24th Annual Meeting of the American Association of Clinical Anatomists

June 16-20, 2007

Henderson, NV

Jointly sponsored by the

American Association of Clinical Anatomists
and
Touro University Nevada,
Medical Education and Research Institute of Nevada, and
University of Nevada Las Vegas School of Dental Medicine

Green Valley Ranch
Resort and Spa
Henderson, NV

The American Association of Clinical Anatomists officially began on October 17, 1983 to advance the science and art of Clinical Anatomy, to encourage research and publication in the field and to maintain high standards in the teaching of Anatomy.

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Clinical Anatomy

The Official Journal of the
American Association of Clinical Anatomists,
the British Association of Clinical Anatomists,
the Australian and New Zealand Association of Clinical
Anatomists, and the Anatomical Society of Southern Africa

Annual Banquet

Tuesday, June 19th, 2007

Green Valley Ranch Resort and Spa
Grand Ballroom

6:30 pm – Reception – *Grand Ballroom Foyer*
7:30 pm – Dinner and presentation of *Honored Member and Distinguished Service Awards*

Previous Honored Members of the AACA

*W. Henry Hollinshead, 1984
*Chester B. McVay, 1985
*Donald James Gray, 1986
*Russell T. Woodburne, 1987
Oliver Beahrs, 1988
N. Alan Green, 1989
*Frank H. Netter, 1990
Ralph Ger, 1991
M. Roy Schwartz, 1992
Carmine D. Clemente, 1993
Keith L. Moore, 1994
Roy J. Scothorne, 1995
Robert A. Chase, 1996
Tatsuo Sato, 1997
John E. Skandalakis, 1998
Donald R. Cahill, 1999
*Sandy C. Marks, Jr., 2000
David G. Whitlock, 2001
Robert D. Acland, 2002
Arthur F. Dalley, II, 2003
John V. Basmajian, 2004
Ian Whitmore, 2005
Peter H. Abrahams, 2006

* deceased

Honored Member, 2007

The American Association of Clinical Anatomists

Recognizes and awards Honored Member to

Gary G. Wind, MD, FACS

Physician ● Artist ● Educator ● Author
Clinical Anatomist

For his distinguished career in, and enthusiasm for, clinical anatomy, as demonstrated by his anatomical/surgical publications, the insight of his anatomical, developmental, and surgical illustrations, and his pioneer efforts in internet-based surgical education.

The 2007 Keith L. Moore/Lippincott, Williams & Wilkins Presidential Speaker

Awarded at the 24th Annual Meeting of the AACA,
Las Vegas, NV - June 19th, 2007

R. Benton Adkins Jr.
Distinguished Service Award, 2007

The American Association of Clinical Anatomists

Recognizes and awards R. Benton Adkins Jr.
Distinguished Service Award to

Ralph Ger, MD, FRCS, FACS

For his outstanding record of service to the AACA as Founder, Councilor, President, Honored Member, and Founding Editor of its official journal, CLINICAL ANATOMY, and for his quarter century of continuous participation, contributions, and eloquent advocacy and leadership.

Awarded at the 24th Annual Meeting of the AACA,
Las Vegas, NV - June 19th, 2007

Sponsors/Commercial Exhibitors

Generous donations and/or commercial exhibitor fees paid by the following companies and organizations have substantially reduced the Association's expenses in presenting this meeting. You are encouraged to visit the exhibits available for viewing in – *Grand Ballroom II, III, IV*

Exhibit hours: 7:30am - 5pm on Monday and Tuesday
7:30am - noon on Wednesday

Bacus Laboratories Inc.
Bone Clones, Inc.
Carolina Biological Supply Co
Edu-Technologies
Elsevier
Holt Anatomical, Inc.
Mopec, Inc.
Oxford University Press
Touch of Life Technologies
Thermo Fisher Scientific
Thieme Publisher
Vital Images, Inc.
Wiley
Wolters Kluwer Health - LWW

Companies Providing Refreshments or Contributing other Items for the Meeting

Cardinal Health
Frito Lay
Henderson Convention Center
Las Vegas Convention Center
Ocean Spray Cranberry
Starbuck's Coffee

24th Meeting of the American Associations of Clinical Anatomy

Pre-Conference Activities

Saturday, June 16th, 2007

8:00 a.m. - 9:30 a.m. **Journal Committee Meeting** - (members of Journal Committee) - *La Estrella Room*

9:30 a.m. - 5:00 p.m. **AACA Council Meeting** – (AACA Officers and Councilors) - *La Estrella Room*

Sunday, June 17th, 2007

*** A separate registration fee is required for this event ***

24th Annual Meeting Postgraduate Course

Clinical Anatomy of the Knee

Co-Sponsored by the **Touro University Nevada**
and the **Medical Education and Research Institute of Nevada**

7:30 a.m. - 5:00 p.m.

Co-Organizer
Terence Ma

7:00 a.m.	Shuttle buses leave Green Valley Ranch Resort for Touro University Campus
7:15 a.m.	Continental Breakfast
7:50 a.m.	Welcome - Terence Ma, Ph.D.
8:00 a.m.	Lecture: Clinical Anatomy of the Knee – Emmett Findlay, D.C.
8:30 a.m.	Lecture: Disesases of the Knee Joint – Mitchell Forman, D.O.
9:00 a.m.	Break
9:15 a.m.	Lecture: Injuries of the Knee Joint – Jason Tarno, D.O.
9:45 a.m.	Lecture: Manipulative Treatmetn of the Knee – John Jones, D.O.
10:15 a.m.	Break
10:30 a.m.	Demonstration of a Total Knee Replacement – Michael Crovetti, D.O.
11:30 a.m.	Lunch

Sunday, June 17th, 2007

12:30 p.m.	Practicum 1A, 1B
2:30 p.m.	Break
3:00 p.m.	Practicum 2A, 2B

Practicum Group A: Total Knee Replacement lab
- Michael Crovetti, D.O.

Practicum Group B: Physical Diagnosis of the Knee
- David Park, D.O.

5:00 p.m. Return to Green Valley Ranch Resort and Spa

Touro University Nevada and the Medical Education and Research Institute of Nevada invites all registered attendees of the AACA conference to visit the campus. There will be shuttle buses between Touro University Nevada and the Green Valley Ranch throughout the day.

Sunday, June 17th, 2007

12:00 p.m. **Registration -** *Grand Ballroom Foyer*

1:00 p.m. - 4:00 p.m. C**ommercial Exhibits/Poster Set-up** **–** *Grand Ballroom II, III, IV*

Career Development Committee

6:00 p.m. – 7:00 p.m. **Reception for Young Anatomists** **–** *La Estrella Room*

Welcome Reception

8:00 p.m. - 10:00 p.m. **Welcome Reception**

Sponsored by Elsevier

For all meeting attendees
and accompanying persons

"The Pond"

Special Exhibit - Del Mar Room

"Artwork from Netter and Machado"

7 am to 5 pm
Monday, June 18th
Tuesday, June 19th

7 am to 3 pm
Wednesday, June 20th

Monday, June 18th, 2007

7:00 - 8:30 a.m. **Editorial Board Breakfast Meeting for Editors/Associate Editors of *Clinical Anatomy*, –** *La Estrella Room*

7:00 - 8:30 a.m. **Career Development Committee** *- Del Fuego Room*

7:00 - 4:00 p.m. **Registration -** *Grand Ballroom Foyer*
Commercial Exhibits **–** *Grand Ballroom II, III, IV*

6:30 – 8:30 a.m. **– Continental Breakfast** **–** *Grand Ballroom II, III, IV*

8:30 – 9:00 a.m. **Opening Ceremonies /Remarks**: *- Grand Ballroom*

Thomas H. Quinn, Ph.D.
AACA President, Creighton University

Michael Harter, Ph.D., C.E.O.
Touro University Nevada

Mitchell Forman, D.O.
Dean, College of Osteopathic Medicine,
Touro University Nevada

Robyn Nelson, D.N.Sc, R.N.
Dean, College of Health and Human Services,
Touro University Nevada

Karen West, D.M.D.
Dean, UNLV School of Dental Medicine

Michael Crovetti, D.O.
Founder, Medical Education
and Research Institute of Nevada

10:00 a.m. **Accompanying Persons' Program Departure** *– Grand Promenade*

POSTER SESSIONS

Poster Session 1 –

THORAX / ABDOMEN / PELVIS / EXTREMITIES / HEAD AND NECK

- Grand Ballroom II, III, IV

Poster Session 2 –

TEACHING / WILLED BODIES

- Grand Ballroom II, III, IV

All posters will be on display **throughout Monday and Tuesday**, 7:30 a.m. to 4:30 p.m.

Presenters assigned to **Poster Session 1** must be present at their posters **during the Monday morning break and Tuesday afternoon break.**

Presenters assigned to **Poster Session 2** must be present at their posters **during the Monday afternoon break and Tuesday morning break.**

The list of the posters is found on Pages 26 to 39

Abbreviations used in the program:

***** Not a member of the AACA.

§ Eligible for the Presidential Travel Award Presentation.

¶ Eligible for the Sandy C. Marks, Jr. Student Poster Presentation Award.

+ Eligible for Ralph Ger Student Platform Presentation Award.

9:00 a.m. **Platform Session 1**: Abdomen and Pelvis.
Terence Ma - Moderator, *Grand Ballroom*

9:00 The inguinal ligament and its attachments: tracking an anatomical error. **STAUBLE, J. Scott JR**, and Robert D. ACLAND. Department of Anatomical Sciences and Neurobiology and Department of Surgery, University of Louisville, Louisville, KY.

9:15 Congenital and acquired abdominal wall defects: case studies. **GER, Ralph**. Department of Anatomy and Structural Biology, Albert Einstein College of Medicine, Bronx, NY.

9:30 Morphologic variations of the prostatic utricle. **OH, Chang-Seok**, Hyung-Sun WON*[1], and In-Hyuk CHUNG[1]. Department of Anatomy, Sungkyunkwan University School of Medicine, Samsung Biomedical Research Institute, Suwon, [1]Department of Anatomy and Brain Korea21 Project for Medical Science, Yonsei University College of Medicine, Seoul, Korea.

9:45 Video demonstration of abdominal anatomy emphasizing the critical importance of visceral fusion fasciae. SATO, Tatsuo, Hirokazu SAKAMOTO*, Sadaaki HEIMA*, Yoko TSUBOI*. Professor Emeritus, Tokyo Medical and Dental University (Clinical Anatomy), Tokyo, Japan.

10:00 - 11:00 a.m. **Refreshment Break** – Browse the posters and commercial exhibits **–** *Grand Ballroom II, III, IV*

11:00 - 12:00 p.m. *Keith L. Moore/Lippincott, Williams & Wilkins Presidential Address*

Gary G. Wind, M.D., FACS
"What You See is What You Get"

Tom Quinn – Moderator – Grand Ballroom

12:00 - 1:00 p.m. **Lunch**. *(on your own)* Browse the posters and commercial exhibits **–** *Grand Ballroom II, III, IV*

1:00 p.m. **Scientific Platform Session 2:** Extremities.
Robert Spinner – Moderator, *Grand Ballroom*

1:00 + Coexisting secondary intraneural and vascular adventitial ganglion cysts of joint origin: a causal rather than a coincidental relationship supporting an articular theory. **DESY, Nicholas M.**, Bernd W. SCHEITHAUER*, Michael G. ROCK*, Frederik C. HOLDT*, Kimberly K. AMRAMI*, and Robert J. SPINNER. Departments of Neurologic Surgery, Orthopedics, Anatomy, Pathology and Radiology, Mayo Clinic, Rochester, MN, USA, Department of Anatomy, University of Pretoria, Pretoria, South Africa.

1:15 + Variable proximal attachment of the quadratus plantae muscle. **FREEMAN*, A. Jay**, Nathan A. JACOBSON*, Quentin A. FOGG. American University of the Caribbean, Sint Maarten, NETHERLANDS ANTILLES.

1:30 Topographical anatomy of lateral circumflex femoral artery for anterolateral thigh flap in Koreans. **KIM Hee-Jin**[1]*, Kyung-Seok HU[1]*, Joo-Yong PARK[2]*, Sung-Weon CHOI[2]*, and Mi-Sun Hur[1]*. [1]Division in Anatomy and Developmental Biology, Department of Oral Biology, College of Dentistry, Oral Science Research Center, Brain Korea 21 Project, Human Identification Research Center, Yonsei University, Seoul, Korea, [2]Oral Cancer Clinic, Research Institute and Hospital, National Cancer Center, Koyang, Korea (Sponsored by Wojciech Pawlina).

1:45 Drop-tower testing of cadaver legs: Experimental production of medial malleolar fractures from foot impacts. **PORTA, David J**., Tyler A. KRESS*, Dave HALSTEAD*, Jeremy O. STATTON*, and Craig S. ROBERTS*. Department of Biology, Bellarmine University, Louisville, KY. B.E.S.T. Engineering Co., Knoxville, TN. Southern Impact Research Center, LLC, Knoxville, TN. University of Louisville Department of Orthopaedic Surgery, Louisville, KY.

2:00 + Regional differences in human lumbar multifidus muscle architecture and intramuscular nerve distribution using 3D computer modeling. **ROSATELLI, Alessandro**, Kajeandra RAVICHANDIRAN, and Anne M. AGUR. Division of Anatomy, Department of Surgery, University of Toronto, Toronto, Canada.

2:15 An anatomical explanation for the atypical appearance of intraneural ganglion cysts extending into the sciatic nerve: the significance of epineurial compartments. **SPINNER, Robert J**., Kimberly K. AMRAMI*, Huan WANG*, Bernd W. SCHEITHAUER*, and Stephen W. CARMICHAEL. Mayo Clinic School of Medicine, Departments of Neurologic Surgery, Orthopedics, Anatomy, Radiology and Laboratory Medicine, Rochester, MN.

2:30 - 3:30 p.m. **Refreshment Break** – Browse the posters and commercial exhibits **–** *Grand Ballroom II, III, IV*

3:30 p.m. **Scientific Platform Session 3:** Head and Neck. Larry Ross – Moderator, *Grand Ballroom*

3:30 The precise localization of motor branches of the tibial nerve in the deep posterior compartment of the leg: danger areas during invasive procedures. **APAYDIN, Nihal***[1], Candice MYERS[2], Marios LOUKAS[2], R. Shane TUBBS[3], Huseng VEFALI[1,] Simel KENDIR[1], and Ibrahim TEKDEMIR[1.] [1]Department of Anatomy, Ankara University, Ankara, Turkey, [2]Department of Anatomical Sciences St. George's University, Grenada West Indies, [3]Section of Pediatric Neurosurgery, University of Alabama at Birmingham, Birmingham, AL.

3:45 Rotator Interval dimensions varies in different shoulder arthroscopy positions. A cadaver study. **DEMIRYUREK, Deniz**[1], M. H. Ozsoy[2], A. Bayramoglu[1], E. Tuccar[3], and Dincel V. E.[2]. [1]Hacettepe University Faculty of Medicine, Department of Anatomy, Ankara, [2]Turkey Ankara Education and Research Hospital, 1st Clinic of Orthopaedics and Traumatology, Ankara, [3]Ankara University Faculty of Medicine, Department of Anatomy, Ankara, Turkey.

4:00 Topography of the neurovascular structures of the mandibular canal. **HU Kyung-Seok**[1]*, Wu-Chul SONG[2]*, Mi-Sun HUR[1]*, Min-Kyu KANG[1]*, Ki-Seok KOH[2]*, Kyoung-Sub SHIM[1]*, Cristian Fontaine[3], Hee-Jin KIM[1]*. [1]Division of Anatomy and Developmental Biology, Department of Oral Biology, Oral Science Research Center, Human Identification Research Center, Brain Korea 21 project, Yonsei University College of Dentistry, Seoul, Korea, [2]Department of Anatomy, College of Medicine, Konkuk University, Chung-ju, Korea, [3]Laboratoire d'Anatomie, Faculte de Medecine, Herri Warenmbourg, Universite Lille 2, Lille, France.

4:15 New anatomical findings of the arteries supplying the medial pterygoid muscle. **KWAK Hyun-Ho**[1]*, Kyung-Seok HU[2]*, Mi-Sun HUR[2]*, Sung-Yun WON[2]*, Gyoo-Cheon KIM[1]*, Bong-Soo PARK[1]*, Han-Sung JUNG[2]*, and Hee-Jin KIM[2]*. [1]Department of Oral Anatomy, Pusan National University, College of Dentistry, Pusan, Korea, [2]Division of Anatomy and Developmental Biology, Department of Oral Biology, Oral Science Research Center, Human Identification Research Center, Brain Korea 21 project, Yonsei University College of Dentistry, Seoul, Korea (Sponsored by Wojciech Pawlina).

4:30 + Three-dimensional contractile muscle model of mandibular elevation based digitized data from human cadaveric specimens. **RAVICHANDIRAN, Mayoorendra**, Laetitia LEON*, Karan SINGH*, Bernie LIEBGOTT*, Kenneth NORWICH*, and Anne AGUR. Departments of Surgery and Computer Science, and Institute of Biomaterials & Biomedical Engineering, University of Toronto, Toronto, ON, Canada.

4:45 Differentiation of stem cells in the dental follicle. **WISE, Gary E**., Shaomian YAO*, and Veronica PRPIC*. Department of Comparative Biomedical Sciences, Louisiana State University, LA.

5:00 – 6:30 p.m. CDC Symposium – *Grand Ballroom*

"Writing constructive reviews of scientific work: what are the editors' expectations/"

Tuesday, June 19th, 2007

7:00 - 8:00 a.m. **Financial Affairs Committee**
– Del Sol Room

7:00 - 8:00 a.m. **Past President's Breakfast**
– La Estrella Room

7:00 a.m.- 4:30 p.m. **Registration** – *Grand Ballroom Foyer*

6:30 – 8:30 a.m. **– Continental Breakfast**
– *Grand Ballroom II, III, IV*

9:30 a.m. **Accompanying Persons' Program Departure**
– Grand Promenade

8:30 a.m. **Scientific Platform Session 4**:
Head and Neck and Teaching.
Marios Loukas – Moderator, *Grand Ballroom*

8:30 + Three-dimensional computer modeling and measurement of human cranial anatomy. **DECKER, Summer J.**,[1] Don R. HILBELINK, [1] and Eric J. HOEGSTROM.[2]* [1]Department of Pathology and Cell Biology, University of South Florida College of Medicine, [2]Department of Chemical Engineering, University of South Florida College of Engineering, Tampa, FL.

8:45 + The transitional nerve: a new and original classification of a peripheral nerve supported by the nature of the accessory nerve (CN XI). **MCNEIL, Jon*** and Brion BENNINGER. Department of Integrative Biosciences and Department of Surgery, Oregon Health and Science University, Portland, OR.

9:00 Seven Tesla MRIs and Advanced Anatomic Images of Cadaver Head. **PARK, Jin Seo**[1]*, Min Suk Chung[2]*, Hyo Seok Park[2]*, Zang-Hee Cho[3]*, and Yong-Wook Jung[1]* [1]Department of Anatomy, College of Medicine, Dongguk University, Korea [2]Department of Anatomy, Ajou University School of Medicine, Korea [3]Neuroscience Research Institute, Gachon University of Medicine and Science, Korea.

