomy, the 2024/2025 follow-up with a new cohort additionally included the renal and gastrointestinal systems alongside the cardiovascular and respiratory systems, to further assess the educational value of VR. In 2024/2025, Year-1 BMS students participated in four anatomy practical sessions, each featuring 3-4 instructor-led DR stations and a self-directed VR station. Based on feedback from the 2023/2024 pilot, several refinements were implemented: additional VR headsets, more time allocated for VR station, and each VR headset were casted to a monitor, enabling collaborative peer learning and instructor observations of what students were exploring, to provide timely guidance as required. Data were collected from post-session surveys, including Likert-scale and open-ended questions, and analysed using two-tailed Mann–Whitney U tests and thematic analysis. Preliminary findings indicated consistently positive student responses. Across the 2024/2025 sessions, students reported enhanced ability to identify anatomical structures, collaboration with peers, and reduced ergonomic difficulties associated with VR. Qualitative feedback highlighted VR's accessibility, complementarity with traditional methods, and its potential to foster teamwork and reflective practice. Quantitative analysis of the respiratory session showed significantly greater interest and motivation ($p=0.010$), understanding of anatomy ($p=0.047$), and self-directed learning ($p=0.002$) in the 2024/2025 cohort compared to the previous year, validating the impact of the implemented refinements. Thematic analysis further confirmed a strong preference for a hybrid VR-DR learning model. The cumulative findings have led the integration of VR into the BMS curriculum from 2025/2026. By extending the pilot's scope, this study demonstrates that a hybrid VR-DR model can be effectively scaled across multiple organ systems, enhancing learning outcomes, collaboration, and accessibility. These insights highlight the value of digital integration in anatomy teaching and offer broader implications for advancing medical and BMS education. This study involved the collection and analysis of anonymised student feedback as part of a regular evaluation of anatomy teaching methods. As per University of Oxford guidelines, formal ethics approval was not required. No cadaveric, animal, or personally identifiable data were collected.

Poster 14

Anatome

Deborah Merrick[1], Natasha Noel-Barker[1], Anthony Bright[1], Sadia Khan[1], Aisia Lea[2]
1 University of Nottingham, Nottingham, UK; 2- Foundation Year 1 Doctor University Hospitals of Derby and Burton NHS Trust, UK

Research shows that marginalised communities are underrepresented in medical and anatomical imagery. Research conducted both at the University of Nottingham and in the United States suggests that there is an underrepresentation of dark skin tones in anatomical textbooks. Moreover, anatomical representations of the 'standard' body typically consist of a light-skinned, cisgender, able-bodied, muscular, male. This means that anything different to this 'standard' is perceived as 'abnormal' by students and healthcare professionals, leading to the formation of implicit biases, stereotype acceptance and poorer healthcare outcomes for patients from marginalised groups. Anatome was born following a dissertation project by a then-third year medical student, which identified a gap in the market for truly diverse and inclusive medical imagery representing those with visible differences, disabilities and those with different gender identities. Representations of those with diversities of sexual development, disabilities and visual differences are typically framed as being 'defects' or 'disorders', presenting a negative connotation to budding healthcare professionals during the course of their teaching that inevitably leads to disparities in the treatment of certain patients. This project exists to give a voice to those who are so often relegated to a footnote in textbooks and education. It exists to share the stories of the lived experience of those who are marginalised. It exists to show that students can make a difference to the face of healthcare. Anatome's offering has now expanded beyond imagery, with 7 interviews detailing the lived expeirences of those who are marginalised, a diverse recommended reading list, 10 episodes of season 1 of a podcast, a bespoke Equity in Action course for healthcare professionals and educators, and a blog sharing new perspectives on all things EDI in healthcare. Please view our resource we would like to showcase here: https://www.anatome.org.uk/

Poster 15

YOUNG INVESTIGATOR

Anatomical Spot Exams: An Evaluation of Current Practices

Katie Mill, Jane English, Mutahira Lone
University College Cork, Cork, Ireland
@Katie_Mill167 (X)

Spot, Spotter, or Pin exams have prevailed as the gold standard for anatomical evaluation due to their unique ability to test students' knowledge in situ. Most commonly a structured timed exam, Spot exams test students on their ability to recall highly specific information, over their ability to have a generalised understanding of a region. The structure of Spots can vary university to university, but typically involve placing one pin per prosection with a two-part question. In some situations it may involve multiple pins per prosection, or multiple questions per pin. In this study we aimed to evaluate the current landscape of spot exams in the UK and Ireland, and how teaching of anatomy is carried out within the laboratory. We also aimed to gather information on the uses and opinions of Artificial Intelligence (AI) that anatomy educators hold. This was specifically relating to the use of AI for exam generation. This was done utilising an anonymous online questionnaire. Results showcasing the differences and similarities of anatomy education and spot exams across institutions were collated and descriptive analysis was carried out. Analysis was completed on the number of people who said they have used AI, their opinion on their experience using it, and how they used it. We would like to note that data collection for this study is still ongoing and finalised results will be available in due course. This study has major implications for the future of anatomical teaching and assessment, showcasing the current practices, opinions and potential future advancements. Ethical Approval was obtained from the UCC Social Research Ethics Committee.