9:15 § Clinical anatomy of the C1 dorsal root, ganglion, and ramus: a review and anatomical study. **TUBBS, R. Shane**, Marios LOUKAS, John B. SLAPPEY*, Mohammadali M. SHOJA*, W. Jerry OAKES*, E. George SALTER. Department of Cell Biology, University of Alabama at Birmingham, Department of Anatomical Sciences, St. George's University, Grenada, Department of Education, Harvard Medical School, Boston, MA. Tuberculosis and Lung Disease Institute, Tabriz Medical University, Tabriz, Iran, Department of Surgery, Division of Neurosurgery, University of Alabama at Birmingham, Birmingham, AL.

9:30 Anatomical research as a teaching method and career guidance, an anatomist perspective Part I. **LOUKAS, Marios**[1], Robert G LOUIS[1], Christopher WARMANN[1], Christopher KINSELLA[1], R. Shane TUBBS[2], Brian CURRY[1], and Robert JORDAN[1]. [1]Department of Anatomical Sciences, St. George's University, Grenada, West Indies, [2]Department of Pediatric Neurosurgery, University of Alabama at Birmingham, Birmingham, AL.

9:45 Anatomical research as a teaching method and career guidance, a student perspective Part II. LOUKAS, Marios[1], Christopher KINSELLA*[1], Robert G LOUIS[1], Christopher WARTMANN[1], R. Shane TUBBS[2], Brian CURRY[1], and Robert JORDAN[1]. [1]Department of Anatomical Sciences, St. George's University, Grenada, West Indies, [2]Department of Pediatric Neurosurgery, University of Alabama at Birmingham, Birmingham, AL.

10:00 - 11:00 a.m. **Refreshment Break** –
Browse posters /commercial exhibits **–** *Grand Ballroom II, III, IV*

11:00 a.m. **Educational Affairs Committee**
Geoffrey Guttmann - Moderator
Special Presentation: Dr. Robert Stephenson
"The Next Half-Millennium of Anatomy Education"

Dr. Robert Stephenson is an educator, eLearning architect, and consultant. Chief Architect and Principal Investigator, http://OpenCourse.Org . Founder, The Harvey Project, Open Course Physiology on the Web, http://HarveyProject.org

*Tues*day, June 19th

12:00 - 1:00 p.m. **Lunch**. *(on your own)*
Browse posters /commercial exhibits **–** *Grand Ballroom II, III, IV*

1:00 - 2:30 p.m. **AACA Annual Business Meeting**
(all members and membership applicants) – *Grand Ballroom*

2:30 - 3:30 p.m. **Refreshment Break** –
Browse posters /commercial exhibits **–** *Grand Ballroom II, III, IV*

Educational Affairs Committee Symposium
On the campus of Touro University Nevada
Buses will transport participants from the hotel (Grand Promenade at 3 pm); Returning to hotel at 5:30 pm.

3:30 – 5:30 pm "Workshop on Instructional Technology in Action" - Geoffrey Guttmann and Cristian Stefan, Moderators

Setting up Clinical Discussion and e-Portfolios for Anatomy Courses - Geoffrey D. Guttmann, Wayne State University School of Medicine.

The games we (can) play in medical education - Don R. HILBELINK[1], Eric HOEGSTROM[2] and Amy J. HILBELINK[3,] [1]University of South Florida, College of Medicine, and [2]University of South Florida, College of Engineering, and [3]Kaplan University School of Health Sciences, Ft. Lauderdale, FL.

The audience response system (ARS) as an effective feedback mechanism in the teaching of anatomical sciences - Wojciech PAWLINA[1] and Cristian STEFAN[2,] [1]Mayo Medical School and [2]University of Massachusetts Medical School.

Podcasting for Anatomists - Robert TRELEASE, UCLA School of Medicine.

6:30 p.m. **Reception** (cash bar) - *Grand Ballroom Foyer*

7:30 p.m. **Annual Banquet** and presentation of Honored Member Award – *Grand Ballroom*

Wednesday, June 20th, 2007

7:00 - 8:00 a.m. **Educational Affairs Breakfast** - *Del Feugo*

7:00 a.m. – 4:30 p.m. **Registration** – *Grand Ballroom Foyer*

6:30 – 8:30 a.m. **– Continental Breakfast –** *Grand Ballroom II*

10:00 a.m. **Accompanying Persons' Program Departure** *– Grand Promenade*

8:30 a.m. **AACA TechFair Session -** Brian MacPherson - Moderator. *Grand Ballroom*

8:30 Evaluation of the video, "The Obitozygomatic Approach" as a teaching tool for neurosurgical residents. **BAE, Sam S**., Michael D. CUSIMANO, and Anne M. AGUR. Division of Anatomy, Department of Surgery, University of Toronto, Toronto, Canada.

8:40 GATEways: The role of technology in the enhancement of interdisciplinary gross anatomy education. **BREWER, Patricia A**., David F. BAKER*, Vicki L. BYERS*, Nancy J. GIRARD*, Linda Y. JOHNSON, John H. LITTLEFIELD*, Ron PHILO, Omid B. RAHIMI*, Janis N. RICE*, Debra L. STARK*, Frank J. WEAKER, and Vick WILLIAMS. Departments of Cellular and Structural Biology, Physical Therapy and Acute Nursing Care, University of Texas Health Science Center at San Antonio, San Antonio, TX.

8:50 Description of a standard computer graphics "pipeline" for generating interactive 3D anatomical model libraries reconstructed from computed tomography and magnetic resonance image sets followed by a demonstration of a digital dissector of the human neck using this resource. **HISLEY, Kenneth C**. and Duc H. NGUYEN*. Department of Diagnostic Radiology, University of Maryland School of Medicine, Baltimore, MD, Department of Art As Applied to Medicine, Johns Hopkins School of Medicine, Baltimore, MD.

9:00 + A novel use of podcasting in teaching cross-sectional anatomy. **JOHNSON*, Nathan F**., April D. RICHARDSON*, and Jennifer K. BRUECKNER. Department of Anatomy and Neurobiology, University of Kentucky, Lexington, KY.

9:10 Oral Histology 2.0. **MacPHERSON, Brian R**. and Jerry TIEMAN*. Department of Anatomy and Neurobiology, University of Kentucky, Lexington, KY.

9:20 SpecimenTrak: a demonstration of the anatomical specimen tagging and tracking. **PRABHU, Shiv***[1], Xiaoyong SU*[1], Charlie QIU*[1], Brandi SCHMITT[2], Chi-Cheng CHU*[1], and GADH, Rajit*[1]. [1]Wireless Internet for the Mobile Enterprise Consortium (WINMEC), UCLA, Los Angeles, CA, [2]University of California, Oakland, CA.

9:30 Virtual simulation instructional methodology that enhances the teaching of anatomy and strengthen its integration with radiological imaging. **STEFAN, Cristian**[1,2], Charles MAYO*[2], Ancuta M. STEFAN[1,2], Alexandra SHERMAN*[2], Sathish K. DUNDAMADAPPA*[3], and Thomas J. FITZGERALD*[2]. [1]Department of Cell Biology and [2]Department of Radiation Oncology, University of Massachusetts Medical School and [3]Department of Radiology, University of Massachusetts Memorial Health Care, Worcester, MA.

9:40 Organization of the face. **WINESKI, Lawrence E**., Perry RIGGINS*, Christopher MAY*, and Rebecca SEALAND*. Department of Anatomy & Neurobiology and Division of Information Technology Services, Morehouse School of Medicine, Atlanta, GA.

9:50 -10:20 a.m. **Refreshment Break** – Browse the posters and commercial exhibits – *Grand Ballroom II, III, IV*

10:30 a.m. **Platform Session 5:** Education 1
Greg Smith – Moderator, *Grand Ballroom*

10:30 + Variation in maxillary artery branching points in relation to feasibility of extracranial-intracranial bypasses. **BAKER, Zachary***, Thomas RIDDELL*, Quentin A. FOGG. American University of the Caribbean, Sint Maarten, NETHERLANDS ANTILLES.

10:45 § Presurgical delineation of anatomic details for successful separation of thoracopagus-omphalopagus conjoined twins. **THOMPSON, Jess L**., Jane M. MATSUMOTO*, and Christopher R. MOIR*. Division of Pediatric Surgery and Department of Radiology, Mayo Clinic, Rochester, MN.

11:00 + Learning Under Fire: Transition from Student to Teacher. **CASEY, Gregory P**. Department of Cell Biology and Anatomy, Louisiana State University Health Sciences Center, New Orleans, LA. (Sponsored by William J. Swartz).

11:15 + "A matter of perception": an ethnographic study of medical students' impressions of the body in cadaver-based anatomy education. **FOUNTAIN, T. Kenny***. Department of Rhetoric, University of Minnesota, Saint Paul, MN. (Sponsored by Kenneth P. Roberts).

11:30 A learning portfolio for gross anatomy students. **PETTERBORG, Larry J**. School of Physical Therapy, Texas Woman's University, Dallas, TX.

11:45 Computer-based Anatomic Radiology Correlation (ARC) model of integration of clinical radiology anatomy into the medical gross anatomy curriculum. **SALKOWSKI, Lonie R**.[1], Edward T. Bersu[2], Bruce H. Barton[3]*, Kazuhiko Shinki[4]*, and Kenneth H. Jones[5]. University of Wisconsin School of Medicine & Public Health, Department of Radiology[1] and Department of Anatomy[2], UW DoIT Academic Technology[3], UW-Madison Department of Statistics[4], Madison, WI and The Ohio State University, Division of Anatomy[5], Columbus, OH.

12:00 - 1:00 p.m. **Lunch**. *(on your own)*

12:00 to 1:00 p.m. **AACA New Council Meeting**
– Del Feugo Room

1:00 p.m. **Platform Session 6:** Education 2
Robert Trelease - Moderator, *Grand Ballroom*

1:00 Impact of web-based instructional tools and other factors on the examination scores of first year medical students when students dissect alternately. **GRANGER, Noelle A**., Diane C. CALLESON*, and Jennifer M. BURGOON. Department of Cell and Developmental Biology and Department of Family Medicine, School of Medicine, School of Education, and Public Health Leadership Program, School of Public Health, University of North Carolina, Chapel Hill, NC.

1:15 An elective for senior medical students designed to integrate their clinical science knowledge with the basic sciences of anatomy and pathology from a clinical case perspective. **SOSNOWSKI, Jeffrey**. Department of Pathology, University of South Alabama, Mobile, AL.

1:30 From research into practice: Cognitive-based instructional designs in the anatomy classroom. **TERRELL, Mark**. Division of Anatomy, Ohio State University - Medical Center, Columbus, OH.

1:45 Living anatomy: Transforming clinical imaging data for virtual reality learning objects. **TRELEASE, Robert B**. and Antoine ROSSET*. Division of Integrative Anatomy, Department of Pathology and Laboratory Medicine, David Geffen School of Medicine at UCLA, Los Angeles, CA, and Hôpital Cantonal Universitaire de Genève, Geneva, Switzerland.

2:00 Anatomic characteristics of the medial antebrachial cutaneous nerve and its clinical implication. **WANG, Huan***, Guixin SUN*, and Yudong GU*. Department of Neurologic Surgery, Mayo Clinic, Rochester, MN and Department of Hand Surgery, Huashan Hospital, Fudan University, Shanghai, P. R. China. (Sponsored by R. J. Spinner).

2:15 Virtual Dissection in the Teaching of the Anatomical Sciences. **ZOLLER, Lawrence C***. Department of Biomedical Sciences, University of Nevada Las Vegas School of Dental Medicine, Las Vegas, NV. (Sponsored by T. Ma)

3:00 p.m. Anatomical Services - *Grand Ballroom I*

POSTER LISTING

Abbreviations:

* Not a member of the AACA.
§ Eligible for the Presidential Travel Award Presentation.
¶ Eligible for the Sandy C. Marks, Jr. Student Poster Presentation Award.
+ Eligible for Ralph Ger Student Platform Presentation Award.

Poster Session 1 – THORAX / ABDOMEN AND PELVIS / EXTREMITIES / HEAD AND NECK

Thorax

01 Batson's plexus obstruction causes spinal and radicular pain in patients with thoracic outlet syndrome (TOS) and migraine: MRI/MRA/MRV. COLLINS, James D., Ernestina H. SAXTON*, Samuel S. AHN*, Hugh GELABERT*, David AGNEW* and Alfred CARNES*. Departments of Radiological Sciences, Neurology and Vascular Surgery, UCLA, Los Angeles, CA.

02 Quantitative assessment of brachiocephalic artery position relative to the trachea. FOGG, Quentin A., Daniel GIVEN*, and Peter TASSONE*. American University of the Caribbean, Sint Maarten, NETHERLANDS ANTILLES.

03 Pattern of connection between papillary muscle and chordae tendineae of left ventricle. OZAN, H.[1]*, N. KOCABIYIK[1]*, B. Demirel[2]*, and B. YALCIN[1]*. [1]Gulhane Military Medical Faculty, Department of Anatomy, [2]Gazi Medical Faculty, Department of Forensic Medicine, Ankara, Turkey. (Sponsored by B. R. MacPherson).

04 Adolescent thoracic outlet syndrome (TOS): MRI/MRA/MRV. SAXTON*, Ernestina H., James D. COLLINS, Samuel S. AHN*, Hugh GELABERT*, David AGNEW*, and Alfred CARNES*. Departments of Neurology, Radiological Sciences and Vascular Surgery, UCLA, Los Angeles, CA.

Abdomen and Pelvis

05 Showing the inguinal region from behind. ACLAND, Robert D. and John S. STAUBLE, JR. Department of Surgery, Department of Anatomical Sciences and Neurobiology, University of Louisville, Louisville, KY.

06 The Inferior phrenic artery revisited. FISHER, Cara*[1], Shane TUBBS[2], Brian CURRY[1], Robert JORDAN[1], and Marios LOUKAS[1]. [1]Department of Anatomical Sciences, St. George's University, Grenada, West Indies, [2]Department of Pediatric Neurosurgery, University of Alabama at Birmingham, Birmingham, AL.

07 ¶ Bilateral intrathoracic kidneys associated with posterior diaphragmatic hernias. DINGELDEIN, Michael*, Derek KANE*, Anthony W. KIM*, Maurice J. PESCITELLI, Jr.*, and Mark J. HOLTERMAN[2]. Departments of Surgery and Pediatrics, Rush Presbyterian-St. Luke's Medical Center, and Departments of Surgery and Cell Biology and Anatomy, University of Illinois at Chicago, [2]Department of Surgery, University of Illinois at Chicago, Chicago, IL.

08 The absence of the right branch of the portal hepatic vein as a morphologic entity. Study on corrosion casts. MATUSZ Petru L.[1], Agneta Maria PUSZTAI[1]*, Delia Elena ZAHOI[1]*, Cristian STEFAN[2], Ancuta M. STEFAN[2]*, Dorina SZTIKA[1]*, Eniko Christine HORDOVAN[1]*. [1]Department of Anatomy, University of Medicine and Pharmacy "Victor Babes" Timisoara, ROMANIA, [2]Department of Cell Biology, University of Massachusetts Medical School, Worcester, MA.

09 Right hepatic artery originating from the superior mesenteric artery and its potential implications. MOON*, Judy J., Coen A. WIJDICKS*, and James M. WILLIAMS. Department of Anatomy and Cell Biology, Rush Medical College, Rush University, Chicago, IL.

10 The course and branching pattern of the pudendal nerve in fetus. KOCABIYIK, N.*, I. Tatar*, B. Yalcin*, and H. Ozan*. *Department of Anatomy, Gulhane Military Medical Faculty, 06018, Etlik, Ankara, Turkey. (Sponsored by B. R. MacPherson)

11 Effect of prenatal stress and serotonin depletion on postnatal serotonin metabolism in Wister rats. PRABHU, Latha V.[c], Sampath MADHYASTHA[c], S.N. SOMAYAJi[a], K.L. BAIRY[b], PRAKASH[c]. [a]Department of Anatomy, Manipal-Melaka Medical College, Manipal, [b]Department of Pharmacology, Kasturba Medical College, Manipal, [c]Department of Anatomy, Kasturba Medical College, Mangalore.

12 Role of antioxidants on reperfusion injury following testicular torsion in rats. RANADE, Anu V.*, Rajalakshmi RAI*, Latha V. PRABHU*, Sampath MADHYASTHA*, Prakash*, Mangala KUMARAN. Department of Anatomy, Kasturba Medical College, and department of Anatomy, Yenepoya Medical College, Mangalore, KA, India. (Supported by Medical Education and Research Trust, Karnataka) (Sponsored by Lynn Romrell).

13 ¶ Unilateral complete agenesis of mesonephric duct derivatives in an 82-year-old male cadaver: embryology, anatomy and clinical considerations. YAO-COHEN*, Morgan, Bradley MORGANSTERN*, David DARCY*, Joshua SCHIFFMAN*, Tommy SWANSON*, Todd R. OLSON, and Sherry A. DOWNIE. Department of Anatomy and Structural Biology, Albert Einstein College of Medicine, Bronx, NY.

Extremities

14 Femoral nerve morphology at the traditional single injection sites within the femoral triangle for analgesia of lower limb procedures. BENNINGER, Brion and Jon MCNEIL*. Department of Integrative Biosciences and Department of Surgery, Oregon Health and Science University, Portland, OR.

15 Surface anatomy versus upper brachial trunk morphology to identify a consistent single injection site for combined high interscalene and suprascapular nerve block. BENNINGER, Brion and Phillip KUPFER*. Department of Integrative Biosciences and Department of Surgery, Oregon Health and Science University, Portland, OR.

16 The Conjoined Tendon-Does It Exist? FARHAN, Thaer Mahmood. Department of Human Anatomy College of Medicine, Al-Nahrain University Kadhmiya, Baghdad Iraq.

17 Growth and deformation of the foot in childhood. FIRBAS, Wilhelm, Ulrike FIRBAS*, Josef KABELKA*, Wolfgang HEINRICH*, Manfred KREJS*, and Elfriede KERT*. Department of Systematic Anatomy, Center for Anatomy and Cell Biology, Medical University of Vienna, Austria.

18 ¶ Architecture of the human infraspinatus muscle: A pilot study. GILL, Richard, Kajeandra RAVICHANDIRAN, and Anne AGUR, Division of Anatomy, Department of Surgery, University of Toronto, Toronto, ON, Canada.

19 Superficial brachial artery anomaly serving as collateral circulation to the radial artery. HOOVER*, Chris RV., Tasha M. HUGHES*, Coen A. WIJDICKS, Julia R. HOWELL*, Meghann V. HOUCK*, and James M. WILLIAMS. Rush University Medical College, Department of Anatomy and Cell Biology, Chicago, IL.

20 An anatomical study of the blood supply of the dorsal side of the thumb and the first web. HUR Mi-Sun[1]*, Hyun-Ho KWAK[2]*, Hun-Moo YANG[1]*, Sung-Yoon WON[1]*, Kyung-Seok HU[1]*, Cristian Fontaine[3], Hee-Jin KIM[1]*. [1]Division of Anatomy and Developmental Biology, Department of Oral Biology, Oral Science Research Center, Human Identification Research Center, Brain Korea 21 project, Yonsei University College of Dentistry, Seoul, Korea, [2]Department of Oral Anatomy, Pusan National University, College of Dentistry, Pusan Korea, [3]Laboratoire d'Anatomie, Faculte de Medecine, Herri Warenmbourg, Universite Lille 2, Lille, France.

21 ¶ Hamstring tears: histologic analyses of a morphologic weakness in the semitendinosus muscle and a potential explanation for chronic injury. JACOBSON*, Nathan A., A. Jay FREEMAN*, Rajnil SHAH*, and Quentin A. FOGG. American University of the Caribbean, Sint Maarten, NETHERLANDS ANTILLES.

22 ¶ Arteria peronea magna accompanied with the bilateral hypoplasia of the anterior tibial arteries. JUNG, Wonsug*, Chang-Seok OH[1], Hyung-Sun WON*, and In-Hyuk CHUNG. Department of Anatomy, Yonsei University College of Medicine, Brain Korea 21 Project for Medical Science Yonsei University, Seoul. [1]Department of Anatomy, Sungkyunkwan University School of Medicine, Samsung Biomedical Research Institute, Suwon, Korea.

23 ¶ Development of an ultrasound protocol to investigate the static and dynamic in vivo musculotendinous architecture of the supraspinatus. IM, Soo Y., Robert R. BLEAKNEY*, Erin L, BOYNTON*, and Anne M. AGUR. Division of Anatomy, Department of Surgery, University of Toronto, Toronto, ON, Canada.

24 T2 and T3 contributions to the brachial plexus. MYERS, Candice*[1], Robert G. LOUIS[1], Christopher WARTMANN[1], R. Shane TUBBS[2], Brian CURRY[1], Robert JORDAN[1], and Marios LOUKAS[1]. [1]Department of Anatomical Sciences, St. George's University, Grenada, West Indies, [2]Department of Pediatric Neurosurgery, University of Alabama at Birmingham, Birmingham, AL.

25 ¶ Physiological cross sectional area of extensor carpi radialis longus and brevis: an in situ computer modeling study. RAVICHANDIRAN, Kajeandra, Karan SINGH*, Nancy MCKEE*, and Anne AGUR. Division of Anatomy, Department of Surgery, and Department of Computer Science, University of Toronto, Toronto, ON, Canada.

26 ¶ Reassessment of the functional significance of the lesser trochanter. SEDLMAYR, Jayc C.* and Jonathan J. WISCO*. David Geffen School of Medicine at UCLA, Department of Pathology and Laboratory Medicine, Division of Integrative Anatomy, Los Angeles, CA (Sponsored by S. Metten).

27 Anatomic relationships between the ulnar nerve and medial intermuscular septum in the arm. WON*, Hyung-Sun, Wonsug JUNG*, Chang-Seok OH[1], and In-Hyuk CHUNG. Department of Anatomy and Brain Korea21 Project for Medical Science, Yonsei University College of

Medicine, Seoul, [1]Department of Anatomy, Sungkyunkwan University School of Medicine, Samsung Biomedical Research Institute Suwon, Korea.

28 ¶ Morphology of the human pectoralis major muscle and tendon: A comparison of historic, photographic and digitized images. OXORN*, Valerie M., Brian WONG, Lillia FUNG*, Amr ELMARAGHY*, and Anne AGUR. Divisions of Anatomy and Orthopaedic Surgery, Department of Surgery, University of Toronto, Toronto, ON, Canada.

Head and Neck

29 § Evidence and proposal for a new cranial nerve definition and classification. BENNINGER, Brion and Jon MCNEIL*. Department of Integrative Biosciences and Department of Surgery, Oregon Health and Science University, Portland, OR.

30 The accessory nerve (CN XI): a historical investigation into the incorrect classification as a cranial nerve. BENNINGER, Brion and Jon MCNEIL*. Department of Integrative Biosciences and Department of Surgery, Oregon Health and Science University, Portland, OR.

31 ¶ A rare case of monocular visual loss caused by an isolated neurosarcoidosis. CAIN*, Kressida, Jessica CROWDER*, and Jeffrey SOSNOWSKI. Departments of Pathology and Radiology, University of South Alabama, Mobile, AL.

32 ¶ Who is this person? a comparison of facial approximation methods. DECKER, Summer J.,[1] Don R. HILBELINK,[1] Eric J. HOEGSTROM,[2]* and Stephanie L. DAVY-JOW.[3]* [1]Department of Pathology and Cell Biology, University of South Florida College of Medicine, [2]Department of Chemical Engineering, University of South Florida College of Engineering, Tampa, FL. [3]Department of Archaeology, University of Sheffield, Sheffield, UK.

33 ¶ Anatomy of a type I split cord malformation. HOLDER*, David M. and Robert M. DEPHILIP. Division of Anatomy, Ohio State University College of Medicine, Columbus, OH.

34 ¶ Periapical granuloma possibilities. HOWE, Robert B.* and David J. ELIOT. Basic Science Department, Touro University-CA, Vallejo, CA.

35 Multiple variations in the relations of the maxillary artery in the infratemporal fossa. JERGENSON, Margaret A., Neil S. NORTON, and Laura C. BARRITT. Department of Oral Biology, School of Dentistry, Creighton University Medical Center, Omaha, NE.

36 ¶ The spinal and cranial roots of the accessory nerve do not join intracranially. MCNEIL, Jon* and Brion BENNINGER. Department of Integrative Biosciences and Department of Surgery, Oregon Health and Science University, Portland, OR.

37 ¶ An assessment of strain distribution during mechanical loading of lateral pterygoid process of the sphenoid bone. NELSON, Peter S.*, Greg C. THOMPSON*, Mohammed P. AKHTER*, Tarnjit S. SAINI*, and Neil S. NORTON. School of Dentistry, Creighton University Medical Center, Omaha, NE.

38 An anomalous origin of the long buccal nerve arising from the lingual nerve. NORTON, Neil S., Margaret A. JERGENSON, and Laura C. BARRITT. Department of Oral Biology, School of Dentistry, Creighton University, Omaha, NE.

39 ¶ Potential sites for extracranial-intracranial bypass using the maxillary artery. RIDDELL, Thomas*, Zachary BAKER*, Quentin A. FOGG. American University of the Caribbean, Sint Maarten, NETHERLANDS ANTILLES.

40 ¶ A rare case of an intracranial ependymoma, possibly bilateral, in a patient with neurofibromatosis. RODRIGUEZ, Jolie R.* and Jeffrey SOSNOWSKI. Department of Pathology, University of South Alabama, Mobile, AL.

41 An Anatomical Study of the Inferior Nasal Meatus Region of the Human Nasolacrimal Duct. SAGA*, Tsuyoshi, Kengoh TANAKA*, Akira YAKEISHI*, Sadaharu KITASHIMA*, Keiichiro NAKAMURA*, and Koh-ichi YAMAKI*. Department of Anatomy, Kurume University School of Medicine, Kurume, Japan. (Sponsored by T. Sato).

42 Microanatomy and classification of incisive canal using three-dimensional reconstruction of microCT images. SONG Wu-Chul*, Sun-Heum KIM*, Sang-Hyun KIM*, and Ki-Seok KOH*. Department of Anatomy, College of Medicine, Konkuk University, Seoul, South Korea.

43 Topographic relationship between the zygomatic arch and coronoid process. SONG Wu-Chul*, Sun-Heum KIM*, Sang-Hyun KIM*, and Ki-Seok KOH*. Department of Anatomy, College of Medicine, Konkuk University, Seoul, South Korea.

44 ¶ Identifying age related cellular changes in brain compared to neoplastic cytological features with cytological smear preparations. TAYLOR, Jessalyn* and Jeffrey SOSNOWSKI, Department of Pathology, University of South Alabama, AL.

45 ¶ 3-Dimensional demonstration of the clinical anatomy of the pterygopalatine fossa using cone beam computed tomography. WASSERBURGER, J. Max, Terry F. LANPHIER*, Tarnjit S. SAINI*, Margaret A. JERGENSON, and Neil S. NORTON. Departments of Oral Biology, Oral & Maxillofacial Surgery, and General Dentistry, School of Dentistry, Creighton University, Omaha, NE.

Poster Session 2 – EDUCATION / WILLED BODIES

Education

46 Effectiveness of online pre-laboratory assignments in the instruction of general histology. BARRITT, L.C., N.S. NORTON, M.A. JERGENSON. Creighton University, Omaha NE.

47 Radiology education in the anatomy lab: Interactive 3D CT images. BARTHOLMAI*, Brian J., Kevin M. WIESMANN*, John M. BARLOW*, Dean R. FISHER, Terry D. REGNIER, Eric WARNKE*, Todd JOHNSON*, Ryan HENNEN*, Wojciech PAWLINA, and Stephen W. CARMICHAEL. Departments of Radiology and Anatomy, Mayo Clinic, Rochester, MN and Vital Images Inc., Minnetonka, MN.

48 Comparing examination and grading to time allocated for undergraduate anatomy while preparing students for a healthcare profession. BENNINGER, Brion. Department of Integrative Biosciences and Department of Surgery, Oregon Health and Science University, Portland, OR.

49 Teaching and evaluating a clinical anatomy course for physician's assistant programs. BENNINGER, Brion. Department of Integrative Biosciences and Department of Surgery, Oregon Health and Science University, Portland, OR.

50 True comprehensive final examinations and negative marking philosophy are positive educational and assessment tools for clinical anatomy courses at professional healthcare institutions. BENNINGER, Brion. Department of Integrative Biosciences and Department of Surgery, Oregon Health and Science University, Portland, OR.

51 Enhancing Undergraduate Anatomy Pedagogy Using a Digital Laboratory Experience. BRUECKNER, Jennifer K., Marie Jose PAGE*, Sandra D. CHALLMAN*, and Brian R. MACPHERSON. University of Kentucky, College of Medicine, Department of Anatomy, Lexington, KY.

52 Attitudes of dental students toward dissection. BURK, Dorothy T. Department of Anatomy, University of the Pacific Arthur A. Dugoni School of Dentistry, San Francisco, CA.

53 An anatomical treasure hunt of the abdomen using sectional images from the Visible Human (VH) Dissector. COOKE, John M. and Anne M. GILROY. Department of Cell Biology, University of Massachusetts Medical School, Amherest, MA.

54 Organization of an undergraduate anatomy course utilizing student dissection of human cadavers. CORK, R. John and Peter D. OLIVER*. Department of Cell Biology & Anatomy, Louisiana State University Health Sciences Center, New Orleans, LA.

55 Presentation of high-magnification section images taken from late-stage human embryos in the Carnegie collection. CORK, R. John and Raymond F. GASSER. Department of Cell Biology & Anatomy, Louisiana State University Health Sciences Center, New Orleans, LA.

56 Design of a head and neck anatomy course in a unique modular dental school curriculum. COTTAM, Wayne W. Arizona School of Dentistry & Oral Health, Mesa, AZ.

57 ¶ Found: More Anatomy Instructors. CUNNINGHAM, Anna C.[1], Gregg C. ALLEN[2]*, Brent J. THOMPSON[3]*, Arthur F. DALLEY[1], Susan R. WENTE[1]*, Jeanette J. NORDEN[1]*, and Roger CHALKLEY[4]*. [1]Department of Cell and Developmental Biology, [2]Department of Biological Sciences, [3]Department of Pharmacology, [4]Vanderbilt University, Nashville, TN.

58 An Anatomy course that achieves modern goals in a traditional setting. FOGG, Quentin A. and Lance G. NASH. American University of the Caribbean, Sint Maarten, NETHERLANDS ANTILLES.

59 The results of a usability study conducted on a new neuroanatomy multimedia learning tool. GOULD, Douglas J. and Jo FLEMING*. Division of Anatomy, Ohio State University, Columbus, OH and ORCCA Technology, Lexington, KY.

60 Clinical Anatomy of the sensory portion of the autonomic nervous system. LOUIS, Thomas M. and Ronald W. DUDEK. The Brody School of Medicine, East Carolina University, Greenville, NC.

61 Implementation of interactive seminars in medical school Neuroanatomy. MCBRIDE, Jennifer M. Cleveland Clinic Lerner College of Medicine, Cleveland, OH.

62 Retention of anatomical knowledge by senior medical students. MILLER, Brian T., Thomas J. COLLINS, and Diane E. CHICO. Division of Anatomy, Department of Neuroscience and Cell Biology, University of Texas Medical Branch, Galveston, TX.

63 Applications and Technical Challenges of Radiology-Based Visualization Programs for Three-dimensional Modeling of the Neck. NGUYEN, Duc H.* and Kenneth C. HISLEY. Department of Art As Applied to Medicine, Johns Hopkins School of Medicine, Baltimore, MD; Department of Diagnostic Radiology, University of Maryland School of Medicine, Baltimore, MD.

64 Surface reconstruction of stacked contours by using the commercial software. PARK, Hyo Seok*[a], Min Suk Chung*[a], and Jin Seo Park*[b]. [a]Department of Anatomy, Ajou University School of Medicine, 5 South Korea, [b]Department of Anatomy, College of Medicine, Dongguk University, Korea.

65 Level of comfort in first year medical students when disclosing difficulties, and reasons for non-disclosure. PARNANDI, Vandana*, Monica BRANIGAN*, and Anne AGUR. Departments of Surgery and Family and Community Medicine, Faculty of Medicine, University of Toronto, Toronto, ON, Canada.

66 Using the Audience Response System (ARS) as a Means for Enhancing Anatomy Teaching in a Large Class. RAOOF, Ameed, Sabine HILDEBRANDT*, John STRIBLEY, Jose DAVILA*, and Alissa PULLOS*. Division of Anatomical Sciences, Office of Medical Education, The University of Michigan Medical School, Ann Arbor, Michigan.

67 ¶ Evaluation of podcasting as a learning tool for independent study of cross-sectional anatomy. RICHARDSON*, April D., Nathan F. JOHNSON*, and Jennifer K. BRUECKNER. Department of Anatomy and Neurobiology, University of Kentucky, Lexington, KY.

68 Countering the Future Shortage of Qualified Gross Anatomists: A Proposed Education Track Ph.D. In Anatomy. SEIFERT[1], Mark F., Ronald L. SHEW[1], Valerie D. O'LOUGHLIN[1], James J. BROKAW[1], Laura TORBECK[2]*, Robert L. OSGOOD[3]*, Dale W. SAXON[1], and James J. WALKER[1]. [1]Department of Anatomy and Cell Biology, [2]Department of Surgery, Indiana University School of Medicine, [3]IUPUI School of Education, Indianapolis, IN.

69 Introducing a Reflective Writing Exercise into the Gross Anatomy Curriculum. SEIFERT, Mark F. and Ron L. SHEW. Department of Anatomy and Cell Biology, Indiana University School of Medicine, Indianapolis, IN.

70 Using team based learning (TBL) as an instructional strategy for learning normal and abnormal reproductive system development. SEVERSON, Arlen R. Department of Anatomy, Microbiology and Pathology, Division of Anatomy and Cell Biology, University of Minnesota Medical School Duluth, Duluth, MN.

71 Summer Workshops in the Anatomical Sciences for Middle and High School Students. SHEEDLO, Harold J., Armando A. ROSALES, Robert ROUTH*, and Rustin E. REEVES. Department of Cell Biology and Genetics, University of North Texas Health Science Center, Fort Worth, TX.

72 Developing observational skills at the Worcester Art Museum for a greater appreciation of art and anatomy. STEFAN, Cristian[1] and James A. WELU*[2]. [1]Departments of Cell Biology and Radiation Oncology, University of Massachusetts Medical School and [2]Worcester Art Museum, Worcester, MA.

73 The multicultural classroom and teaching strategies that facilitate collaborative learning and the understanding of the tree-dimensional organization of the nervous system. STEFAN, Cristian[1] and Nirusha LACHMAN[2]. [1]Departments of Cell Biology and Radiation Oncology, University of Massachusetts Medical School, Worcester, MA, and [2]Department of Basic Medical Sciences, Durban University of Technology, Durban, South Africa.

74 Contemporary issues in the changing neuroanatomy curriculum: A cause for concern? SUBRAMANIAM, Krishnan. Department of Anatomy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia.

Willed Bodies

75 Using alkaline hydrolysis as a form of final disposition in anatomical bequest programs. FISHER, Dean R. and Terry D. REGNIER*. Department of Anatomy, Mayo Clinic, Rochester, MN.

76 Standards and Guidelines for Willed Body Donations at the John A. Burns School of Medicine, 2007. LABRASH, Steven and Scott LOZANOFF. Department of Anatomy, Biochemistry and Physiology, University of Hawaii School of Medicine, Honolulu, HI.

77 The University of Nebraska Medical Center's Appropriate Use of Human Anatomical Material Policy. LOMNETH[1], Carol S., Shelia A.WROBEL[2]*, Janet M. KEUCHEL[3]*, and Paul R. BECKER[4]. [1]Department of Genetics, Cell Biology and Anatomy , [2]Academic Affairs, [3]The University of Nebraska Medical Center, and [4]Anatomical Board of the State of Nebraska, University of Nebraska Medical Center, Omaha, NE.

78 Utilization of a Materials and Usage Policy for the internal acquisition and use of cadaveric materials. MARTINO, Leon J. and Julie A CHANG*. Anatomical Gift Program, Albany Medical College, Albany, NY.

79 A state-wide network: increasing awareness, advancing education and addressing proper procurement and use standards for non-transplantable anatomical donations. MCARTHUR, Angela M. and David A. LEE, Anatomy Bequest Program, University of Minnesota Medical School, Minneapolis, MN, Dean R. FISHER, and Terry D. REGNIER, Anatomy Bequest Program, Mayo Medical School, Rochester, MN, Ryan M. GRAVER*, TRIA Orthopaedic Center, Bloomington, MN.

80 SpecimenTrak: an RFID system for tagging and tracking anatomical specimens. PRABHU*[1], Shiv, Xiaoyong SU*[1], Charlie QIU*[1], Chi-Cheng CHU*[1], SCHMITT, Brandi[2], and Rajit GADH*[1]. [1] Wireless Internet for the Mobile Enterprise Consortium (WINMEC), UCLA, Los Angeles, CA. [2] University of California, Office of the President, Oakland, CA.

Abstracts

ACLAND, Robert D., and John S. STAUBLE, JR. Department of Surgery, Department of Anatomical Sciences and Neurobiology, University of Louisville, Louisville, KY. Showing the inguinal region from behind.

The pre-peritoneal laparoscopic approach is coming into increasing use for inguinal hernia repair. A surgeon learning this approach must first learn to interpret inguinal anatomy as seen from above and behind. This presentation describes the pre-peritoneal approach, and shows details of work in progress on a video to show the inguinal region from in front, from behind, and from above in fresh cadaver dissections.

APAYDIN, Nihal*[1], Candice MYERS[2], Marios LOUKAS[2], R. Shane TUBBS[3], Huseng VEFALI[1], Simel KENDIR[1], and Ibrahim TEKDEMIR[1]. [1]Department of Anatomy, Ankara University, Ankara, Turkey, [2]Department of Anatomical Sciences St. George's University, Grenada West Indies, [3]Section of Pediatric Neurosurgery, University of Alabama at Birmingham, Birmingham, AL. The precise localization of motor branches of the tibial nerve in the deep posterior compartment of the leg: danger areas during invasive procedures.