Poster 16

YOUNG INVESTIGATOR

When Easy Feels Effective: Perception-Performance Mismatch in AI-Assisted Anatomy Learning

Isaac Sung Him Ng[1], Anthony Siu[2], Claire Soo Jeong Han[2], Oscar Sing Him Ho[2], Johnathan Sun[2], Mandeep Gill Sagoo[2]

1- Faculty of Life Sciences and Medicine, King's College London, UK; Department of Public Health and Primary Care, University of Cambridge, UK; 2- Faculty of Life Sciences and Medicine, King's College London, UK

AI chatbots are increasingly integrated into medical education, yet their subjective appeal may diverge from objective learning gains. This exploratory study examined whether students' perceived benefits align with actual performance when using chatbots for anatomy learning, and quantified the reciprocal association between perceptions and outcomes. Twenty first-year medical students completed a randomised crossover trial, each undertaking two neuroanatomical SBA tasks (brachial and lumbosacral plexuses) using either a custom-built LLM chatbot or conventional resources. Pre- and post-task ratings captured confidence, perceived efficiency, information accuracy, performance judgments, alongside objective accuracy scores. Within-student change scores (Δ = AI – Traditional) were computed for all variables. Exhaustive exploratory ordinary least-squares regressions tested each predictor-outcome pair while controlling for age, gender, student status, and task order. 2000 bootstrap resamples produced 95% confidence intervals; effects were considered meaningful when CIs excluded 0 and total model $R^2 \geq 0.60$, with incremental R^2 reported to isolate predictor contributions. Three models met these criteria. Perceived efficiency and objective accuracy were inversely related in both directions: students who felt more efficient under AI performed objectively worse ($\beta = -0.39$, 95% CI [−0.92, −0.09], $R^2 = 0.61$), and those who performed worse reported greater perceived efficiency ($\beta = -0.68$, 95% CI [−1.59, −0.11]). Perceived performance predicted perceived efficiency ($\beta = 0.82$, 95% CI [0.22, 1.42], $R^2 = 0.64$), and confidence gains tracked perceived information-accuracy gains ($\beta \approx 0.56$ bidirectionally). Baseline AI familiarity, usage frequency, and attitudinal beliefs did not moderate these effects, though power to detect moderation was limited by sample size. Findings suggest that chatbot-generated fluency may induce a metacognitive miscalibration whereby ease of interaction is mistaken for learning depth, consistent with desirable-difficulty and dual-process theories. Further work with larger, multi-domain samples is needed to test generalisability and temporal causality. Ethical Approval: King's College London (LRS/DP-23/24-40754).

Poster 17

Bringing Anatomy to Life: A Student-Led Outreach Initiative Using Models and Virtual Reality at UCC

Aisling Noone, Sarah M. Ross, Mutahira Lone. Presented by Katie Mill
Department of Anatomy and Neuroscience, University College Cork, Ireland.
@mutahira_lone

The World Anatomy Day event at University College Cork (UCC) was developed as a large-scale public engagement initiative to promote anatomical education among school students and the wider community while empowering MSc Human Anatomy students to act as educators and facilitators. The event aimed to enhance public understanding of anatomy through interactive, technology-supported learning and to provide postgraduate students with an authentic teaching and leadership experience. Supported by a £500 Outreach Grant from the Anatomical Society (UK), which enabled the purchase of three Virtual Reality (VR) licenses, the event incorporated a combination of anatomical models, skeletons, 3D models and immersive VR technology to create a dynamic and inclusive learning environment. MSc Human Anatomy students were divided into small groups; each assigned a specific anatomical theme. They were given autonomy to design and deliver their sessions using creative methods of engagement, integrating traditional and digital tools. Approximately 200 primary and secondary school students, accompanied by their teachers, attended the event alongside postgraduate students from non-science disciplines. Observations and post-event feedback indicated very high levels of engagement and enthusiasm among visitors, with many expressing fascinations at being able to “walk through the human body” using VR. Teachers commented positively on the approachability of the MSc presenters and the clarity of their explanations. For the MSc students, reflective feedback demonstrated significant gains in confidence, communication skills, teamwork, and creativity, particularly among those with limited prior teaching experience. The experience also highlighted the value of giving postgraduate learners autonomy and trust to design outreach activities, thereby strengthening their pedagogical understanding and professional identity. Overall, this initiative successfully combined community engagement with experiential learning, using technology to make anatomy education more inclusive and inspiring. It also provided a sustainable framework for future outreach at UCC, where VR resources and student-led teaching will continue to be embedded into public engagement practice. Ethics approval was grant by the Research Ethics Committee of the School of Medicine.

Poster 18

YOUNG INVESTIGATOR

Anatomy Education: What do students want?

Ayoola Olaleye, Paul McKeegah
Hull York Medical School, Hull, UK

Anatomy education has undergone a significant transformation in recent years, shifting from traditional cadaver-based teaching methods to a more integrative approach that includes systems-based learning and advanced digital modalities. This transition has been largely influenced by recommendations from the General Medical Council (GMC) and the necessity for adaptations brought about by the COVID-19 pandemic. While the incorporation of virtual dissections and interactive 3D models has substantially increased accessibility for students, the notable reduction in hands-on dissection opportunities has raised important concerns regarding the long-term retention of anatomical knowledge and the development of spatial understanding critical for medical practice. A qualitative study was conducted using Patricia Benner's interpretive phenomenological approach to explore medical students' perceptions of online and face-to-face anatomy teaching methods at Hull York Medical School. Twelve students from various clinical years were recruited through purposive and snowball sampling. Semi-structured interviews were analyzed using Braun and Clarke's thematic analysis framework with NVivo software, and external reviewers were involved to ensure analytical rigor. The interviews revealed a spectrum of student preferences, with many expressing a clear favor for in-person anatomy sessions. They reported that these sessions fostered greater engagement, enhanced peer interaction, and improved spatial comprehension, which are crucial for understanding complex anatomical structures. Conversely, students acknowledged the value of online materials for their flexibility and accessibility, allowing for self-paced learning and easy access to resources tailored to their individual study needs. Many students described cadaveric dissection as an indispensable component for contextual learning and exam preparation, asserting that the tactile experience is irreplaceable for mastering anatomical concepts. On the other hand, e-learning resources were found to be beneficial for revision and reinforcing theoretical knowledge, complementing the practical experiences gained in the laboratory. The findings suggest that a hybrid educational model, which effectively integrates both cadaveric dissection and digital resources, may represent the optimal approach for anatomy education moving forward. Moreover, it is critical that student input and participation in curriculum design are prioritized to ensure that pedagogical methods align with the evolving learning needs and professional preparations of future medical doctors. The study was conducted with HYMS ethical approval.