The fibula is often used for bone grafts and together with the flexor hallucis longus muscle, serves as a desirable osteomuscular graft. However, such surgical procedures utilizing the upper one third of the fibula may result in weakness of the muscles located in the deep posterior compartment of the leg. The aim of the present study was to quantitative and localize the motor nerve points for the flexor hallucis longus (FHL), tibialis posterior (TP) and flexor digitorum longus muscles (FDL) in relation to a regional bony landmark. 36 limbs of 18 cadavers were dissected. The range for the number of branches of the tibial nerve and the terminal motor points of each muscle were identified and measurements were made with a digital caliper from these points to the apex of the head of fibula. The motor points of the FHL muscles were categorized into two types. In type 1 (61%), the muscle was innervated by 2-3 distal branches. The average distance between the closest branch and the head of the fibula was 12.4 cm. In type 2 (39%), the muscle was innervated by 4-5 branches which were diffusely distributed. In both types, the nerve branches innervated the muscle near the fibula. The TP was innervated by 3-4 nerve branches with both proximal and distal branches. The FDL muscle was innervated

distally with 2-3 branches with an average distance of 17.6 cm from the fibular head. In conclusion, type 2 innervation of the FHL would increase the risk of nerve injury and subsequent dennervation of the FHL following graft operations. The proximal part of the TP was also found to be at an increased risk with such procedures. The FDL was found to be at minimal risk regarding its innervation and the proximal fibula. We believe that the findings of the present study may be useful to surgeons and clinicians by providing precise localization of the motor nerves to the deep posterior compartment of the leg.

BAE, Sam S., Michael D. CUSIMANO, and Anne M. AGUR. Division of Anatomy, Department of Surgery, University of Toronto, Toronto, Canada. Evaluation of the video, "The Obitozygomatic Approach" as a teaching tool for neurosurgical residents.
Background: Kneebone (1999) found that simultaneous use of multimedia and other physical models led to "widespread improvements in basic surgical skills". A video of the orbitozygomatic (OZ) approach, including surgical footage, cadaveric dissections, anatomical drawings, and 3D animations was created in our laboratory as a teaching tool (van Furth et al., 2006). Objective: To evaluate the effectiveness of "The Orbitozygomatic Approach" video in the training of neurosurgical residents. Methods: Without any prior teaching, residents (n=38) were asked to draw the six cuts of the OZ approach on pictures of the skull and then perform the procedure on Sawbones™. Next, the video was shown and the same protocol was repeated. No feedback was given to the students until completion of the pre- and post-video tasks. The overall outcome and each of the six cuts were graded blindly by a neurosurgeon. Data was analyzed using descriptive statistics and paired t-tests ($P<0.05$). Results: The post-video scores ($87 \pm 14.43\%$) were found to be significantly higher ($P<0.05$) than the pre-video scores ($48 \pm 33.28\%$). Scores of all six cuts increased post-video. Overall outcome showed improvement: unacceptable (Pre 48%|Post 52%) and acceptable (11%|89%). Conclusion: "The Orbitozygomatic Approach" video is an effective teaching tool for neurosurgical residents to learn this surgical procedure.

BAKER, Zachary*, Thomas RIDDELL*, and Quentin A. FOGG. American University of the Caribbean, Sint Maarten, NETHERLANDS ANTILLES. Variation in maxillary artery

branching points in relation to feasibility of extracranial-intracranial bypasses.
Gold standard extra-intracranial bypass procedures are mostly successful with “low flow” solutions from superficial vessels. “High-flow” solutions include venous bypasses with typical low patency, and arterial solutions, such as using the maxillary artery. This study attempts to clarify the morphological characteristics of the maxillary artery in relation to its suitability for a bypass. To do this, cadaveric heads (n = 18) were dissected after the maxillary artery had been injected with coloured latex. Measurements were made along the length of the artery, including total length, and length to each branching point. Total length of the maxillary artery was not significantly different when the artery coursed superficial to the lateral pterygoid muscle (n=13; 50.8$\pm$6.4mm) compared with when the artery went deep to the muscle (n= 5; 47.4$\pm$3.7mm, $p>0.05$). Measurements to individual branching points were also lacking significant differences ($p>0.05$). These data suggest that irrespective of course or branching pattern, estimates of maxillary artery length can be considered suitably accurate. However, other studies suggest that a surgically mobilized maxillary artery needs to be greater than 50mm in length. This was a rarity in the sample population, suggesting that other approaches for high flow bypasses may be required. This may be achieved via alternate routes through the skull, or the use of other arteries.

BARRITT, L.C., N.S. NORTON, and M.A. JERGENSON. Creighton University, Omaha NE. Effectiveness of online pre-laboratory assignments in the instruction of general histology.
Web-based technology has many attributes and is considered a useful tool for teaching outside the classroom due to its networking capability and broad accessibility. For many instructors web-based technology serves as the mechanism for course delivery, while in other instances online activities may simply enhance traditional classroom instruction. Presently we utilize Blackboard, an integrated web-based support system that enables students to access grades and course material online. Over the last two years we have increased the amount of online material in our General Histology course. While the course still utilizes light microscopy as the primary method of laboratory instruction we now have supplemented these teaching methods with online digital pre-laboratory assignments and quizzes. The implementation of online material was designed to promote self-

directed learning and facilitate structure identification during lab. Due to the format change we sought to evaluate the effectiveness of online lab material as a supplement to traditional teaching, and assess the outcome of administering pre-laboratory quizzes on student performance. In the present study student performance was assessed over a two year period. In the first year, the course was taught to 67 dental students using traditional methods of laboratory instruction. In the second year, students with equivalent GPA and DAT scores were instructed using web-based materials as a supplement to traditional methods and took a pre-lab quiz. Both groups of students were evaluated using light-microscopy based lab exams. There was no difference on student performance between students using traditional methods and students using web-based materials.

BARTHOLMAI*, Brian J., Kevin M. WIESMANN*, John M. BARLOW*, Dean R. FISHER, Terry D. REGNIER, Eric WARNKE*, Todd JOHNSON*, Ryan HENNEN*, Wojciech PAWLINA, and Stephen W. CARMICHAEL. Departments of Radiology and Anatomy, Mayo Clinic, Rochester, MN and Vital Images Inc., Minnetonka, MN. Radiology education in the anatomy lab: Interactive 3D CT images.

Although dissection of the human body is still considered essential for first-year medical students to learn anatomy, practicing physicians also utilize radiologic images of the human body during their careers. To introduce our first-year medical students to radiologic anatomy that would correlate to their dissection experience, we obtained volumetric, high-resolution computed tomographic (CT) scans of each cadaver dissected. A computer at each dissection table provided access to a sophisticated, web-based visualization tool (ViTALConnect®, Vital Images Inc, Minnetonka, Minnesota, www.vitalimages.com) that allowed students to create multiplanar reformations and three-dimensional (3D) volumetric color renderings of the cadaveric CT data. Students could also access images of normal human anatomy obtained during clinical CT scans. During the course, students completed exercises requiring them to correlate radiologic and cadaveric appearances of anatomic structures, such as rendering a 3D reconstruction of the vertebral column during dissection of the back. This correlation of radiology and gross anatomy added both relevance and excitement to our course. It also gave our students an early experience with radiologic images that will teach them anatomy throughout their careers.

BENNINGER, Brion. Department of Integrative Biosciences, Department of Surgery, Oregon Health and Science University, Portland, OR. Comparing examination and grading to time allocated for undergraduate anatomy while preparing students for a healthcare profession.

Several undergraduate institutions have a disparity regarding examination, grading and allocation of lecture versus lab time with both their lower and upper division anatomy courses. Many institutions allocate more time to lab than lecture while some give equal time to both. Regardless, most emphasize a greater percentage of their examination and grade to the lecture material. Not a single institution surveyed put more emphasis on the lab despite allocating more teaching hours to the lab. New students at our professional institution reported having to memorize lists of osteology and muscle attachments during their undergraduate courses. They reported to be inadequately prepared regarding general concepts such as a major nerve that innervates a compartment. We have had to teach basic concepts in order to extend further anatomical knowledge and teach common anomalies in clinical anatomy. Surveying four years of clinical postgraduate anatomy students revealed that they learned more and felt their recall was better from comprehensive lab instruction using cadavers as compared to the classical lecture format. Our data suggest that undergraduate institutions should emphasize general concepts rather than rote memorization and focus on comprehensive teaching techniques in labs while adjusting their exams and grading to fit the hours allocated to lecture and lab accordingly.

BENNINGER, Brion. Department of Integrative Biosciences, Department of Surgery, Oregon Health and Science University, Portland, OR. Teaching and evaluating a clinical anatomy course for physician's assistant programs.

Physician Assistant programs are unique because they must integrate basic sciences, didactic clinical material and patient contact training to produce a safe practicing healthcare professional within two years. When setting up a clinical anatomy course, we chose to emphasize the lab and weight lecture 45% and lab 55%. The lecture portion consisted of formal lectures with multiple-choice exams. The lab had three components: 1.cadaver dissection, 2.radiological imaging (radiographs, CT, MRI, USS) and 3.clinical anatomy tutorials. Lab exams consist of structure identification from cadavers, surface and radiological anatomy. The philosophy of each lab session was for students to

initially appreciate the anatomy of the cadaver region under study. Then, at the tableside, compare and contrast its architecture with radiological imaging(CT, MRI and USS). Applying the cognitive load theory, surface and clinical anatomy tutorials were conducted each lab session. Students evaluated the course immediately upon its completion and were surveyed at the end of their first year. Interestingly, higher scores were received at the end of the first year at the second survey. Results suggested retention or better recall of important clinical anatomy and its ease of transfer to their subsequent training. We feel our method best optimizes learning and retention of important clinical anatomy in a fast-paced, compressed curriculum.

BENNINGER, Brion. Department of Integrative Biosciences, Department of Surgery, Oregon Health and Science University, Portland, OR. True comprehensive final examinations and negative marking philosophy are positive educational and assessment tools for clinical anatomy courses at professional healthcare institutions.

Final comprehensive course examinations are virtually nonexistent and negative marking schemes are misused. At postgraduate institutions teaching the basic sciences for practicing healthcare, course material is overwhelmingly examined with ‘midterms’ or sectional examinations. Very few courses offer a true comprehensive final examination representing concepts and objectives of the course being taught. Nevertheless, the board examinations for training health care professionals reflect the ability to demonstrate and integrate comprehensive knowledge. McLachlan and Whiten reported that negative marking of multiple choice questions should be discouraged because it discriminates between students on the basis of their risk taking behavior rather than knowledge. In our clinical anatomy course, we have given a final comprehensive exam the past 4 years and used negative marking with clinically orientated true/false questions. We also use written essay questions as part of our overall assessment for each exam. Surveys from our students during the past 4 years have revealed a strong acceptance for a final comprehensive exam and an understanding of the benefits of negative marking. The final exam allows students an opportunity to demonstrate that they have learned the material from a previous midterm exam, on which they may have under performed. Our surveys reveal students guess more on traditional MCQ’s than on our T/F negative marked questions. Our course and surveys over the

past 4 years suggest that final comprehensive exams are well received and negative marking can be implemented to benefit training healthcare professionals.

BENNINGER, Brion, and Phillip Kupfer*. Department of Integrative Biosciences, Department of Surgery, Oregon Health and Science University, Portland, OR. Surface anatomy versus upper brachial trunk morphology to identify a consistent single injection site for combined high interscalene and suprascapular nerve block

Upper limb regional analgesia has gained popularity following AP Winnie's description of his relatively safe interscalene block technique. Upper limb regional analgesia has evolved with shoulder surgery technology, albeit delayed. Several upper limb nerve blocks are described in the literature but each have their analgesic limitations and associated complications. Clinically, upper limb nerve blockade has decreased postoperative opiate use, hospitalization time, and improved early rehabilitation for both arthroscopic and open shoulder procedures. Traditional interscalene block generally bypasses the suprascapular nerve which has been reported to provide sensation to ~70% of the shoulder joint. A fascial sleeve envelops the brachial plexus trunks which allows anesthetic to diffuse within the sheath to generally anesthetize beyond the original site. Typical interscalene block anesthetizes part of the upper, entire middle, and part of the lower trunk. In 15 healthy volunteers we measured both sides from the midline of the upper border of the cricothyroid membrane to the posterior border of the sternocleidomastoid muscle, remaining parallel to the clavicle. We dissected 26 cadaver sides and applied the same measurements as above and found the upper trunk consistently present at this site. This suggests that a bolus of anesthetic can be placed at this site to achieve suprascapular and an interscalene block with a single injection site.

BENNINGER, Brion, and Jon MCNEIL*. Department of Integrative Biosciences, Department of Surgery, Oregon Health and Science University, Portland, OR. The accessory nerve (CN XI): a historical investigation into the incorrect classification as a cranial nerve.

Several attempts to classify the cranial nerves have been documented. Contemporary texts have universally adopted the 12-nerve classification popularized by Soemmering. Soemmering includes the accessory nerve as the eleventh

cranial nerve, which differs from the earlier 10-nerve classification of Thomas Willis. We investigated the original historical writings and translations of Galen, Vesalius, Falopius, Willis, Soemmering, Arnold, and Gray to determine when and why the accessory nerve became incorporated as a cranial nerve. Our findings support Galen's role in originally describing the cranial nerves, but we question the current usage of 'cranial', which is not consistent with original Greek terminology. The first effort to functionally describe the accessory nerve occurs in Thomas Willis' *Cerebri Anatome*. Willis describes only the spinal root of the accessory nerve and does not group it among the other cranial nerves on the basis of its nuclear location. Soemmering's drawings do not explicitly mention the cranial root of the accessory nerve. The formal reporting of a cranial root of the accessory nerve is linked to the work of Arnold and later Henry Gray's acceptance of Arnold's work. We conclude that the contemporary 12-nerve classification is based on empirical observations, which are not entirely accurate.

BENNINGER, Brion, and Jon MCNEIL*. Department of Integrative Biosciences, Department of Surgery, Oregon Health and Science University, Portland, OR. Evidence and proposal for a new cranial nerve definition and classification.

The current definition of a cranial nerve is not universally consistent, which has resulted in inaccurate naming and classifications. Some definitions describe the 12 pairs of nerves emerging directly from the brainstem and reaching the periphery through a foramen in the skull. Others describe the nerves emerging from the brain prior to exiting a foramen. We suggest new criteria that must be completely satisfied to classify a cranial nerve. A cranial nerve must have its nucleus within the brainstem, be composed of primary sensory neurons and communicate through a foramen in the skull. Our new classification,12 paired cranial nerves replace the current 12 nerves. We eliminated 3 current cranial nerves and replaced them with 3 others. Cranial nerve 1 olfactory, and cranial nerve 2 optic do not have their original nucleus within the brainstem, are composed of secondary sensory neurons, and are outgrowths of the frontal brain. These findings eliminate them from our cranial nerve definition. The accessory nerve originates from the spinal cord and therefore does not satisfy the cranial nerve definition. We added the nervus intermedius and split the trigeminal and vestibulocochlear nerves. Our suggested classification is 1.Oculomotor, .Trochlear, 3.Trigeminal, 4.Masticatory (trigeminal

motor), 5.Abducens, 6.Facial, 7.Nervus Intermedius, 8.Vestibular, 9.Cochlear, 10.Glossopharyngeal, 11.Vagus, and 12.Hypoglosssal.

BENNINGER, Brion and Jon MCNEIL*. Department of Integrative Biosciences, Department of Surgery, Oregon Health and Science University, Portland, OR. Femoral nerve morphology at the traditional single injection sites within the femoral triangle for analgesia of lower limb procedures.
Clinically, the femoral nerve has become important for regional anesthesia within the femoral triangle to provide intra and postoperative analgesia involving lower limb procedures. Increasing demand for improved post-operative pain control has brought the femoral nerve block to clinical importance for lower limb procedures. There is no universally accepted preferred site for a single-injection, femoral nerve block within the femoral triangle. Common injection sites are 1)2.5cm distal to the inguinal ligament and immediately lateral to the femoral artery, 2)just distal to the inguinal ligament and lateral to the femoral artery, and 3)at the inguinal crease and immediately lateral to the femoral artery. Unfortunately, these sites do not consistently provide desired analgesia. Understanding of the morphology of the femoral nerve may increase the success rate of the single-injection femoral block. We dissected 30 embalmed cadaver sides (20M/10F) and found the femoral nerve to vary according to gender. In females, it was consistently arborized beneath the inguinal ligament. In males, arborization occurred 1.5-1.75cm distal to the inguinal ligament. In females, we found the medial aspect to be 0.2cm under cover of the femoral artery. In males it was immediately adjacent to the artery. This study suggests that gender influences needle site selection for single-injection femoral nerve blocks.

BREWER, Patricia A., David F. BAKER*, Vicki L. BYERS*, Nancy J. GIRARD*, Linda Y. JOHNSON, John H. LITTLEFIELD*, Ron PHILO, Omid B. RAHIMI*, Janis N. RICE*, Debra L. STARK*, Frank J. WEAKER, and Vick WILLIAMS. Departments of Cellular and Structural Biology, Physical Therapy and Acute Nursing Care, University of Texas Health Science Center at San Antonio, San Antonio, TX. GATEways: The role of technology in the enhancement of interdisciplinary gross anatomy education.
GATEways (Gross Anatomy Teaching Enhancement) is an interdisciplinary instructional project that is developing three

initiatives: 1) digital videos of human cadaver dissections, 2) three-dimensional cranial nerve animations, and 3) an illustrated digital anatomy test bank. To evaluate potential impact of these initiatives, five groups of students from programs in occupational therapy, physical therapy, physician assistant studies, medicine and dentistry participated in focus groups. Each student was in the second year of the program and had completed gross anatomy using traditional teaching methods without the benefit of these technological innovations. Students affirmed that GATEways innovations would enhance learning anatomy but adamantly rejected technological replacement of dissection. This feedback also substantiated the need for instructional programs to respect the dissimilar ways in which different health professions students learn anatomy, while sharing limited resources of time, money, space, and faculty. Future evaluations of GATEways innovations will assess: 1) quality and efficiency of dissections, 2) ease of accessing anatomy instruction and 3) test-based measures of learning outcomes. The overall goals are to give students the opportunity to maximize anatomy knowledge using high quality technological study aids, and to contribute to the professional discourse concerning technology and dissection as learning methods in anatomy. (Sponsored by ATT/SBC Foundation and the University of Texas Health Science Center at San Antonio).

BRUECKNER, Jennifer K., Marie Jose PAGE*, Sandra D. CHALLMAN*, and Brian R. MACPHERSON. University of Kentucky, College of Medicine, Department of Anatomy, Lexington, KY. Enhancing Undergraduate Anatomy Pedagogy Using a Digital Laboratory Experience.

While many small colleges offer undergraduate anatomy laboratories, larger institutions are unable to do so due to the financial and staffing constraints of large class enrollment. Commercial digital laboratories are available, but are not customized for the topic sequence or instructional level. To enhance a pre-professional anatomy course (ANA 209), we are developing an online laboratory for both the classroom-based and online course sections. Authored in Dreamweaver™, the online laboratory presents students with well-defined, structured lab sessions in which they apply didactic information to images and videos of the relevant human anatomy. Twenty lab modules will include the following systems: 1) axial and appendicular musculoskeletal, 2) nervous, 3) cardiopulmonary, 4) gastrointestinal, 5) urogenital and 6) endocrine. This study will

present the Upper Limb as a prototype for online laboratory. Each Lab Session has four components: 1) Introduction and Objectives, 2) Labeled images from Thieme's Atlas of Anatomy Image Collection, 3) Images from correlative cadaver dissections with videoclips and 4) Self-assessment. In sum, this project provides a structured digital lab experience to an undergraduate anatomy curriculum, with incorporation of the relevant histology and radiology to reinforce the clinical relevance of anatomy for students' future in a health professions career.