Poster 19

FetalBoneData: an R data package collating raw measurements of human foetal bones across different gestational stages

Thomas O'Mahoney, Jael Vakil Kumar
Anglia Ruskin University, East Road, Cambridge, UK

Raw foetal osteometric data is often difficult to access, with researchers typically reliant on summary tables or required to collect measurements independently. To address this, we present FetalBoneData, an R package available from https://github.com/Tomomahoney/FetalBoneData . This has compiled morphometric data from multiple sources, including the long out-of-print work of Fazekas and Kósa, recent cranial base datasets from Grzonkowska et al., and original measurements of long bones from the Liverpool Foetal Collection. The data are structured as .csv files and integrated into a user-friendly R package to facilitate comparative analysis. As a case study, we compare cranial base measurements from Grzonkowska et al., and femoral measurements of the Liverpool collection with those reported by Fazekas and Kósa. This demonstrates the utility of the package in assessing inter-population variation and developmental trajectories. By making these datasets openly available in a widely used statistical format, we aim to improve access to foetal osteometric data and encourage further contributions to expand its scope.

Poster 20

YOUNG INVESTIGATOR

Elucidating the function of the dopaminergic midbrain-claustrum projection in the healthy brain and in Parkinson's disease

Demi Owen-Bowyer[1], Anne Rosser[2], Mariah Lelos[1]

1- Cardiff University, School of Biosciences, Cardiff, UK, 2- Cardiff University, School of Medicine, Cardiff, UK

The claustrum is a small subcortical nucleus that is reciprocally connected with most cortical regions. This distinctive connectivity has led to diverse hypotheses about its function, including roles in salience detection, multisensory integration, and consciousness. It has been suggested that the claustrum also receives limited input from subcortical structures including dopaminergic innervation from the substantia nigra pars compacta. But how dopaminergic transmission modulates claustral activity or how loss of dopamine innervation may affect the claustrum's integrity remains unclear. Given the extensive cortical projections and evidence of disrupted catecholaminergic innervation to the human claustrum in Parkinson's disease (PD), the midbrain–claustrum pathway may play a key role in supporting cognitive function in both the healthy and Parkinson's brain. This study aimed to further delineate the structure and function of catecholaminergic innervation to the claustrum and determine its influence on cognition in the healthy and PD brain. We conducted histological examination of the human claustrum, staining control and PD tissue for tyrosine hydroxylase (TH), dopamine transporter, and α-synuclein to assess potential PD associated degeneration. Our data challenge the view that this region is denervated in PD and that dopaminergic innervation derives from the substantia nigra. Complementary retrograde and anterograde tracing in the rodent brain is underway to identify alternative subcortical TH-positive nuclei projecting to the claustrum. These findings will establish to a more precise understanding of catecholaminergic innervation to the claustrum. Identified pathways of interest will be manipulated in vivo via surgical intervention to determine impact on behavioural output. All human and animal work received ethical approval and was conducted in accordance with the UK Human Tissue Act (2004) and the Animals (Scientific Procedures) Act (1986).

Poster 21

YOUNG INVESTIGATOR

Anatomical Variations of The Big Vessels in Head and Neck: A Review Exploring Implications

Monisha Tarini Premkumar[1], Srirahul Premkumar[2]

1-Anglia Ruskin University, School of Medicine, Chelmsford, UK; 2Wythenshawe Hospital, Manchester University NHS Foundation Trust , Manchester, UK

Head and neck anatomy is home to a rich complexity of vasculature. Therefore, detailed knowledge is essential for surgeons to safely navigate operative procedures. This includes appreciating rare variations, such as the posterior branching variant of the internal jugular vein (IJV) and kissing carotids. The IJV (major venous drainage of head and neck) is formed from the left and right anterior cardinal veins (week eight of foetal life). Meanwhile, the internal carotid artery (ICA) is a major oxygenated-blood supplier and is developed from the third aortic arch, which descends into the thorax during the eighth week of intrauterine life. This study will raise awareness of the big vessel variations of the head and neck. Literature review done on electronic search engines such as PubMed and Embase, using the keywords, 'anatomical variation', 'internal jugular vein', 'carotid artery', 'head and neck' and 'ENT surgery' (study duration of 2000-2025). IJV variations (bifurcation, trifurcation, duplication, fenestration, posterior tributary) were reported in 2%. However, posterior branching was reported in only five patients, with an equal distribution on right and left sides. Anehosur et al demonstrated the posterior tributary as a communicating branch from the external jugular vein that usually directly drains into the subclavian vein. The 'Kissing Carotids' is an anatomical aberration where bilateral ICA are juxtaposed to one another, with medial relation in the retropharyngeal space. The reported incidence of the ICA anomaly is 5% in the neck. Although usually asymptomatic, it poses a surgical risk of sudden catastrophic haemorrhage during tracheal intubation, and ear, nose and throat (ENT) procedures like tonsillectomy, adenoidectomy and abscess drainage. These variations can be diagnosed with preoperative contrast-enhanced computed tomography imaging to plan and reduce intraoperative complications of morbidity and mortality. Vasculature of the neck generally holds implications in ENT operations, head and neck cancer treatment, reconstructive plastic surgery, radiology, anaesthesiology and intensivists. Therefore, knowledge is key for high-quality care. Additionally, the kissing carotids are associated with an increased incidence of abdominal aortic aneurysms. Hence, awareness and teaching on concurrent screening to diagnose anatomical carotid variations is vital to advance our healthcare services. No Ethical Approval Required.

Poster 22

YOUNG INVESTIGATOR

Exploring A Novel Solution For Complex Human Anatomy: Whitwell

Monisha Tarini Premkumar, Samantha Goodchild
Anglia Ruskin University, School of Medicine, Chelmsford, UK

Cadaveric dissection is a centuries old, laboratory-based learning resource, typically used for understanding human anatomy in an interactive manner. Traditionally, formaldehyde has been the main method of embalming. However, its health implications and rigidity in preservation has consequently emerged embalming methods such as Thiel and formalin. Despite advancements, the axillary region (although of high clinical importance) is still regarded by students as a difficult area of comprehension. This has led to the experimentation of a newer embalming method: WhitWell- a method with limited research noted to be pedagogic of colour, smell, texture and joint mobility while providing a reduced cost. However, this has not been assessed on the target audience: students. This study aims to explore the impact of a WhitWell (1.5% HCHO) embalmed axillary cadaveric prosection on medical student performance and satisfaction. An axillary dissection conducted on a WhitWell preserved cadaver, which will be analysed. Images will be taken using a high caliper camera and tripod, and this will be safely stored by the supervisor and HTA Designated Individual (DI). Participants are 80 (eight groups of 10) Year 2-5 medical students at Anglia Ruskin University School of Medicine, collected through gatekeeper-approved announcements (containing participant information sheets). Participant groups will be allocated 10 minutes to identify structures using a checklist, resembling a study session. Participants will then complete a questionnaire attached to the checklist to share their subjective experience of the task, before being debriefed. Objective and subjective responses will be exported to excel for analysis via Likert scale and thematic analysis. Responses will remain anonymous but participants will randomly be allocated numbers to group questionnaire and checklist responses. The study aids in the transformation of anatomical education. Understanding axillary anatomy will improve future healthcare by empowering the next workforce's approach to breast cancer treatment and decrease complications of chest drain insertion. However, future research should be wide scale and explore this tool as a supplementary resource along with proven methods such as mixed method teaching. Dissection in accordance with the Human Tissue Act (2004). Data collection following UK GDPR guidelines (2018).

Poster 23

From skin to heart to mind: Anatomy as a bridge between science and society

Benedicta Quaye
Lancaster University, Lancaster, UK

@BenyquayeMensah

Anatomy provides an accessible gateway for understanding not only the structure of the human body but also the interconnectedness of health, emotion, and identity. As part of this years National Festival of Social Sciences, the public engagement event “From Skin to Heart to Mind: Understanding Ourselves in a Digital World” invited families and community members to explore anatomy in relation to mental wellbeing and social interaction. Held at Lancaster City Library, the festival transformed anatomy into a shared experience that celebrated curiosity, inclusion, and reflection. Participants engaged with interactive exhibits and discussions linking the anatomy of the skin, heart, and brain to concepts of body image, emotional regulation, and cognitive function in an increasingly digital society. Through sessions such as Skin Deep: The Beauty of Diversity, Matters of the Heart, and Brain Talk: Types of Learners and Brain Lobes, participants examined how self-perception, heart health, and learning are influenced by both biological mechanisms and social contexts. A mixed-method evaluation combining facilitator reflections and participant feedback (n=227) demonstrated that 92% of attendees gained new understanding of anatomy’s relevance to emotional and physical health, while 88% reported increased awareness of how digital habits affect wellbeing. Families described the experience as engaging, inspiring, and empowering. This project highlights how anatomy can extend beyond the laboratory and lecture hall to become a catalyst for public dialogue and self-understanding. By blending scientific learning with creative expression, the initiative demonstrated anatomy’s enduring capacity to connect people to themselves and to one another. There was no ethical clearance needed.

Poster 24

Using the Anatomage Table to Showcase Technology-Enhanced Anatomy Education During an Open Day

Benedicta Quaye, Ahsan Chaudhary
Lancaster University,Lancaster, United Kingdom

@BenyquayeMensah

During our institutional Open Day October 2025, the Anatomage Table, a high-resolution 3D virtual dissection platform was used to demonstrate human anatomy to a diverse audience including prospective students, secondary-school students, parents, and the general public. Visitors were invited to interact directly with the table, exploring full-scale 3D models, manipulating organ systems, and performing virtual dissections under guidance after introduction and education. The sessions highlighted anatomical relationships, variations, clinical correlations and illustrating how digital technology can complement traditional anatomical teaching. Feedback was collected immediately after each session through informal discussions. Visitors reported that the visual and interactive nature of the Anatomage Table helped them understand complex anatomical structures clearly. Many noted that the experience made anatomy more tangible and sparked curiosity about health sciences and medical careers. Facilitators observed sustained interest and active participation throughout the sessions, with participants exploring multiple systems and sometimes carers with health or clinical backgrounds asking clinically oriented questions. This Open Day experience demonstrates that the Anatomage Table can be used effectively as a hands-on, technology-driven teaching tool to communicate anatomical concepts to a non-specialist audience. It shows the potential of digital anatomy platforms to enhance understanding, illustrate spatial relationships, and inspire interest in health science disciplines. Future activities will incorporate structured evaluation to assess knowledge acquisition and explore broader applications of virtual anatomy in both education and outreach. There was no need for ethical approval.