BURK, Dorothy T. Department of Anatomy, University of the Pacific Arthur A. Dugoni School of Dentistry, San Francisco, CA.
Attitudes of dental students toward dissection.
A number of studies have looked at the reaction of medical students to the dissection lab, but a literature review revealed only one describing the attitudes and emotions of dental students. In this study, factors that influenced dental students' ratings of the value of dissection were investigated. Seven classes of dental students were surveyed on the last day of a gross anatomy course (n = 905, 92% return rate). Consistent with other studies, results revealed a decrease in the mean amount of emotional discomfort experienced by students between the start of the course and the end and a decrease in the number reporting extreme discomfort (8.1% to 2.1%). About half of the students rated personal dissection as valuable or very valuable and 55.8% felt that they would not have learned gross anatomy as well if they had not had the opportunity to dissect. Multiple regression analysis was used to identify factors that predicted the students' ratings of the value of personal dissection. The strongest predictors were: time spent dissecting, emotional discomfort at the end of the course, expected grade, rating of lab instructor, and dissecting table dynamics. Results will be compared with those of other studies

CAIN*, Kressida, Jessica CROWDER*, and Jeffrey SOSNOWSKI. Departments of Pathology and Radiology, University of South Alabama, Mobile, AL. A rare case of monocular visual loss caused by an isolated neurosarcoidosis.
We report a case of a 25-year-old male who presented with a four month history of progressive vision loss in the left eye and an initial clinical diagnosis of optic neuritis followed by an optic nerve glioma based on radiographic findings. A differential diagnosis of monocular visual loss included glaucoma, elevated intracranial pressure, optic neuritis, trauma, meningioma, and

optic nerve glioma. Lesions that create a monocular visual field loss in the primary visual pathway produce ipsilateral visual loss due to damaged axons from the temporal and nasal visual fields before crossing at the optic chiasm. Histological and immunohistochemical analysis of the optic nerve demonstrated CD68 immunopositive macrophages and CD45 immunopositive lymphocytes which formed non-caseating graulomas with giant cells consistent with sarcoidosis. Isolated neurosarcoidosis affecting the optic nerve is extremely rare and very difficult to diagnose without a previous history of systemic sarcoidosis. Sarcoidosis is a systemic chronic inflammatory granulomatous disease of unknown etiology, primarily affecting the lungs. Involvement of the central nervous system occurs in approximately 5-10% of patients with sarcoidosis. This is a case in which isolated optic nerve sarcoidosis was the initial presentation of sarcoidosis and clinically, as well as radiographically mimicked an optic nerve glioma.

CASEY, Gregory P. Department of Cell Biology and Anatomy, Louisiana State University Health Sciences Center (LSUHSC) New Orleans, LA. Learning Under Fire: Transition from Student to Teacher.

Young anatomists are needed to fill the void left by retiring gross anatomy faculty. LSUHSC is trying to fill this void by re-instituting a traditional type of graduate anatomy program to train graduate students as clinical anatomists. The transition from graduate student to teacher is an experience that most faculty have forgotten. The graduate student differs little from the medical student when taking gross anatomy during his first year. They share similar fears and anxieties as they struggle to master the material. However, once a graduate student becomes a teaching assistant (TA), he faces a double challenge: 1) interaction with students and 2) interaction with faculty. Similarities in age and life experiences make young TAs more approachable and comforting in the eyes of professional students in the health sciences. As a result, TAs in the laboratory may encounter questions more frequently than their faculty counterparts. Being under fire in this manner necessitates a strong anatomical foundation and ability to communicate effectively. The TA is also expected to assist the faculty in teaching concepts of professionalism and in monitoring student progress, interaction, and gross anatomy lab dynamics. Thus, the journey from student to teacher is a demanding one with different responsibilities. (Sponsored by William J. Swartz).

COLLINS, James D., Ernestina H. SAXTON*, Samuel S. AHN*, Hugh GELABERT*, David AGNEW*, and Alfred CARNES*. Departments of Radiological Sciences, Neurology and Vascular Surgery, UCLA, Los Angeles, CA. Batson's plexus obstruction causes spinal and radicular pain in patients with thoracic outlet syndrome (TOS) and migraine: MRI/MRA/MRV.
Batson's venous plexus, an extensive paravertebral system of valve-less venous channels within and alongside the spinal canal, provides direct venous communication from the peritoneum and lower body to the cranial cavity and spinal canal. Obstructed venous return increases intracranial, intrathoracic and intraabdominal pressure. In migraine and TOS patients bicuspid valve compression (costoclavicular) within the veins of the neck and supraclavicular fossae, and neurovascular bundles causes collateral venous return, expands fascial planes and triggers complaints of upper extremity numbness and tingling; pain; temperature and color changes; visual blurring and "floaters", and headache. Obstruction to venous return causes dilatation of Batson's plexus. Lesser recognized symptoms of TOS venous obstruction are neck pain; pain in the hip, groin and low back, with radicular pain in the leg and feet, reflecting the proximity of the dilated plexus to the disks and spinal nerve roots. Abduction external rotation enhances TOS symptoms and migraine. In this presentation bilateral multiplanar MRI, angiography (MRA) and venography (MRV) conducted on the 1.5 Tesla (GE Signa LX) with abduction external rotation, 4.0mm thickness and 512 x 256 matrix size, display vascular compression (JNMA. 2003; 95:298-306) and dilatation of Batson's plexus in Scheuermann's disease, silicone implant, goiter and subclavian artery graft.

COOKE, John M. and Anne M. GILROY. Department of Cell Biology, University of Massachusetts Medical School, MA. An anatomical treasure hunt of the abdomen using sectional images from the Visible Human (VH) Dissector.
To build students competence in sectional anatomy, we designed an Anatomical Treasure Hunt using images from VH Dissector Pro (TolTech). Design objectives included ease-of-use as a self-study tool, adaptability to WebCT, and the inclusion of game features that made it fun to use. An image library was constructed by selecting 20 VH sections at regular intervals of approximately 2 cm in the axial plane. Criteria for image selection included the presence of a key surface or skeletal landmark, e.g., the iliac crest, or the presence of multiple

anatomical treasures in a single section, e.g., the transpyloric plane (VH#1559). The image library was exported to a PowerPoint format where numbered labels were applied to 20 structures, surface landmarks, or spaces. In pursuing the treasure hunt, students are either directed to go to specific sections, e.g., VH#1559, or given anatomical clues to help them locate key structures in the abdomen or pelvis. Directions to each numbered treasure were written in such a way as to promote increased understanding of 3-D anatomy. Use of the Treasure Hunt and its application in conjunction with other learning tools, e.g. VH Dissector lessons or sectional images in clinical medicine will be discussed. (Acknowledgement: MKWolf's, Neuroanatomical TreasureHunt).

CORK, R. John and Raymond F. GASSER. Department of Cell Biology & Anatomy, Louisiana State University Health Sciences Center, New Orleans, LA. Presentation of high-magnification section images taken from late-stage human embryos in the Carnegie collection.

We have completed DREM (Digitally Reproduced Embryonic Morphology) databases for Carnegie embryos from stage 1 to stage 15. These databases, which are available on DVDs and the web (http://virtualhumanembryo.lsuhsc.edu), include images of the serial sections viewable at several sizes. In most databases the highest magnification available is of images captured with a 20x objective (200x total magnification). We are currently working on databases for the older embryos between stages 16 and 23. The larger size of these embryos dictates changing the format of the DREM databases. The highest magnification at which complete sections can be viewed on the disks is 20x (2x objective). In order to provide histological detail of organs and tissues we are including high magnification images of selected regions of the sections. For the stage 23 DREM database we have included approximately 100 areas that can be viewed at 40x and another 100 that are viewed at 200x (20x objective). The availability of these high-magnification views is indicated on the sections as the user browses through the labeled sections and users can then open the images in a separate viewer. Alternatively, users can browse through and select the tissue sections from a list. (Supported by Grant No. HD37811 from NICHHD) .

CORK, R. John and Peter D. OLIVER*. Department of Cell Biology & Anatomy, Louisiana State University Health Sciences Center, New Orleans, LA. Organization of an undergraduate anatomy course utilizing student dissection of human cadavers.
For many years the anatomy course taken by nursing students at LSU Health Sciences Center has had the advantage of access to human cadaveric material. Upon taking over the course directorship in 2004 we reorganized the course putting greater emphasis on the laboratory portion. The students are divided into two groups with each group dissecting for 3 hours/week. We dissect the whole body although we do not have enough time to be very detailed. Dissection starts with the back and proceeds through shoulder, upper limb, thorax, abdomen, pelvis, lower limb and finishes with the spinal cord, head and neck. The goal of the laboratory course is to give nursing students a foundation for their careers and a visual and tactile framework on which to hang their anatomical knowledge. Students have always been enthusiastic about the experience of studying cadavers but we have not previously had any data to back up their comments. Hurricane Katrina gave us the opportunity to compare the students' performance with and without the laboratory component of the course. An increase in the average grade for the course in Fall '06 compared to Fall '05 supports their claims that dissection gives them a better feeling for the anatomy.

COTTAM, Wayne W. Arizona School of Dentistry & Oral Health, Mesa, AZ. Design of a head and neck anatomy course in a unique modular dental school curriculum.
The Arizona School of Dentistry & Oral Health, the newest dental school in the United States, employs a unique modular design in the basic science and pre-clinical curriculum. Basic sciences are presented in short, one – two week modules emphasizing a systems, rather than a discipline, approach with visiting lecturers presenting content, then returning to their home institutions. The head and neck anatomy module is presented in the second semester of the first year and spans three weeks, the time devoted entirely to head and neck anatomy material. This presentation discusses the unique curricular and educational challenges presented by this educational model such as time management, integration with previous modules and sequencing, and the resulting design of the module which includes a de-emphasis on lecture hours, careful self-study time management, group study projects, group presentations, frequent and meaningful assessment activities, early

identification and emphasis on key concepts and careful identification of dissection lab objectives. National Board Part I scores over three years indicate consistent performance on the anatomy section with this curricular design.

CUNNINGHAM, Anna C.[1], Gregg C. ALLEN[2]*, Brent J. THOMPSON[3]*, Arthur F. DALLEY[1], Susan R. WENTE[1]*, Jeanette J. NORDEN[1]*, and Roger CHALKLEY[4]*. [1]Department of Cell and Developmental Biology, [2]Department of Biological Sciences, [3]Department of Pharmacology, [4]Vanderbilt University, Nashville, TN. Found: More Anatomy Instructors.

Recent surveys conducted by the American Association of Anatomists have found that schools and departments responsible for teaching gross anatomy and other basic sciences are facing increasingly severe shortages of trained and well qualified instructors for recruitment. To address this critical issue, the Vanderbilt University Biomedical Research Education and Training Office and Department of Cell and Developmental Biology implemented the Vanderbilt Scientist-Educator Program in 2005. This postdoctoral training program aims to develop both the basic science research skills and the pedagogical expertise of individuals who desire to be biomedical researchers and educators. The program currently provides support for three years of postdoctoral training with a 25% time commitment to learning and teaching gross anatomy and a 75% time commitment to biomedical research. In the first year of the program, fellows enroll in the medical gross anatomy course, establish a mentoring committee, and participate in faculty-led pedagogical discussions. During the second year, fellows serve as laboratory instructors. Fellows in the third year perform duties of full-time gross anatomy instructors. This presentation will provide details regarding the Vanderbilt Scientist-Educator program, lessons learned from the first two years of this program and a discussion with postdoctoral fellows participating in this exciting new program. Supported by the Vanderbilt Biomedical Research Education and Training Office and an Institutional Research and Academic Career Development Award (IRACDA) from the National Institute of General Medical Services / NIH 5K12 GM068543-04.

DECKER, Summer J., Don R. HILBELINK, and Rafael C. GUERRA*. Department of Pathology and Cell Biology, University of South Florida College of Medicine, Tampa, FL. Skeletonizing an embalmed or “fixed” specimen: a comparison of methods.

Soft tissue removal in the processing of skeletal materials is done regularly by medical institutions, museums, and forensic agencies. This most often involves non-embalmed or “fresh” specimens. Embalmed (fixed) specimens can present a problem when using traditional skeletonization methods. The goal of this study was to evaluate several protocols previously described for skull preparation from embalmed cadaveric specimens. For all specimens, all readily accessible soft tissue was first removed by dissection. A colony of dermestid beetles was established for which fresh pig head specimens were used to provide nutrition and to gain experience in the use of the beetle colony. Three different methodologies were examined including: 1) alternating simmering the specimen in hot water followed by manual removal of loosened soft tissue, 2) placement of the embalmed specimen directly within the dermestid beetle colony, and 3) alternating simmering in hot water with placement of the specimen in the beetle colony. Specimens were regularly photographed to document the progression of the process throughout the study. The time and effort as well as the overall quality of the final product of each methodology was evaluated and compared. If logistically possible, resulting skulls will be presented for evaluation and review by conference participants.

DECKER, Summer J.,[1] Don R. HILBELINK,[1] and Eric J. HOEGSTROM.[2]* [1]Department of Pathology and Cell Biology, University of South Florida College of Medicine, [2]Department of Chemical Engineering, University of South Florida College of Engineering, Tampa, FL. Three-dimensional computer modeling and measurement of human cranial anatomy.

Computed virtual models of anatomical structures are proving to be of increasing value in medical education and research. In this study, morphometric measurement was conducted to validate the accuracy of technologies now available to produce virtual as well as printed 3-D prototypes of actual human skulls. A human cadaver head was CT imaged and a virtual model of the skull computed from the volumetric CT data (ScanIP, 3-D Studio Max©). A full size prototype of the skull was then produced from the computed model using a 3D ZPrinter 310 (ZCorp ©) printer. The cadaver head was processed and the skull recovered and cleaned. A series of classic anthropological measurements were made on all three versions of the skull (virtual, printed solid model and actual) and the resulting data was statistically analyzed. The data demonstrates that anatomically accurate virtual and prototypic representations can be made of actual

anatomical structures using state of the art medical imaging and computer technology. We are confident that expansion of this pilot study will confirm that anatomically accurate virtual and/or prototypic anatomical models can be produced for use in a wide range of anatomical structures for use in medicine, biological anthropology and the forensic sciences.

DECKER, Summer J.,[1] Don R. HILBELINK,[1] Eric J. HOEGSTROM,[2]* and Stephanie L. DAVY-JOW.[3]* [1]Department of Pathology and Cell Biology, University of South Florida College of Medicine, [2]Department of Chemical Engineering, University of South Florida College of Engineering, Tampa, FL. [3]Department of Archaeology, University of Sheffield, Sheffield, UK. Who is this person? a comparison of facial approximation methods.

Facial approximation is a common tool utilized in forensic identification. Three-dimensional imaging technologies allow researchers to go beyond traditional clay models to now create virtual computed models of anatomical structures. The goal of this study was to compare the accuracy of available methods of facial approximation ranging from clay modeling to advanced computer facial reconstruction techniques. Anatomically accurate virtual models of both the skull and of the surface contour of the face were computed from CT image data of the head region of a living individual using Mimics (Materialise) and ScanIP (Simpleware) software. An accurate full size prototype of the skull was produced from the computed virtual skull model using a 3D ZPrinter 310 (ZCorp) printer. A face was constructed on the skull prototype by an experienced profession forensic artist using clay facial approximation techniques. Virtual facial approximations were also produced using two computer-based techniques. Facial approximation results from all three methods were compared visually to each other and collectively to the actual features of the living individual to determine the level of accuracy and detail that each provided. Resulting images and models will be available for conference participants to review to provide additional input into our evaluation process.

DEMIRYUREK Deniz[1], M.H. Ozsoy[2], A Bayramoglu[1], E. Tuccar[3], and Dincel V.E.[2]. [1]Hacettepe University Faculty of Medicine, Department of Anatomy, Ankara, [2]Turkey Ankara Education and Research Hospital, 1st Clinic of Orthopaedics and Traumatology, Ankara, [3]Ankara University Faculty of Medicine, Department of Anatomy, Ankara, Turkey. Rotator Interval dimensions varies in

different shoulder arthroscopy positions. A cadaver study. Rotator interval is an important structure in antero-inferior shoulder instability. The purpose of this cadaver study was to evaluate the dimensions of the rotator interval in three different shoulder arthroscopy positions. 11 formalin-fixed adult cadavers' shoulders were dissected. Rotator interval was defined as a triangle with the base being dimensions along the coracoid(C), the superior arm (Sp) being the inferior border of supraspinatus muscle and inferior arm (Sb) being the superior border of subscapularis muscle. The shoulders were held in 30º flexion in beach chair position, 45º abduction and 30º flexion in lateral decubitus-1 position (LD-1) and 70º abduction and 30º flexion in lateral decubitus-2 (LD-2) position. In all three positions three measurements were made in neutral (NR), 45ºER and 45ºIR. Friedman and Wilcoxon tests were used for statistical analyses. In all three arthroscopy positions the base of the triangle (C) widened with IR. In neutral and internal rotation RI base length was max. in LD-2 position. Here, differences between BC-LD1 and BC-LD2 measurements were statistically significant. (p=0.01) RI closure should be made in neurtal or 45º external rotation in beach chair position.

DESY, Nicholas M., Bernd W. SCHEITHAUER*, Michael G. ROCK*, Frederik C. HOLDT*, Kimberly K. AMRAMI*, and Robert J. SPINNER. Departments of Neurologic Surgery, Orthopedics, Anatomy, Pathology and Radiology, Mayo Clinic, Rochester, MN, USA, Department of Anatomy, University of Pretoria, Pretoria, South Africa. Coexisting secondary intraneural and vascular adventitial ganglion cysts of joint origin: a causal rather than a coincidental relationship supporting an articular theory. We sought to introduce the clinical entity of an intraneural ganglion cyst coexisting with a vascular adventitial cyst arising from the same joint. Two patients presented with predominantly deep fibular neuropathy due to complex superior tibiofibular joint-related cysts. In addition to having fibular intraneural ganglion cysts, these patients had vascular adventitial cysts: one involving a capsular arterial branch, and the other a capsular vein (as well as a large, recurrent, intramuscular [extraneural] ganglion cyst). We then reviewed MRIs of 12 other consecutive cases of intraneural ganglion cysts (10 fibular and 2 tibial) arising from the superior tibiofibular joint that we treated as well as other reported cases in the literature to determine if there were other (unrecognized) examples supporting the combination of clinical findings and radiographic patterns. Retrospective analysis of

MRIs in the two surgically proven cases of fibular intraneural ganglion cysts with vascular adventitial cyst extension showed a common imaging pattern which we have termed “the wishbone sign,” consisting of the connection of the transverse limb of the intraneural ganglion cyst and the longitudinal limb of the vascular adventitial cyst in the axial plane. Our review suggests that vascular adventitial cyst extension occurs in a large proportion of cases of fibular intraneural ganglion cysts. A similar growth pattern was noted in a case of a tibial intraneural ganglion cyst. Our study concludes that the combination of intraneural and vascular adventitial cysts is understandable given our knowledge of normal and pathologic anatomy of para-articular cysts. These cases provide important evidence to support the articular theory for the pathogenesis of not only neural but vascular adventitial cysts as well.

DINGELDEIN, Michael*, Derek KANE*, Anthony W. KIM*, Maurice J. PESCITELLI, Jr.*, and Mark J. HOLTERMAN[2]. Departments of Surgery and Pediatrics, Rush Presbyterian-St. Luke’s Medical Center, and Departments of Surgery and Cell Biology and Anatomy, University of Illinois at Chicago, [2]Department of Surgery, University of Illinois at Chicago, Chicago, IL. Bilateral intrathoracic kidneys associated with posterior diaphragmatic hernias.
We present a case of bilateral intrathoracic kidneys associated with bilateral posterior diaphragmatic defects in an 18-month-old child. The diaphragmatic defect did not appear to be the typical posterolateral diaphragmatic hernia of Bochdalek. The patient underwent primary surgical correction via an abdominal approach. Postoperatively, the patient enjoyed an uneventful course and was discharged home without any further events. We discuss this first ever report of bilateral intrathoracic kidneys associated with bilateral diaphragmatic hernias, analyze the possible embryological development of this defect and describe the operative management.