Poster 25

Seeing beyond the skull: Enhancing anatomy learning through immersive experiences

Saroash Shahid, Meher Khan, Jorge Freire
Institute of Dentistry, Queen Mary University of London, London, UK

Learning human anatomy remains a cornerstone of dental education, yet many students find it challenging to visualise complex three-dimensional relationships within the head and neck. This project examined how immersive and mixed reality (XR) learning, integrated within an active framework, could help first-year Bachelor of Dental Surgery (BDS) students overcome these challenges. Working within a flipped learning framework and in collaboration with the Digital Education Studio, TINALP, and Meta, a three-phase learning sequence was implemented, each phase increasing immersion and learner agency. The first session, Osteology of the skull, combined pre-recorded and live demonstrations where the lecturer manipulated XR assets to illustrate spatial relationships. Assets were shared for independent exploration and discussion. The second session, Blood supply of the head and neck, used live demonstrations and 2D and 3D models on students' devices for interactive tasks. The final session, Cranial nerves, took place in a fully immersive environment using VR headsets, with students working in small groups to explore and categorise nerve pathways. Facilitated reflection and clinical discussions concluded each session, consolidating understanding and linking spatial anatomy to clinical context. This progressive design—integrating preparatory, independent, and immersive in-class components—enabled more active use of contact time for discussion and consolidation, strengthening staff and student confidence in applying new technologies. Evaluation used mixed methods. Pre- and post-session quizzes measured gains in declarative knowledge, while surveys and classroom observations captured engagement, usability, and perceived value. Data indicated improved spatial understanding and recall of anatomical structures, with students describing the 3D and XR sessions as engaging and confidence-building. Observations showed strong participation and collaboration, and students expressed a clear preference for interactive rather than didactic formats. In conclusion, progressively immersive 2D, 3D, and XR activities appeared to enhance students' spatial understanding, engagement, and confidence. Screen-based models supported independent exploration, while VR further promoted procedural and spatial reasoning through collaborative, hands-on interaction. When embedded within a planned digital learning framework, immersive approaches can shift anatomy education from passive observation to active exploration. Ethical approval statement: This project did not involve animal or cadaveric specimens. It used anonymised student feedback and engagement data collected as part of standard educational evaluation collected for module improvement and did not require formal ethics approval.

Poster 26

An Educator's Perspective on Incorporating Anatomical Drawing into Medical School Problem Based Learning (PBL) Facilitation

Sheona I. Shankland, Claire Fitton
University of Glasgow, Glasgow, UK
@sheonashankland @sheonashankland.bsky.social

Problem Based Learning (PBL) is a teaching method where students work together to discuss a clinical scenario. The scenario stimulates learning for relevant topics, but without the intention of solving a problem e.g. diagnosing the patient. This is achieved through a set of defined processes, focused on brainstorming and then feedback at a future session; at the University of Glasgow these are referred to as 'The Glasgow Steps'. As anatomists, drawing is often second nature for both learning and teaching: supporting deeper anatomical understanding via visual communication and/or tactile feedback. When facilitating PBL sessions for medical students, drawing can support the PBL process in anatomically focused areas of the scenario. The output of the brainstorming stage is a selection of intended learning outcomes (ILOs) created by the students. These all begin with action words and students in our classes are encouraged to use 'draw', with the understanding that every class member will be expected to draw the anatomy for the ILO at the subsequent feedback session. When initially encouraging students to incorporate drawing into their ILOs, the overall feeling of the group appeared to be that of hesitation, and in some cases, fear. However, after a few weeks, it was evident that the approach was helping with learning and building confidence, not just in anatomical knowledge, but in peer interaction and interpersonal communications, particularly in first year groups. In creating a visual for their learning that all members of the group were responsible for producing, it seemed to impact the group dynamics positively and improve anatomical knowledge through peer-to-peer learning, and through the act of drawing itself, especially as every student will draw something slightly different. By having the whole group responsible for the output, no student is singled out or made to feel uncomfortable: fostering inclusivity while improving confidence. In addition, not all facilitators are confident with anatomy, coming from a variety of science and medicine backgrounds, and the positive impact and eventual appreciation for the inclusion of drawing could help reduce this imbalance for facilitators in addition to better supporting student's self-directed learning. As a reflection by the authors on their teaching, no ethical approval was required.

Poster 27

YOUNG INVESTIGATOR

Who Should Have Access to Body Donors for Anatomy Education? A Look at the Complementary Therapies

Faarina Sheikh[1], Millie Patel[1,2], Aisha Ali[1], Mitchell Hickey-James [1], Lara Lewis [3,1], Janet Philp[4], Lauren Clunie[1]

1-Anatomy Department, Hull York Medical School, Hull, UK 2- Medical Department, University of Leicester, Leicester, UK 3- Medical Department, University of Leeds, Leeds, UK 4- Medicine and Veterinary Medicine Department, University of Edinburgh, Edinburgh, UK

While donor-based anatomy is widely regarded as the gold standard in healthcare education, access is typically limited to traditional medical professions, and to a lesser extent, allied health professions. This study specifically explored whether complementary therapists (CTs) should have access to body donors for learning anatomy. The term "complementary therapies" is used as an umbrella term encompassing interrelated disciplines such as mind-body (e.g., yoga), physical (e.g., osteopathy), and energy (e.g., acupuncture) therapies. To explore the perceptions of both CTs and anatomists, two participant groups were recruited: (1) HTA Designated Individuals (DIs), or equivalent, from UK institutions responsible for granting access to body donors and, (2) CTs from diverse disciplines who have previous experience learning anatomy via body donors. A parallel convergent mixed-methods approach was employed, combining open-ended surveys from DIs (N=7), and semi-structured interviews from CTs (N=6). Reflexive thematic analysis revealed five key themes: barriers to access, educational value, perceived legitimacy, impact on clinical practice, and finally, inclusivity and evolving anatomical education. Findings reveal a clear contrast between institutional perspectives and CTs. While DIs emphasised issues such as legal caution, reputational risk, and limited resources, the interviewed CTs strongly advocated for access, discussing professional benefit, patient safety, and a desire for a holistic healthcare system. Many of the barriers identified were not solely rooted in legislation but in interpretive discrepancies and perceptions of professional hierarchies. This study concludes that there is an educational and clinical case for expanding access to donor-based learning for CTs. The barriers identified in this study could be overcome via multiple means including: clearer information about regulatory bodies governing specific CT disciplines; collective agreement and guidance from institutional DIs about access requirements, and; a review of donor consent forms. Ethical approval was granted by the Hull York Medical School Research Ethics Committee (HYMS-24-25-047). All participants provided informed consent after receiving study details and confidentiality assurances, and data were securely managed in accordance with GDPR and the Data Protection Act 2018.

YOUNG INVESTIGATOR

Exploring short-term plasticity in dopamine release between anatomical compartments of nigrostriatal dopamine neurons in ex vivo mouse brain slices

Avanthika Sivakumar[1], Bethan O'Connor[2,3,4], Stephanie J. Cragg[2,3,4]

1 School of Medicine and Biomedical Sciences, University of Oxford, UK; 2 Centre for Cellular and Molecular Neurobiology, Department of Physiology, Anatomy and Genetics, University of Oxford, UK; 3 Oxford Parkinson's Disease Centre, University of Oxford, UK; 4 Aligning Science Across Parkinson's (ASAP) Collaborative Research Network, Chevy Chase, MD 20815, USA

Dopamine (DA) neurons of the nigrostriatal system play an essential role in motor control and are preferentially vulnerable to degeneration in Parkinson's disease. In the substantia nigra pars compacta (SNc), where these neurons originate, DA neurons display unbranched, long, dendrites. Upon reaching the striatum, however, these neurons give rise to the most branched axonal arbours seen in the CNS. These distinct morphological compartments might give rise to differential DA release dynamics, and differential regulation of DA release by local intrinsic or extrinsic mechanisms. DA is released from both somatodendritic and axonal compartments, yet mechanisms of somatodendritic DA release are poorly understood. Whether these mechanisms differ from axonal DA release, which is thought to be from small synaptic vesicles, remains unknown. This project aimed to explore somatodendritic and axonal DA release dynamics using a new genetically-encoded fluorescent DA sensor (GRABDA3m), and investigate how the DA transporter (DAT) regulates DA release from each of these morphologically distinct compartments. The GRABDA3m sensor was stereotaxically injected into the SNc of wild-type mice, and following 3-5 weeks of viral incubation, 300 µm coronal brain slices containing the SNc and dorsolateral striatum (DLS) were prepared for ex vivo imaging. Electrically-evoked fluorescent signals were obtained in SNc and DLS, and were abolished by tetrodotoxin, confirming action potential-dependence. Signals were attenuated by pharmacologically inhibiting the GRABDA3m sensor construct. Paired-pulse stimulations at interpulse intervals of 25-200 ms (corresponding to 5-40 Hz firing frequency) were conducted, revealing that DA release in both SNc and DLS undergo short-term depression. Inhibition of DATs, which not only govern DA uptake but also axonal DA release and re-release, prolonged fluorescent signals in SNc and DLS. DAT inhibition relieved short-term depression, particularly in SNc, indicating that DATs limit somatodendritic DA re-release. DA re-release was greater in SNc than DLS, demonstrating differential release dynamics between somatodendritic and axonal compartments. These data indicate that DA re-release varies depending on anatomical compartment, yet some similarities may exist regarding how DATs govern DA transmission across regions. These findings provide insight into DA release dynamics, and regulation by DATs, from morphologically-distinct regions of the DA neurons vulnerable in Parkinson's disease. Ethics statement: All procedures were carried out in accordance with institutional guidelines and the U.K. Animals (Scientific Procedures) Act, 1986.

Poster 29

Reflections on three years of World Anatomy Day workshops

Samuel Snowdon, Hannah Simm, Louise Cotterell, Sharmila Rajendran
Department of Physiology, Anatomy and Genetics, Medical Sciences Division, University of Oxford, Oxford UK