FARHAN, Thaer Mahmood. Department of Human Anatomy College of Medicine, Al-Nahrain University Kadhmiya, Baghdad, Iraq. The Conjoined Tendon-Does It Exist?
Background: The conjoined tendon is formed by the fusion between the lower margins of the transverse abdominis and the internal oblique muscles. This turns downwards between the transversalis fascia and the inguinal canal.The conjoined tendon is attached to the pubic crest .Thus, the conjoined tendon forms

the strong posterior wall for the medial part of the inguinal canal. The details of the normal anatomy of the conjoined tendon, as described in the textbooks, were infrequently found. Aim: to verify the controversy about the presence of conjoined tendon Patients and Methods: This study was performed on 17 embalmed cadavers in the laboratory and 27 surgical cases at the hospital. An anatomical observation was carried out on the anatomy of the inguinal region, particularly the posterior wall, and on the operative cases. Results: No conjoined tendon "conjoined aponeurosis"was observed in 42/44 (95.5%) and only in 2/44 (4.5%) of the cases where conjoined aponeurosis was noticed. Discussion: There was a controversy between the classical description of the posterior inguinal wall and what have been stated in this study due to technical difficulties of dissection or the presence of many structures in the inguinal region like rectus tendon, lateral extension of rectus sheath and ligament of Henle. Conclusion: The fusion between both internal oblique and transversus abdominis aponeuroses to form the classical conjoined tendon is a rare rather than what has been previously established.

FIRBAS, Wilhelm, Ulrike FIRBAS*, Josef KABELKA*, Wolfgang HEINRICH*, Manfred KREJS*, and Elfriede KERT*. Department of Systematic Anatomy, Center for Anatomy and Cell Biology, Medical University of Vienna, Austria. Growth and deformation of the foot in childhood.

In two studies on the growth of foot in children in the age between three and six years (1100 persons) we investigated the development of deformations like hallux valgus and their correlation with wrong shoe types. The children, who took part in this study, came from urban and rural communities and were visitors of the local kindergartens. Besides taking height and weight the morphological assessment of the foot was done with conventional measurements as well as with a scanning device. For connecting the morphological results with the size of the individual outdoor and indoor shoes all shoes were controlled. Our results are documented with diagrams, illustrating the influence of age and gender on the tempo and mode of growth. The result of our investigation indicates very clearly, that the development of deformations starts early and is connected to the use of wrong, mainly to short and to narrow shoes. In the future a program is planned for educating the parents and an evaluation of the impact of such a campaign will be performed.

FISHER, Cara*[1], Shane TUBBS[2], Brian CURRY[1], Robert JORDAN[1], and Marios LOUKAS[1]. [1]Department of Anatomical Sciences, St. George's University, Grenada, West Indies, [2]Department of Pediatric Neurosurgery, University of Alabama at Birmingham, Birmingham, AL. The Inferior phrenic artery revisited.

The majority of anatomical textbooks of gross anatomy offer very little information concerning the anatomy and distribution of the inferior phrenic artery (IPA), in addition to the ratio of tendinous versus muscular portion of the diaphragm. However, in the last decade increased numbers of reports have appeared with reference to the arterial supply of hepatocellular carcinoma (HCC). The IPA is a major source of collateral or parasitized arterial supply to this type of carcinoma, second only to the hepatic artery. The aim of this study was to identify the origin and distribution of the IPAs (right and left), and to relate such findings to the ratio of tendinous versus muscular portion of the diaphragm. We have examined 30 formalin-fixed adult cadavers lacking abdominal pathology. Dissections revealed that the right IPA originated from the: a) celiac trunk in 12 (40%) specimens, b) aorta in 11 (36.6%), c) renal in 5 (16.6%), d) left gastric in 2 (6.6%). The left IPA originated from the: a) celiac trunk in 14 (46.6%), b) aorta in 10 (33.3%), c) renal in 3 (10%), d) left gastric in 2 (6.6%), and e) hepatic artery proper in 1 (3.3%) of the specimens. The IPA gave rise to eight notable branches: ascending, descending, inferior vena cava, superior suprarenal, middle suprarenal, esophageal, diaphragmatic hiatal, and accessory splenic. The ratio of tendinous versus muscular portion of the diaphragm ranged from 10.1% to 32% of the total diaphragmatic area, with a mean of 21.6. In addition, the greater the ratio between tendinous versus muscular portion of the diaphragm, the greater the diameter of the IPA observed. These findings could have major implications in the transcatheter embolization of HCC patients.

FISHER, Dean R. and Terry D. REGNIER*. Department of Anatomy, Mayo Clinic, Rochester, MN. Using alkaline hydrolysis as a form of final disposition in anatomical bequest programs.

Alkaline hydrolysis is an environmentally responsible, non-burn, water-based process that returns the body to its constituent elements. It utilizes and accelerates a naturally occurring alkaline hydrolysis reaction to rapidly decompose the body, leaving behind a pure white calcium phosphate that can be returned to families, very similar to the ash created during the cremation

process. Alkaline hydrolysis takes place in the natural environment when bodies are buried in the earth. This process is slow, sometimes taking years to complete. Alkaline hydrolysis greatly speeds up the process using an alkali/water mixture and a temperature of 300˚ Fahrenheit. At the completion of the 4 hour process, the two remaining elements are an innocuous liquid, (amino acids, peptides, sugar and a mild soap), and bony remnants that can be processed and returned to the family for final disposition. The environment benefits in that no mercury from dental fillings is emitted into the atmosphere, it neutralizes embalming fluids, and it destroys prions and chemotherapeutic drugs. This process is more economical to run per cycle than cremation, and pacemakers or other hardware remain in place.

FOGG, Quentin A., Daniel GIVEN*, and Peter TASSONE*. American University of the Caribbean, Sint Maarten, NETHERLANDS ANTILLES. Quantitative assessment of brachiocephalic artery position relative to the trachea.

Iatrogenic problems associated with tracheostomy and other invasive procedures of the respiratory tract are often reported. Several studies have assessed “ring number to artery position” relationships, but few have given quantifiable data to enable studies to be repeated accurately. This study attempts to describe brachiocephalic artery position relative to major landmarks along the trachea in a numerical fashion. Cadaveric specimens (n=35) were dissected to reveal the trachea and the brachiocephalic artery. Mid-line measures were taken from the cricoid cartilage to the superior and inferior borders of the artery, and to the carina. The mean cricoid to brachiocephalic distance (49.4$\pm$10.7mm) was significantly smaller that the mean cricoid to carina distance (92.2$\pm$9.9mm, $p>0.05$); likewise, the mean number of rings to the brachiocephalic artery (10$\pm$1.4) was significantly smaller than that to the carina (16.7$\pm$1.3). These data and the numerous clinical case reports reviewed make obvious that a clearer morphologic understanding of the dimensions within the upper respiratory tract will make quick and accurate judgments of available space and tissue more commonplace. Increased exposure to such numerical observations may make the transition from nervous novice to confident expert much easier, and therefore reduce the number of iatrogenic complications.

FOGG, Quentin A. and Lance G. NASH. American University of the Caribbean, Sint Maarten, NETHERLANDS ANTILLES. An Anatomy course that achieves modern goals in a traditional setting.
Modern anatomy courses (and their integrated counterparts) primarily stress clinical application, professional development, and self-direct learning. A traditional approach to anatomy may include didactic lectures and hands-on dissection, but are modern values addressed, and how clearly? We attempted, within a traditional framework, to prioritise modern values. The five block regional anatomy course was modified to noticeably emphasise development of professional demeanour and communication skills, as well promote group interaction and broadened problem solving skills. Each block of the course contains clinically-directed lectures and labs split into dissection for some students and self-directed osteology, radiology and virtual sectional anatomy for others. The clinical emphasis throughout the course has encouraged students to better understand the variation of specific structures throughout the laboratories. Splitting the class into different lab groups has proven to effectively promote peer-to-peer teaching, develop communication skills and increase appreciation of team work. Standardised exam questions show a higher percentage of correct responses to detailed clinical vignette questions, and to practical examination tags in sectional and radiologic anatomy. We feel we have begun to successfully incorporate many modern values into our somewhat traditional format.

FOUNTAIN, T. Kenny*. Department of Rhetoric, University of Minnesota, Saint Paul, MN. "A matter of perception": an ethnographic study of medical students' impressions of the body in cadaver-based anatomy education.
For centuries, medical students, educators, and physicians have argued that the experience and knowledge gained through cadaveric dissection is unique, authentic, and indispensable. In light of the increased use of digital technology as a substitute for human material, there is a need to understand what role real bodies play in communicating anatomy. Ethnography, a qualitative method that combines direct observations and in-depth interviews, offers a promising lens through which to investigate the use of the body. This presentation reports on a year-long ethnographic study of the Program in Human Anatomy Education at the University of Minnesota, focusing specifically on how students and instructors in a gross anatomy course

experience the body and how visual representations assist learning. The results presented draw specifically from an analysis of field notes and audio-recorded interviews with 16 first-year medical students and 14 third-year teaching assistants. The data suggests that the body is an educational tool that facilitates learning and challenges students' existing conceptions of both the body and the nature of visual representation. The data also suggests that students learn through a process of self-persuasion in which they use visual and tactile evidence to reason out the structures in question. (Sponsored by Kenneth P. Roberts).

FREEMAN*, A. Jay, Nathan A. JACOBSON*, and Quentin A. FOGG. American University of the Caribbean, Sint Maarten, NETHERLANDS ANTILLES. Variable proximal attachment of the quadratus plantae muscle.

The quadratus plantae muscle (QP) is of much clinical interest due to its involvement in many foot problems. Recent evidence suggests that this muscle may be of even greater functional significance than previously thought, therefore reinforcing the need for more detailed understanding of its anatomy. This study aims to document variation of the proximal attachment of the QP. Cadaveric feet (n = 45) were dissected to the level of the QP. Proximal and distal attachments of this muscle were then photographed and tabulated, along with associated structures. The proximal attachment of the QP was either localized to the calcaneus (n = 32; 71%) or split medially (n = 13; 29%). The medial segment of muscle was composed of approximately 25% of the muscle width, and was attached into a common tendon with the adductor hallucis muscle. The medial and lateral plantar neurovascular bundles were passed deep to this slip of muscle. These data suggest that in a small percentage of the sample population, individuals may be predisposed to neurovascular problems in the foot. Recent evidence for an increased role of the QP as a primary flexor may give addition importance or interest to these findings.

GER, Ralph. Department of Anatomy and Structural Biology, Albert Einstein College of Medicine, Bronx, NY. Congenital and acquired abdominal wall defects: case studies.

Congenital and acquired abdominal wall problems lead to severe therapeutic problems that include large incisional hernias, fistulae, abscesses, infections, poor epithelial coverage, extruding intra-abdominal mesh, abdominal dehisences, inability

to raise intra-abdominal pressure to empty bladder/rectum ,difficulty with spinal movements amongst other problems. Several case studies are presented that restore the muscular abdominal wall covered by thickness skin. Perhaps this will lead to a new appreciation by clinical anatomists movements orrectum.

GILL, Richard, Kajeandra RAVICHANDIRAN, and Anne AGUR. Division of Anatomy, Department of Surgery, University of Toronto, Toronto, ON, Canada. Architecture of the human infraspinatus muscle: A pilot study.
Background: The architecture of the infraspinatus muscle has not been defined throughout its volume. Existing studies focus on the superficial surface of the muscle and partition it by visual inspection (Ward et al., 2006) or by dividing the tendon and adjoining muscle into quadrants (Langenderfer et al., 2006).Purpose: This is a pilot study to quantify the architecture of infraspinatus to determine if the muscle is divided into architecturally distinct regions. Methods: The tendon and muscle belly of one formalin-embalmed cadaveric specimen were serially dissected, digitized and reconstructed in 3D using MAYA™. Average fibre bundle length(FBL) and pennation angles(PA) were computed throughout the muscle volume. Results: Infraspinatus has two architecturally distinct regions: superficial (with superosuperficial and inferosuperficial parts) and deep. Fibre bundles of the superosuperficial part were directed inferolaterally; those of the inferosuperficial part were directed superolaterally. Fibre bundles of the deep region were horizontally oriented. The average FBL of the superosuperficial part was 4.9 ± 1.5 cm, whereas the inferosuperficial and deep parts had average FBL of 6.6 ± 2.3 cm, and 7.0 ± 1.5 cm, respectively. Medial and lateral PA were similar for the deep region, but in both superficial parts the lateral PA was greater than the medial PA. Conclusions: Infraspinatus has architecturally distinct regions. Mapping of infraspinatus architecture will provide better insight into its function in normal and pathological states.

GOULD, Douglas J. and Jo FLEMING*. Division of Anatomy, Ohio State University, Columbus, OH and ORCCA Technology, Lexington, KY. The results of a usability study conducted on a new neuroanatomy multimedia learning tool.
The objective of the present study is to report the results of a Usability Study conducted on a new neuroanatomy multimedia

learning tool – Anatomy of the Central Nervous System: A Multimedia Course. The program, funded by a Phase I, Small Business Technology Transfer grant from the National Institutes of Health is designed to serve as a stand-alone programmed-learning tutorial for graduate-level neuroscience instruction. It makes use of a programmed learning sequence and the latest in multimedia technologies to lead the user through an integrated study of multiple aspects of the Central Nervous System. The Usability Study was completed in 2004 and involved 62 faculty members and students from 13 institutions across the United States. Demographic data were gathered along with feedback specific to the program. This study presents general descriptive feedback as well as statistically significant feedback using five demographic parameters: 1) faculty vs. student, 2) age, 3) gender, 4) ethnicity, and 5) area of focus. The results of the analysis of this data were incorporated into the comprehensive program developed during Phase II, of a Small Business Innovative Research (SBIR) grant and will be considered when planning future multimedia programs. (Supported by NIH grant #1R41NS40588).

GRANGER, Noelle A., Diane C. CALLESON*, and Jennifer M. BURGOON. Department of Cell and Developmental Biology and Department of Family Medicine, School of Medicine, School of Education, and Public Health Leadership Program, School of Public Health, University of North Carolina, Chapel Hill, NC. Impact of web-based instructional tools and other factors on the examination scores of first year medical students when students dissect alternately.

A third year of data was collected to determine the impact of web-based instructional tools on medical student preparation for the dissection laboratory and examinations. In anticipation of limited room for dissection during building renovation, students were organized in groups of eight. Half of each group dissected at a time, rather than groups of four doing every dissection. Those students not dissecting studied the material covering the dissection on their own, using textbooks, the web-based instructional tools, and a resource room staffed by an anatomy instructor. At the end of each dissection, the group not dissecting would be shown the dissection by the students who did it. This study examines the effect of the students' use of the web-based tools and other factors (prior experience, MCAT scores) when students dissect alternately. Data collection methods included pre- and post-use surveys, and descriptive, bivariate and

regression analyses were run to determine the effect of the materials as well as other factors on practical and written anatomy examination scores. The results are compared to those of a previous study where all the students performed each dissection. [Sponsored by Grant No. P116B010181 from the Fund for the Development of Post-Secondary Education, US Department of Education.]

HISLEY, Kenneth C. and Duc H. NGUYEN*. Department of Diagnostic Radiology, University of Maryland School of Medicine, Baltimore, MD.; Department of Art As Applied to Medicine, Johns Hopkins School of Medicine, Baltimore, MD.
Description of a standard computer graphics "pipeline" for generating interactive 3D anatomical model libraries reconstructed from computed tomography and magnetic resonance image sets followed by a demonstration of a digital dissector of the human neck using this resource.
Anatomical regions assigned in dissection laboratory consist of sequentially overlapping 3D volumes, objects, spaces and surfaces having ranges of normal spatial variations. Optimum preparation for dissection includes obtaining the capability to "visually expect" the occurrence of a given feature among multiple discrete structures and landmarks within a superficial-to-deep sequence. Past preparation has been carried out by demonstrations with models and prosections which portrayed the target discrete structures with most underlying anatomical surface context absent or hidden. Our main hypothesis is that student intrinsic understanding of anatomical structure is significantly enhanced when the student is able to simultaneously view target structures sharply contrasted with their 3D surrounding gross anatomical context from any angle. We have designed computer-based methods to achieve this instructional goal. These methods use CT and MR image sets to generate surface polymesh models of anatomical structures contained within their original volumes. Once generated, these models are easy to reassemble in a structured guided dissection task viewable from any angle, and enhance with color, transparency, texture, and text annotation. Finally, scripting may then be used to integrate multiple related tasks into a coherent dissection lesson by defining a sequence of stored viewpoints for each task.

HOLDER*, David M. and Robert M. DEPHILIP. Division of Anatomy, Ohio State University College of Medicine, Columbus, OH. Anatomy of a type I split cord malformation.

Split cord Malformations (SCMs) are a rare congenital anomaly involving a divided spinal cord. Type I SCMs involve a split spinal cord with two halves separated by an osseo-cartilaginous septum and contained by separate dural sacs. Current theories of embryogenesis identify the formation of an accessory neurenteric canal (ANC) wherein a dorsal midline fistula forms to split the neural plate.1,4 The manifestations of SCMs typically present in infancy with varying degrees of disability ranging from neurocutaneous stigmata, neurological deficit, or skeletal deformities. This paper examines a cadaver with scoliosis: randomly selected to be cross-sectioned for teaching sectional anatomy. Study of the sections revealed a Type I SCM in the lumbar region. This SCM involves an asymmetric division of the spinal cord, with no paramedian nerve roots crossing the midline septum. Therefore this lesion is not a duplication of the spinal cord but a bisection of it, thus supporting current theories of embryogenesis.4 The relative diameters of the hemicords indicate that the septum is at the level of the lumbrosacral enlargement. The hemicords reconnect caudal to the septum but are tethered posteriorly by arachnoidal adhesions. This is likely the first SCM to be prepared for cross-sectional anatomy.

HOOVER*, Chris RV., Tasha M. HUGHES*, Coen A. WIJDICKS, Julia R. HOWELL*, Meghann V. HOUCK*, and James M. WILLIAMS. Rush University Medical College, Department of Anatomy and Cell Biology, Chicago, IL. Superficial brachial artery anomaly serving as collateral circulation to the radial artery.

BACKGROUND: Collateral circulation of the upper extremity is normally provided by the brachial, radial, and ulnar arteries. An additional brachial artery, the superficial brachial artery, is present in 3% of the population. CASE REPORT: Dissection of a 90-year-old female cadaver revealed a left, unilateral superficial brachial artery branching immediately distal to the thoracoacromial trunk, sending one branch to breast tissue before extending superficially to 6cm distal to the cubital fossa, to join the radial artery. A deep artery of the arm was noted with middle and ulnar collateral branches. Both the expected radial collateral branch and the recurrent branch of the radial artery were absent. CONCLUSIONS: This precise arterial variant has not been previously reported. This anomaly provided collateral

circulation between axillary and radial arteries. Most literature cited complete absence of the radial artery. A developmental abnormality of the vascular plexus of the upper limb buds could explain this variation. CLINICAL RELEVANCE: This deviation has important implications for surgical management and radiographic interpretation of the upper extremity. Superficial arteries lack protection from the bicipital aponeurosis making them susceptible to injuries during routine venipuncture and traumatic laceration in the cubital fossa. ACKNOWLEDGEMENTS: Work performed at the Rush University Gross Anatomy Laboratory.