Since 2023, the Department of Physiology, Anatomy and Genetics at the University of Oxford, has hosted annual World Anatomy Day outreach workshops for sixth form students across Oxfordshire. Whilst the primary aim is to celebrate World Anatomy Day, they also offer a unique opportunity to build on students understanding of human anatomy in an applied context and to offer them some insight into teaching and learning at Oxford Medical School. Each workshop is designed around a central theme with several activities being coordinated to create a cohesive and interactive learning experience for attendees. Across the three years, activities have included microscopy, sculpting muscles of facial expression, virtual reality (VR) anatomy, mapping spinal pathways, and mythological stories related to human anatomy. The events are delivered by a multidisciplinary team of educators, medical students, researchers and technicians who can offer additional guidance on university applications and different pathways into biomedical and health sciences. In 2024, the workshops were supported by funding from the Anatomical Society via their Public Engagement and Outreach Grant. Partnership with the Oxford University Museum of Natural History has been instrumental in supporting the events through the provision of workshop space, their expertise with outreach and connections with local schools. This collaboration has ensured accessibility, inclusivity as well as cost-effectiveness with expenses extending no further than £200. Attendance at the workshops has been high, with 25 participants in two of the three years, however there was a dip in 2024 (N=11). Evaluative data was collected in 2024 and 2025 via anonymous feedback surveys incorporating Likert-scale ratings and open-ended responses. Findings indicated positive impacts across multiple domains, including engagement, learning outcomes, resources, organisation and satisfaction. The introduction of 3D anatomy software (3DOrganon) in 2025 further enriched participant experience and enabled all participants to receive a one-year license for free. This reflective evaluation summarises the planning, delivery and outcomes of three years of World Anatomy Day workshops, providing insights into examples of best practice for anatomy outreach that can be shared with conference attendees. It highlights a three-part model that is (1) collaborative, (2) cost-effective and sustainable, and (3) evidence-based. Ethics was not required for this project.

YOUNG INVESTIGATOR

Anatomical Considerations in Relation to Total Hip Arthroplasty: A Comparison of the Direct Anterior and Posterior Approaches. A Human Cadaveric Study and Literature Review.

Thomas Sturt[1], Sean Strauther[2], Michael Price[1]

1-University of Leeds, Leeds, UK; 2-Leeds Institute of Medical Education (LIME), Leeds, UK

Total hip arthroplasty (THA) remains one of the most successful and commonly performed procedures to restore function and relieve pain in patients with osteoarthritis. There are various surgical approaches to THA, which present distinct advantages and risks. The posterior approach (PA) is the most popular in the United Kingdom, offering excellent visualisation and reliable outcomes, but involves disruption of posterior soft tissues, which can make post-operative dislocation more likely. In contrast, the direct anterior approach (DAA) is the only surgical approach to THA that utilises an intermuscular and internervous plane. The DAA has gained attention for facilitating faster recovery and helping preserve hip stability post-operatively, though it carries a steep learning curve due to its increased technical complexity. During this study, two extensive dissections of the anterior and posterior hip regions were undertaken to examine the relevant anatomy, contextualise current literature, and support the findings of this review. Both dissections were performed on the same cadaver, embalmed in a formaldehyde-based solution. Dissection of the anterior hip region revealed the course of the lateral femoral cutaneous nerve within the Hueter interval between sartorius and tensor fascia lata and demonstrated the crossing of the ascending branches of the lateral femoral circumflex artery within the surgical field. This highlighted the potential for iatrogenic damage to these structures during the DAA. In contrast, dissection of the gluteal region highlighted the close relationship between the sciatic nerve and the short external rotators, and illustrated how the PA can offer better visibility of the hip joint. This additional visibility may be advantageous when performing THA on patients with more complex hip anatomy, or during revision procedures where the effects of previous surgery may increase operative complexity. In light of growing demand for THA, this review integrates findings from cadaveric dissection and scrutinises current literature to highlight the importance of integrating anatomical considerations, surgical preference, and clinical judgement to guide approach selection on a patient-specific basis. This study complied with the UK Human Tissue Act (2004) and the UK Human Tissue Authority Code of Practice on Anatomical Examination (UK Human Tissue Authority, 2023).

YOUNG INVESTIGATOR

The impact of neuroimaging in understanding neuroanatomical relationships–medical students' perspectives.

Zara Tanna
Anglia Ruskin University, School of Medicine, Chelmsford, Essex, UK

Understanding neuroanatomy is a critical component of medical education, underpinning the ability to diagnose and manage neurological disorders. However, many medical students report difficulty mastering this topic, resulting in a phenomenon known as neurophobia - an aversion towards neurology often linked to the complexity of neuroanatomical relationships. This literature-based study aimed to explore the impact of neuroimaging techniques on enhancing medical students' understanding of neuroanatomy and their potential role in reducing neurophobia. Relevant research articles published over the past 15 years were identified through the PubMed database using keywords such as "neuroanatomy," "medical imaging," and "neurophobia." Studies were selected based on their focus on neuroimaging in education, including modalities such as MRI, CT, and virtual reality (VR)-based 3D visualisation. Findings from these studies were critically analysed to evaluate improvements in comprehension, engagement, and learning outcomes among medical students. The analysis revealed that exposure to neuroimaging and computer-aided learning tools significantly enhanced students' spatial awareness of brain structures and their confidence in applying anatomical knowledge to clinical scenarios. For instance, cohorts taught using VR or 3D imaging achieved higher assessment scores and reported greater motivation compared to those taught via traditional methods. These tools allowed learners to manipulate and visualise anatomical structures in three dimensions, bridging the gap between theoretical study and clinical application. Although limitations such as cost, accessibility, and technological learning curves persist, the overall evidence suggests that neuroimaging-based teaching improves understanding, reduces anxiety toward neurology, and may increase interest in neurology as a career. In conclusion, neuroimaging provides an effective adjunct to conventional anatomy teaching by fostering deeper comprehension of neuroanatomical relationships. Incorporating such technologies into the medical curriculum could help overcome neurophobia, leading to more confident and competent future clinicians. This study was a literature-based educational review and did not involve human participants, cadaveric material, or animals. Therefore, ethical approval was not required.

YOUNG INVESTIGATOR

Ontogeny and Sexual Dimorphism in the Juvenile Homo sapien Lung

Thomas Van Parys[1], Thomas O'Mahoney[2]

1-University of Cambridge, Cambridge, UK, 2- Anglia Ruskin University, Cambridge, UK

Sexual dimorphism between biological male and female Homo sapiens is well documented, with most anatomical differences being noticeable following puberty, especially amongst skeletal tissue such as the pelvis and cranium. Despite this, the exact timing and development of sexual dimorphism in many soft tissues, especially the lungs in subadults, remains unresolved. This is significant because understanding juvenile development in relation to biological sex is crucial for paediatric medicine and reinforces the complexity of peripubertal and pubertal processes in Homo sapiens. By acknowledging the research gap and its significance, this study quantifies sexual dimorphism of subadult lung size and shape using geometric morphometrics, applied to a dataset of 359 high resolution juvenile computerised tomographic scans with known biological sex (180 males, 179 females). The mean age of this sexed dataset was 7.0± 4.5, with a median age of 6 years. Two-way ANOVA revealed no statistically significant difference in lung shape variation by sex-age groups ($p = 0.79$), but a significant difference in lung size for age-sex groups was revealed using centroid size (CS) ($p = 0.0063$, $\alpha = 0.05$, 95% confidence interval), with marked sexual dimorphism between males and females aged 11-16 years ($p = 0.014$). The difference in this age group is likely due to puberty and total body size growth in males, with female puberty focusing on reproductive optimisation. These size and shape differences have various physiological implications, differences in breathing kinematics, and respiratory pathologies, which should be investigated in future research. This study received full ethical approval, and includes fully anonymised computerised tomographic scans of living individuals.

Enhancing Applied Anatomy Learning in Undergraduate Dental Education Through Contextualised Clinical Multimedia Video Resources

Ourania Varsou[1], Adam Wyroslawski[2], Lauren Duguid[1], John McCall[2], Scott Border[1], Paul M. Rea[1], Alison Cairns[2]

1- Anatomy Facility, School of Medicine, Dentistry and Nursing, College of Medical, Veterinary and Life Sciences, University of Glasgow; 2- Dental School, School of Medicine, Dentistry and Nursing, College of Medical, Veterinary and Life Sciences, University of Glasgow

@OuraniaVarsou @ScottBorder1

Anatomy underpins clinical dental practice, yet students often struggle to translate theoretical anatomical knowledge into real clinical contexts, leading to reduced engagement and confidence. To address this, a curriculum review and needs analysis of the BDS year 3 anatomy curriculum at the University of Glasgow was undertaken to identify priority areas, which were further validated by student feedback as points of difficulty when linking anatomy to practice. In response, seven contextualised clinical multimedia video resources were co-created by anatomists, clinical dental educators and an e-learning systems developer to enhance applied anatomy learning. The resources featured dental clinicians explaining how the anatomy of the region being taught informs clinical reasoning and decision-making and were delivered at key points during lab teaching to reinforce applied learning. An additional outcome was the development of a scalable multimedia production workflow (including storyboarding, filming protocols and editable templates) to support colleagues undertaking similar initiatives. A preliminary staff (n=3) and student (n=3) post-intervention perception survey was conducted in 2024-25. Staff rated integration highly with an average score of 4.67/5, while engagement impact averaged 2.67/5 indicating a modest positive shift. Qualitative comments praised the concise format, which helped maintain attention, and the clear applied anatomy relevance. Students rated the quality of the resources at 3.67/5, noting that the most valued aspect was the explicit link between anatomical content and clinical application. A knowledge exchange workshop showcasing the workflow and resources gathered further interdisciplinary feedback from educators (n=10) across biosciences and healthcare programmes. The project was endorsed as scalable, with recommendations to align the resources with curriculum sequencing and to integrate interactive elements such as quizzes for consolidation and engagement. This works introduces a novel multimedia approach to contextualising dental anatomy teaching and the presentation will discuss the development process, validation data and a transferable workflow for use in other healthcare and biosciences programmes. In the current academic year, the resources are being further evaluated through a within-subject study design using pre- and post-intervention data. Ethics statement: Approval was granted from the University of Glasgow MVLS College Ethics Committee (reference: 200240318).

Poster 34

Using Digital 3D Models to Learn Physical Objects

Staci Bronson, Lindsay Biga
Oregon State University, Corvallis, OR, USA, Oregon State University, Corvallis, OR, USA

The study of human anatomy and physiology (A&P) typically involves a laboratory component where students explore anatomical structures through physical models and dissection. Advances in technology have enabled the development of three-dimensional (3D) models which can be observed and manipulated through a web browser. With these advances, the ability to create and share open-access 3D models is improving access to low-cost materials for students which are available on-demand anywhere there is internet. In partnership with Oregon State University (OSU) Ecampus we created virtual tools for our online A&P course to help students learn the bones and features of the human skeleton. This virtual bone box mimics the box of unlabeled, disarticulated bones that students in our on-campus labs use to familiarize themselves with the unique shapes, markings, and characteristics of each bone. The primary aim of this study was to examine the ability of students to apply identification knowledge gained in the online learning environment using virtual models to the same models in their physical form. A secondary aim was to compare the learning gains between on campus and online students in the introductory level A&P courses. Participants were recruited from students enrolled in A&P online (n=14) and A&P on-Campus (n=32). As a part of the curriculum in both modalities, students are assessed on their knowledge of the skeletal system before and after the skeletal unit. Study participants completed an additional assessment using physical bone models. Students on average improved over 50% from the pre-test to post-test (n = 325). Learning gains for study participants were similar and robust in both modalities at over 60%. Participants' physical bone model test results were similar to post-test results at over 70% for both course modalities. Both online and on-campus learners of human A&P succeeded in learning a large quantity of anatomical structures indicating that quality anatomical education is possible in an online environment. This study was approved by the OSU Institutional Review Board and informed consent was obtained from all study participants.