HOWE, Robert B.* and David J. ELIOT. Basic Science Department, Touro University-CA, Vallejo, CA. Periapical granuloma possibilities.
As the maxillary sinus expands throughout adult life, bone surrounding the upper molar tooth roots may thin to less than 1 mm. To explore the developmental trajectory of maxillary sinus expansion and its clinical consequences, the authors studied the distance between the upper molar tooth roots and the maxillary sinus floor in a mostly geriatric cadaveric sample. A unique cystic and bony lesion found during the study demonstrates the osteolytic and surprising osteogenic effects of a periapical granuloma presumed to have resulted from a molar tooth abscess. The cyst developed at the apices of the roots of the upper right first molar. The tooth had a gold crown and buccal decay, strongly suggesting endodontic pathogenesis of a periapical abscess leading to formation of a granuloma and, ultimately, an unusual lesion of bone. Dimensions of the bone surrounding the cyst were 9 mm (mediolateral) by 7 mm (anteroposterior); these bony walls were approximately 2 mm thick and rose 7 mm above the sinus maxillary floor to resemble a volcano. There was shelf-like erosion of the outer circumferences of each root. The lesion reported here elucidates classic root resorption effects while dramatically demonstrating the osteogenic potential of chronic inflammation upon connective tissues. Research supported by a Dean’s Creativity Fund grant, University of California, San Francisco School of Dentistry, 2001.

HU Kyung-Seok1*, Wu-Chul SONG2*, Mi-Sun HUR1*, Min-Kyu KANG1*, Ki-Seok KOH2*, Kyoung-Sub SHIM1*, Cristian Fontaine3, and Hee-Jin KIM1*. 1Division of Anatomy and Developmental Biology, Department of Oral Biology, Oral Science Research Center, Human Identification Research

Center, Brain Korea 21 project, Yonsei University College of Dentistry, Seoul, Korea, 2Department of Anatomy, College of Medicine, Konkuk University, Chung-ju, Korea, 3Laboratoire d'Anatomie, Faculte de Medecine, Herri Warenmbourg, Universite Lille 2, Lille, France. Topography of the neurovascular structures of the mandibular canal.

The major complication during or after the dental implantation is the loss of sensation resulted in the damage of the inferior alveolar nerve. This damage occurs because the precise information such as the location of the mandibular canal and the traveling course of the inferior alveolar nerve, artery and vein is not clearly clarified. Therefore, the purposes of this study were to verify the topography of the inferior alveolar nerve, artery, and vein within the mandibular canal. Ten mandibles were used for this study. The mandibular canal was reconstructed three dimensionally for investigating topography of the inferior alveolar nerve, artery and vein. The inferior alveolar vessel traveled above the inferior alveolar nerve within the main part of the mandibular canal in most cases (80%, 8/10), with the inferior alveolar artery being lingual to the inferior alveolar vein. The other case was where the inferior alveolar artery above the nerve over the entire mandibular canal (20%, 2/10). This data is expected to help prevent complications of implant fixtures, such as loss of sensation.

HUR Mi-Sun[1]*, Hyun-Ho KWAK[2]*, Hun-Moo YANG[1]*, Sung-Yoon WON[1]*, Kyung-Seok HU[1]*, Cristian Fontaine[3], and Hee-Jin KIM[1]*. [1]Division of Anatomy and Developmental Biology, Department of Oral Biology, Oral Science Research Center, Human Identification Research Center, Brain Korea 21 project, Yonsei University College of Dentistry, Seoul, Korea, [2]Department of Oral Anatomy, Pusan National University, College of Dentistry, Pusan Korea, [3]Laboratoire d'Anatomie, Faculte de Medecine, Herri Warenmbourg, Universite Lille 2, Lille, France. An anatomical study of the blood supply of the dorsal side of the thumb and the first web.

The reversed dorsal metacarpal arterial flaps are widely used to cover defects of the finger. However, the variable anatomy of the dorsal hand vascular system sometimes prevents successful flap harvest. The purpose of this study was to clarify the vascular network in this area and to find an anatomic basis for the flaps raised on the thumb metacarpal. Eight hands were dissected. The arrangement of the first dorsal metacarpal artery (FDMA) and its branches were vary. The typical course of the FDMA was

within the fascial layer overlying the first dorsal interosseous muscle. However, in two cases the FDMA had a deep course within the first dorsal interosseous muscle. The princes pollicis artery arose from the radial just as it turned medialward to the deep part of the hand. It descended between the first dorsal interosseous muscle and the oblique head of the adductor pollicis. The radialis indicis artery arose close to the preceding, descended between the first dorsal interosseus muscle and the transverse head of the adductor pollicis, and ran along the radial side of the index finger, where it anastomosed with the proper digital artery, supplying the ulnar side of the finger.

JACOBSON*, Nathan A., A. Jay FREEMAN*, Rajnil SHAH*, and Quentin A. FOGG. American University of the Caribbean, Sint Maarten, NETHERLANDS ANTILLES. Hamstring tears: histologic analyses of a morphologic weakness in the semitendinosus muscle and a potential explanation for chronic injury.

The “torn hamstring” continues to be the bane of many athletes. Functional understanding of limb mechanics and the identification of errors inherent in many weight training regimes has improved the outcome of many individuals, but the torn hamstring remains a perpetual problem. This study aims to describe the intramuscular morphology of the midl-belly of the most commonly damaged hamstring muscles, the semitendinosus muscle. Histologic sections from 10 cadaveric muscles were taken, sectioned and stained with Masson’s Trichrome. The tissue in this are was then examined for potential weaknesses. The majority of specimens (n=8; 80%) displayed a distinct band of primarily loose connective tissue obliquely orientated through the muscle. This musculo-fibrous juncture was at least 7mm from superior to inferior in each case. An additional 3 cadaveric semitendinosus muscles were pulled to tear, each rupturing at a similar place on the muscle. The distal segments of each ruptured muscle were also assessed histologically, revealing a “dead-end” of loose connective tissue. These preliminary data suggest some structural rationale for the high incidence of hamstring tear, and warrant further, more detailed investigation.

JERGENSON, Margaret A., Neil S. NORTON, and Laura C. BARRITT. Department of Oral Biology, School of Dentistry, Creighton University Medical Center, Omaha, NE. Multiple

variations in the relations of the maxillary artery in the infratemporal fossa.

The relationship of the maxillary artery to other structures in the infratemporal fossa is variable. Most noted is the relatively even distribution of maxillary arteries that lie superficial or deep to the lateral pterygoid muscle. In the process of dissecting twelve cadavers (24 sides), the infratemporal fossa was approached from the lateral aspect by removing the ramus of the mandible just above the mandibular foramen to the neck. After observation of the pterygomandibular space, the lateral pterygoid muscle and the temporomandibular joint were removed. In this group, an unusually high number of variations were seen in the ten sides where the maxillary artery passed deep to the lateral pterygoid. Five sides demonstrated some form of a split of the inferior alveolar nerve which enclosed the maxillary artery, in one of these, the maxillary artery then passed superficially through the belly of the inferior head of the lateral pterygoid. In a sixth situation, the maxillary artery passed deep to both the inferior alveolar nerve and the lingual nerve. All variants were unilateral. Though normally less common, this cluster of variants serves to emphasize the possibility of impact on clinical symptoms and effects in block anesthesia in this area.

JOHNSON*, Nathan F., April D. RICHARDSON*, and Jennifer K. BRUECKNER. Department of Anatomy and Neurobiology, University of Kentucky, Lexington, KY. A novel use of podcasting in teaching cross-sectional anatomy.

Recent advances in podcasting technology have prompted many educational institutions to implement teaching strategies that take advantage of this innovative tool. The goal of this study was to integrate podcasting within a medical curriculum to facilitate multi-dimensional learning of cross-sectional anatomy. Traditionally, cross-sectional anatomy has been difficult for medical professional students to grasp due to one-dimensional presentations of anatomical structures and limited application for multiple learning styles. The following study incorporates verbal narratives and visual guidance in a series of cross-sections through the abdomen, head, and neck. This novel technique highlights salient anatomical structures in parallel with an auditory description of the specific and relative location of these structures. The method of instruction used in this study integrates a myriad of learning styles to maximize student performance and retention; furthermore, anatomical terminology and relationships are reinforced through directional cues and

landmarks within each series of cross-sections. The following survey of student opinion manifested a positive correlation between podcasting and ease of cross-sectional interpretation. This positive trend warrants further investigation into the efficacy of using technology to integrate several different learning styles. The technology discussed in this abstract is not available for purchase.

JUNG, Wonsug*, Chang-Seok OH†, Hyung-Sun WON*, and In-Hyuk CHUNG. Department of Anatomy Yonsei University College of Medicine, Brain Korea 21 Project for Medical Science Yonsei University, Seoul. †Department of Anatomy Sungkyunkwan University School of Medicine, Samsung Biomedical Research Institute, Suwon, Korea. Arteria peronea magna accompanied with the bilateral hypoplasia of the anterior tibial arteries.

The arteria peronea magna is defined as the peroneal artery which descends in the leg and supplies the sole in the absence of the posterior tibial artery. We have found this rare variation in the right leg, along with the hypoplasia of the anterior tibial arteries in both legs in a 59 year-old male cadaver. The right popliteal artery gave off the anterior tibial artery and descended in the leg as the arteria peronea magna. Above the malleolar level, this artery turned medialward sharply and then descended toward the sole. The right anterior tibial artery ended before it reached the ankle. The right dorsalis pedis artery arose from the arteria peronea magna through its perforating branch. The left anterior tibial artery arose as two branches, both of which also ended above the ankle. The left dorsalis pedis artery arose from the peroneal artery through its perforating branch. An embryologic explanation of these variants is suggested, and its clinical significance is discussed.

KIM Hee-Jin[1]*, Kyung-Seok HU[1]*, Joo-Yong PARK[2]*, Sung-Weon CHOI[2]*, and Mi-Sun Hur[1]* [1]Division in Anatomy and Developmental Biology, Department of Oral Biology, College of Dentistry, Oral Science Research Center, Brain Korea 21 Project, Human Identification Research Center, Yonsei University, Seoul, Korea [2]Oral Cancer Clinic, Research Institute and Hospital, National Cancer Center, Koyang, Korea. Topographical anatomy of lateral circumflex femoral artery for anterolateral thigh flap in Koreans.

The anterolateral thigh flap was described as a septocutaneous flap based on descending branch of the lateral femoral

circumflex artery (LCFA) for head and neck reconstruction. However, it is not widely used, due to the broad range of anatomic variation of cutaneous perforators. The purposes of this study are to classify the vascular anatomy of the LCFA and to assess the suitability of the anterolateral thigh flap for head and neck reconstruction. From 20 thigh dissections of Korean cadavers, the LCFA commonly arose from the deep femoral artery and divided into ascending, transverse, and descending branches. Cutaneous perforators were present in all cases and septocutaneous perforators were found in 10 of the 20 cases. Of the 99 perforators, 20 (20.2%) were septocutaneous perforators and 79 (79.8%) were musculocutaneous perforators. The average number of cutaneous perforators for the anterolateral thigh flap was 5.0, and these perforators were concentrated in the middle third of the anterolateral thigh. The septocutaneous perforators were located more proximally than the musculocutaneous perforators. The results of this study suggest that the vascular anatomy of the anterolateral thigh flap was reliable and well-suited for head and neck reconstruction. (Sponsored by Wojciech Pawlina).

KIM, Soo Y., Robert R. BLEAKNEY*, Erin L, BOYNTON*, and Anne M. AGUR. Division of Anatomy, Department of Surgery, University of Toronto, Toronto, ON, Canada. Development of an ultrasound protocol to investigate the static and dynamic in vivo musculotendinous architecture of the supraspinatus.
Background: In a previous cadaveric study by Kim et al., 2007, supraspinatus (SP) was found to be architecturally partitioned into anterior and posterior regions each with superficial, middle and deep parts. Purpose: To investigate the architecturally distinct regions of SP in relaxed (R) and contracted (C) states using in vivo ultrasound (US). Methods: The SP of eight subjects (4M/ 4F) with a mean age of 35±13.5 yrs were scanned bilaterally using an US scanner with a 12 MHz transducer. Each shoulder (free of tendon pathology) was scanned in four positions: neutral (N); 60° abduction (C); 60° abduction with 80° external rotation (CE)/ 80° internal rotation (CI). Fiber bundle length (FBL) and pennation angle (PA) were computed from scans and analyzed. Results: Fiber bundles in the middle and deep parts of the anterior region and in the superficial and deep parts of the posterior region were scanable. Mean FBLs in N were similar in the anterior and posterior regions (6.01±0.17cm). In the anterior region, mean PAs were significantly smaller ($P<0.05$) in the middle part than in the deep part in all four

positions. Conclusion: In vivo investigation of the musculotendinous architecture of SP in relaxed and contracted states is feasible. This technique can be used to investigate normal and pathological states.

KOCABIYIK, N.*, I. Tatar*, B. Yalcin*, and H. Ozan*. Department of Anatomy, Gulhane Military Medical Faculty, 06018, Etlik, Ankara, Turkey. The course and branching pattern of the pudendal nerve in fetus.

The pudendal nerve is a crucial branch of the sacral plexus. Until now, there were many articles on it in adults but there is a lack of literature examining the branching pattern and variations in pudendal nerve anatomy in fetus. This study investigates the pudendal nerve trunking in relation to the piriformis muscle in 25 formalin fixed fetuses (50 sides of pelves, 14 female, 11 male), ranging from 20-37 weeks of gestation. Pudendal nerve trunking could be grouped into four types: Type Ia is defined as one trunked with inferior rectal nerve is branching proximal to the dorsal nerve of penis/clitoris (19/50, 38%), type Ib is also one trunked with dorsal nerve of penis/clitoris is branching proximal to the inferior rectal nerve (12/50, 24%), type II is two-trunked with one trunked as an inferior rectal nerve (17/50, 34%) and type III is three-trunked (2/50, 4%). We measure the average diameter of the main trunk of pudendal nerve in type Ia and Ib group to be 0.98+-0.33 mm. We also measured the average length of the pudendal nerve trunks before branching the dorsal nerve of penis/clitoris to be 7.35+-3.50 mm. There was no significant statistical difference in the average length, average diameter, number of trunk and pudendal nerve variations between male and female or right or left sides of the pelves. This first and detailed fetal study of pudendal nerve trunking in relationship to the piriformis muscle would be useful for educational anatomy dissections and anatomical landmark definitions for relevant clinical procedures. (Sponsored by B. R. MacPherson).

KWAK, Hyun-Ho[1]*, Kyung-Seok HU[2]*, Mi-Sun HUR[2]*, Sung-Yun WON[2]*, Gyoo-Cheon KIM[1]*, Bong-Soo PARK[1]*, Han-Sung JUNG[2]*, and Hee-Jin KIM[2]*. [1]Department of Oral Anatomy, Pusan National University, College of Dentistry, Pusan, Korea, [2]Division of Anatomy and Developmental Biology, Department of Oral Biology, Oral Science Research Center, Human Identification Research Center, Brain Korea 21 project, Yonsei

University College of Dentistry, Seoul, Korea. New anatomical findings of the arteries supplying the medial pterygoid muscle.
This study aimed to clarify the arterial supplies of the medial pterygoid muscle for the new anatomical description and the critical information during the various surgical procedures. Detailed dissections were performed on twenty sides of adult cadaveric head and neck specimens following the carotid artery injection with liquid Neoprene latex. The medial pterygoid muscle was supplied by following five branches of the external carotid artery: (1) pterygoid artery of the maxillary artery; (2) direct muscular branch of the facial artery; (3) ascending palatine artery; (4) anterior muscular branch of the facial artery; and (5) the previously undescribed muscular branch of the external carotid artery. Analysis of this vascular anatomy can provide a new anatomical fact on the blood supplies to the medial pterygoid muscle and useful guideline for the prevention of hemorrhage during surgical procedures. (Sponsored by Wojciech Pawlina).

LABRASH, Steven and Scott LOZANOFF. Department of Anatomy, Biochemistry and Physiology, University of Hawaii School of Medicine, Honolulu, HI. Standards and Guidelines for Willed Body Donations at the John A. Burns School of Medicine, 2007.
Abuses have been publicized concerning the unethical and often illegal trafficking of human body donations used in unauthorized activities. Such activities have prompted medical schools to establish ethical standards and guidelines for the use of human anatomical donations. Notably the State of California implemented an Anatomical Gift Board that established guidelines for public review. The John A. Burns School of Medicine (JABSOM) utilizes human cadaveric material for medical research and teaching activities. The purpose of this paper is to describe the guidelines established by JABSOM with respect to human cadaver handling and usage. The guidelines address: 1) Use of Human Anatomical Material; 2) Acquisition and Administration of Donated Material; 3) Requests and Distribution of Cadaver Material; 4) Anatomical Material Return and Disposition; and, 5) Program Staffing and Work Areas. These guidelines assure the public that the Willed Body Donation Program, JABSOM upholds the hallowed tradition of cadaver dissection and is committed to a code of ethics that are based on informed consent and a transparent administrative system. They also have been presented to the Uniform

Commissioners to alter the language in the Hawaii Anatomical Gift Act to ensure that only programs licensed or accredited can served as body donees.

LOMNETH[1], Carol S., Shelia A. WROBEL[2]*, Janet M. KEUCHEL[3]*, and Paul R. BECKER[4]. [1]Department of Genetics, Cell Biology and Anatomy , [2]Academic Affairs, [3]The University of Nebraska Medical Center, and [4]Anatomical Board of the State of Nebraska, University of Nebraska Medical Center , Omaha, NE.
The University of Nebraska Medical Center's Appropriate Use of Human Anatomical Material Policy.
In order to provide investigators with clear and simple guidelines on the proper handling and use of human anatomical material, an appropriate use policy was put into effect at the University of Nebraska Medical Center. The purpose of the policy is to: 1) establish guidelines to account for all human anatomical material from deceased individuals during initial procurement and use through proper disposition and disposal, 2) ensure proper handling of human anatomical material, 3) ensure that the use of human anatomical material meets existing federal, state and institutional guidelines, 4) protect individuals handling or transporting the anatomical material. Although there was initial resistance to some of the requirements of the policy, the benefits have been decreased confusion about what is appropriate use and disposal, a more efficient tracking of all human anatomical materials coming into the university, consistency with other safety guidelines, and a relatively simple and inexpensive means of oversight. The key elements for oversight are the Access data base, a Request for Anatomical Material Form, and a redundant system of electronic and paper tracking of the donors from initial receipt, through custody changes, and final disposition.

LOUIS, Thomas M. and Ronald W. DUDEK, The Brody School of Medicine, East Carolina University, Greenville, NC. Clinical Anatomy of the sensory portion of the autonomic nervous system.
The ANS is both a MOTOR AND SENSORY system. The sensory part of the ANS is the most misunderstood. For example, many clinicians are surprised to learn that CN X and the pelvic splanchnic nerves of the parasympathetic nervous system (PNS) consist of mostly sensory nerve fibers. In this presentation, we will emphasize the following points concerning the sensory role of the ANS: 1) the thoracic splanchnics and other sensory components of the sympathetic nervous system

(SNS) carry visceral pain from nociceptors located in viscera to the brain; e.g., visceral pain due to myocardial infarction, biliary disease and pancreas are carried almost exclusively by the sensory component of the SNS and can be referred to somatic dermatomes (i.e., referred pain); 2) the motor component of the SNS (efferent limb of a reflex arc) is controlled by various visceral sensations (e.g., stretch, movement, pressure, temperature, etc.) carried by CN X (afferent limb of a reflex arc). 3) Finally, the pelvic splanchnic nerves are often overlooked as a second major source of sensory PNS.

LOUKAS, Marios[1], Robert G LOUIS[1], Christopher WARMANN[1], Christopher KINSELLA[1], R. Shane TUBBS[2], Brian CURRY[1], and Robert JORDAN[1]. [1]Department of Anatomical Sciences, St. George's University, Grenada, West Indies, [2]Department of Pediatric Neurosurgery, University of Alabama at Birmingham, Birmingham, AL. Anatomical research as a teaching method and career guidance, an anatomist perspective Part I.

Teaching anatomy in medical schools is becoming increasingly challenging due to the progressive evolution of university teaching missions, student populations, medical curricula and continuous shrinkage of basic sciences teaching hours. In addition, the dominance of basic science research has placed anatomy teaching in a continuous battle for funding and contact hours. At St George's University, we have established a second year selective program of anatomy research, prosections and teaching. Students enrolled in this program have a minimum of 3.5 GPA (honor students), and most importantly a dedication to research and publishing. Over 5 years 88 students have enrolled in this program of which eighty four students have published either an abstract or an original communication in peer reviewed journals. The total number of papers published in peer reviewed journal was 62. In addition, 75 abstracts have been presented either as a poster or oral presentation in national and international meetings. The publishing of papers in peer reviewed journals with medical students as co-authors enables an institution to enhance their reputation in both academia and research. The students enrolled in this program had an average GPA of 3.68 and upon graduation a GPA of 3.88 and their USMLE board scores were 8 percentile units higher when compared to group of students with identical GPA. It is important to note when these students enroll in our selective program, they are required to be demonstrators, teaching assistants and/or prosectors during the anatomy course given to incoming class.

Interestingly, their anatomy knowledge and dissection skills are markedly enhanced. Our results suggest that research driven problem-based learning, in addition to traditional or non traditional method of anatomy instruction, may prove to be of value in enchasing the overall teaching of anatomy. In addition, students knowledge and performance in general is markedly enhanced.

LOUKAS, Marios[1], Christopher KINSELLA*[1], Robert G LOUIS[1], Christopher WARTMANN[1], R. Shane TUBBS[2], Brian CURRY[1], and Robert JORDAN[1]. [1]Department of Anatomical Sciences, St. George's University, Grenada, West Indies, [2]Department of Pediatric Neurosurgery, University of Alabama at Birmingham, Birmingham, AL. Anatomical research as a teaching method and career guidance, a student perspective Part II.

Surgical residencies remain one of the most competitive medical specialties with more than 99% match/fill rate in the past several years. An oversupply of qualified applicants leads to intense competition for these residency spots, allowing program directors to be more selective in choosing future residents. Factors important to program directors include USMLE board scores, research publications, age entering residency, marital status and medical school affiliation. Students who enter our research selective program, in addition to high USMLE board scores, boost their publication record. As a result, all students who applied to competitive residencies received several application interviews and ultimately are matched to their preferred program. Interestingly, research publication records played a major role during the interview process. In addition, a high standard of anatomical knowledge is essential to successful surgical training. All students were very confident with their anatomical knowledge during the interview process. A contributing factor to this was also their experience in presenting projects at national and international meetings. Interestingly, all students after such intense exposure to anatomy research and teaching expressed a strong interest in establishing linkage with the American Association of Clinical Anatomists, especially after their graduation. In addition, the vast majority of students graduated are still collaborating in research papers or suggesting ideas and projects from a clinical perspective. Our experience suggests that research driven problem based learning, in addition to traditional or non traditional anatomy teaching will prove to the residency program directors the value of the these student. In

addition, with this program more young doctors are interested in and actively involved in the anatomical sciences.

MacPHERSON, Brian R. and Jerry TIEMAN*. Department of Anatomy and Neurobiology, University of Kentucky, Lexington, KY. Oral Histology 2.0.
A web/CD hybrid has been used as the laboratory component of the oral histology section of the dental histology course at the University of Kentucky College of Dentistry for the past 10 years. The authors created Oral Histology 1.0 with numerous interactive aspects that allowed users to interface with the web even when using the CD version. The program received critical aclaim from the users - both at UK and elsewhere, but it was clear the template was over-developed for typical student use. Analysis of annual student and/or user evaluations resulted in compilation of a series of features users considered essential, those they liked, some they requested, and others they felt were extraneous. The new template allows scrolling HTML text, larger initial images, the ability to move from one enlarged image to the next (for student self-assessment) and a drop-down jump-to menu. With these modifications in place, the template is now being utilized for the entire dental histology course, as well as replace the microscope-based laboratory in the medical histology course.

MARTINO, Leon J. and Julie A CHANG*. Anatomical Gift Program, Albany Medical College, Albany, NY. Utilization of a Materials and Usage Policy for the internal acquisition and use of cadaveric materials.
The acquisition, distribution and use of cadaveric material has recently come under extreme scrutiny. Numerous adverse reports of misappropriation and handling of cadaveric materials by unscrupulous individuals have introduced distrust to legitimate donation programs. In order to insure the integrity of cadaver donation programs, it is imperative that institutions make a commitment to utilize best practices which include sound written policies governing all aspects of cadaveric material acquisition, distribution and use. The Anatomical Gift Program of Albany Medical College is responsible for the procurement and use of anatomical materials within the Albany Medical Center and its affiliates. Human cadaveric material provides an invaluable resource in the acquisition and development of clinical skills and the Anatomical Gift Program is committed to providing access to cadaveric materials in response to reasonable and practical requests. In an effort to insure integrity of the use of cadaveric

material, the Anatomical Gift Program had developed a policy and procedure for the acquisition and use of human cadaveric material from individuals or groups within the institution. The materials and usage policy is based upon ethical considerations, health hazards, cost effectiveness and the Anatomic Gift Program's obligation to protect Albany Medical College from potential embarrassment and litigation. An individual or group within the institution inquiring on the use or availability of cadaveric material is presented with the Materials and Usage Policy. The policy requires a written proposal including the objectives of the proposed exercise, the participants, a description of the cadaveric materials requested and the duration of the exercise. In addition, it outlines specifics on the use, handling and care of the cadaveric materials and the anatomical laboratories. Utilization of this policy allows access to cadaveric materials to institutional users in an effort to promote the development of clinical skills and research, insures the ethical utilization of cadaveric materials and preserves the integrity of the Anatomical Gift Program.

MATUSZ, Petru L.[1], Agneta Maria PUSZTAI[1]*, Delia Elena ZAHOI[1]*, Cristian STEFAN[2], Ancuta M. STEFAN[2]*, Dorina SZTIKA[1]*, and Eniko Christine HORDOVAN[1]*. [1]Department of Anatomy, University of Medicine and Pharmacy "Victor Babes" Timisoara, ROMANIA, [2]Department of Cell Biology, University of Massachusetts Medical School, Worcester, MA. The absence of the right branch of the portal hepatic vein as a morphologic entity. Study on corrosion casts.

The trunk of the portal hepatic vein (PHV) normally bifurcates into a right branch (RBr), which gives birth to the anterior branch (ABr) and the posterior branch (PBr), and a left branch (LBr), which gives birth to the medial branches (MBrr) and to the lateral branches (LBrr). We analyzed 100 hepatic corrosion casts to study the presence/absence as a morphologic entity of the RBr of the PHV, and the corresponding origin of the ABr and PBr. The corrosion casts were made by injecting with plastic of the hepatic vasculo-ductal system, followed by hepatic parenchyma corrosion with hydrochloric acid. A percentage of 94% of the corrosion casts presented a modal aspect, and in 6% cases the RBr was absent as a morphologic entity. We noticed three peculiar situations: in 3% cases the PHV trifurcates into the LBr, ABr and PBr; in 1% cases the PHV bifurcates directly into the ABr and PBr, and the LBr emerges from the ABr; in 2% cases the PHV bifurcates into the LBr and PBr (the ABr emerges from

the transverse portion of the LBr). These peculiar branching modalities of the PHV trunk need to be known when performing regulated hepatic resections. (Supported by CEEX 175/2006).

MCARTHUR, Angela M. and David A. LEE, Anatomy Bequest Program, University of Minnesota Medical School, Minneapolis, MN. Dean R. FISHER, and Terry D. REGNIER, Anatomy Bequest Program, Mayo Medical School, Rochester, MN. Ryan M. GRAVER*, TRIA Orthopaedic Center, Bloomington, MN. A state-wide network: increasing awareness, advancing education and addressing proper procurement and use standards for non-transplantable anatomical donations.

With advances in genetic research, biotechnology, medical devices and general medicine; an unforeseen consequence has developed in which the demand for donated human tissue has amplified exponentially. Responding to this tremendous increase in demand, a new industry has formed, non-transplantable tissue banking; unfortunately this industry operates with little to no oversight or regulation. Due to the lack of regulation, no standard practices have been established and in many cases basic laws referring to mortuary sciences are not being followed. MN has taken steps to become the first state to address these growing issues on a large scale. In 2005, the MN Commission of the Procurement and Use of Anatomical Donations (MCUAD) was organized to address these issues. The commission provides advocacy and develops best practice protocol standards. MCUAD has established a state-wide network focused on facilitating services related to increasing the awareness around donation and to ethically and operationally help meet the demand associated with the growing need for educational activities in the state of MN. This focus has resulted in draft legislation, proposing revision of the mortuary science statues, to be placed into law in 2007 and has resulted in more donations to both bequest programs in the state.

MCBRIDE, Jennifer M. Cleveland Clinic Lerner College of Medicine, Cleveland, OH. Implementation of interactive seminars in medical school Neuroanatomy.

Neuroanatomy instruction in the medical school setting is predominantly carried out with the use of didactic instruction followed by a laboratory session. To promote active student learning at the Cleveland Clinic Lerner College of Medicine, instruction in Neuroanatomy is approached with case directed discussion lead by a faculty member as an alternative to didactic

sessions. In addition, passive laboratory time is substituted with stations facilitated by a second faculty member using models, images, and gross specimens. Prior to each session students prepare by reading the assigned text and reviewing guiding questions accompanying relevant cases. During the session students are split into two groups of sixteen, one group beginning the laboratory portion while the second group begins discussing the cases. Halfway through the two hour session the two groups switch exercises. Student response to this method of Neuroanatomy instruction during the winter session 2007 was exceedingly positive. Students verbally reported improved comprehension following these interactive sessions as opposed to student reports from previous years in which a less interactive approach was utilized.

MCNEIL, Jon* and Brion BENNINGER. Department of Integrative Biosciences, Department of Surgery, Oregon Health and Science University, Portland, OR. The spinal and cranial roots of the accessory nerve do not join intracranially.

The accessory nerve has been reported to have a spinal root, which ascends through the foramen magnum and subsequently joins its cranial root within the posterior cranial fossa prior to exiting the jugular foramen. Our dissection included several techniques (some using surgical loops). Craniotomy was performed to aid the removal of the cerebral cortex and cerebellum. A V-wedge resection of occipital bone was performed to the posterior foramen magnum. Erector spinae muscles and posterior aspects of cervical and thoracic vertebrae C1–T7 were removed exposing the spinal canal and its contents. Cervical nerves were identified and tracked, which ultimately joined to form the spinal root of the accessory nerve. All nerves forming the spinal root exited caudal to the medulla. We identified a separate nerve (so called cranial root), which had arisen intracranially and ran parallel with the spinal root but failed to join it intracranially. This laborious and meticulous dissecting process, exposing the ascending extracranial spinal root of the accessory nerve, its intracranial morphology and path to the jugular foramen, suggested that the accessory nerve is composed solely of spinal tissue.

MCNEIL, Jon* and Brion BENNINGER. Department of Integrative Biosciences, Department of Surgery, Oregon Health and Science University, Portland, OR. The transitional nerve: a

new and original classification of a peripheral nerve supported by the nature of the accessory nerve (CN XI).
Classically, the accessory nerve is described as having a cranial and a spinal root. Textbooks are inconsistent with regard to the modality of the spinal root of the accessory nerve. Some authors report the spinal root as general somatic efferent (GSE), while others list it as having a special visceral efferent (SVE) modality. We investigated the comparative, anatomical, and embryological literature to determine which modality of the accessory nerve was accurate and why a discrepancy exists. We traced the origin of the incongruity to the writings of early comparative anatomists who believed the accessory nerve was either branchial or somatic depending on the origin of its target musculature. Both theories were supported entirely by empirical observations of anatomical and embryological dissections. We find ample evidence, including very recent molecular experiments, to show that the cranial and spinal root are separate entities. Furthermore, we determined that the modality of the spinal root is neither GSE or SVE, but a unique peripheral nerve with a distinct modality. We propose a new classification of the accessory nerve as a transitional nerve, which demonstrates characteristics of both spinal and cranial nerves.

MILLER, Brian T., Thomas J. COLLINS, and Diane E. CHICO. Division of Anatomy, Department of Neuroscience and Cell Biology, University of Texas Medical Branch, Galveston, TX.
Retention of anatomical knowledge by senior medical students.
First year medical students at our institution take an intensive 8-week anatomy course that includes formal lectures, problem-based learning, and whole body dissection. During their senior year, our medical students may elect to enroll in a 4-week course in anatomy that includes independent dissection, journal clubs and small group discussions. Because we wanted to determine how much anatomical knowledge our senior students possessed, we asked each senior enrolled in the fourth year anatomy course to take a 40 question written examination. This multiple-choice exam contained questions comparable to their first-year exams over standard anatomical regions: thorax, upper and lower extremities, back, abdomen, pelvis, head and neck. Sixty percent of the questions included images of anatomical structures, pathology, or radiographs. Over the past three academic years, 100 senior students completed this exam; the average score was 70.5%. There was no difference in overall performance between the students from different academic

years. In general, students fared best on questions about the head, thorax and upper extremity and relatively poorly on questions concerning the lower extremity and back. Interestingly, the scores students received in the fourth year exam showed only a modest positive correlation with scores from their first year anatomy course.

MOON*, Judy J., Coen A. WIJDICKS*, and James M. WILLIAMS. Department of Anatomy and Cell Biology, Rush Medical College, Rush University, Chicago, IL. Right hepatic artery originating from the superior mesenteric artery and its potential implications.

The arterial supply to the liver varies substantially. Up to 75% of patients have been reported to possess some variant of the circulation. Prior studies define any hepatic artery deviating from the typical celiac hepatic anatomy as aberrant. A right or left hepatic artery arising from the superior mesenteric artery (SMA) is classified as replaced if it represents the corresponding lobe's sole arterial supply, and accessory if it feeds the lobe in addition to the normal hepatic artery. A replaced right hepatic artery (RHA) has been documented in 5-25% of reported cases. A 64-year-old male cadaver revealed a replaced RHA crossing posterior to the portal vein. The replaced RHA originates from the persistence of the longitudinal ventral arterial segment connected to the SMA in embryo. Occlusion of the SMA is a common clinical problem and in cases such as this, not only the gut but also the right liver will become ischemic. Preoperative detection of a replaced RHA in prospective donors and recipients is essential for the proper management of living donor liver transplantation, as transplantation of the right lobe is heavily favored over the left, and the anatomical variation affects the safety of both donor and recipient.

MYERS, Candice*[1], Robert G. LOUIS[1], Christopher WARTMANN[1], R. Shane TUBBS[2], Brian CURRY[1], Robert JORDAN[1], and Marios LOUKAS[1]. [1]Department of Anatomical Sciences, St. George's University, Grenada, West Indies, [2]Department of Pediatric Neurosurgery, University of Alabama at Birmingham, Birmingham, AL. T2 and T3 contributions to the brachial plexus.

Although the surgical anatomy of the axilla has been well described, little is known regarding the degree or frequency of potential contributions to or communications with the brachial plexus. The aim of our study, therefore, was to explore

extrathoracic as well as potential intrathoracic contributions to the brachial plexus from T2 and T3, in prefixed post fixed and typical brachial plexuses. The anatomy of the ventral primary ramus of T2 and the 2nd intercostal nerve, including its lateral cutaneous contribution as the intercostobrachial nerve (ICBN) and the ventral primary ramus of T3 was examined in 75 adult human cadavers (150 axillae), with particular emphasis on the communications with the brachial plexus. From the 150 brachial plexuses, 31 (20.6%) were prefixed and 10 (6.6%) were postfixed. Extrathoracically, communications were observed to occur in 86% of specimens. These contributions arose variably from either the ICBN or one of its branches and communicated with the medial cord (35.6%), medial antebrachial cutaneous nerve (25.5%) or posterior antebrachial cutaneous nerve (24%) While the majority of specimens (68.2%) were observed to have only one extrathoracic communication, 31.7% of specimens exhibited two. Intrathoracically, communications were observed to occur in 17.3% of specimens. These communications always arose from the ventral primary ramus of T2. When combining and comparing data within individual specimens, it was observed that those axillae without an extrathoracic contribution from the ICBN always contained an intrathoracic communication. In addition, 8 of the postfixed specimens had a communication branch with T3. All the specimens with prefixed brachial plexuses had an extrathoracic communication with ICBN, while in all postfixed specimens the ICBN had an intrathoracic course. Based on our findings, we conclude that 100% of specimens contained communication branch between T2 and the brachial plexus and that the majority of the post fixed brachial plexuses had an intrathoracic communication with T3. Considering the possible implications of this data, with regards to sensory innervation of the arm and axilla, further studies in this area of research could prove extremely beneficial.

NELSON, Peter S.*, Greg C. THOMPSON*, Mohammed P. AKHTER*, Tarnjit S. SAINI*, and Neil S. NORTON. School of Dentistry, Creighton University Medical Center, Omaha, NE. An assessment of strain distribution during mechanical loading of lateral pterygoid process of the sphenoid bone.

The lateral pterygoid plate (LPP) gives origin to the inferior head of the lateral pterygoid muscle from its lateral surface and medial pterygoid muscle from its medial surface. There is little information regarding stress loading of the LPP with regards to two heterogeneous and differently functioning muscles from

opposite surfaces. This study was conducted to measure the distribution of the mechanical strain in the LPP in 4 fresh cadaver specimens when the surfaces were mechanically loaded using a range of tensile stresses. Uniaxial strain gauges were centrally attached to the medial surface of the right LPP and to the lateral surface of the left LPP. An Instron was used to apply load through an attached wire to the lateral and medial surfaces of the LPP simulating the direction of the pterygoid muscles. Tensile loading was applied between 0 to 35 Newtons (N). Medial surface was under compressive strain with a slope of 23 microstrain/N (or 0.042 N/microstrain). The lateral surface was under tensile strain with a slope of 6.6 microstrain/N (or 0.152 N/microstrain). These data suggest that there is greater compressive component of the surface strain on the medial surface as compared to the lateral surface when subjected to loads.

NGUYEN, Duc H.* and Kenneth C. HISLEY. Department of Art As Applied to Medicine, Johns Hopkins School of Medicine, Baltimore, MD, Department of Diagnostic Radiology, University of Maryland School of Medicine, Baltimore, MD. Applications and Technical Challenges of Radiology-Based Visualization Programs for Three-dimensional Modeling of the Neck.
The visualization of medical image sets provides for graphic innovation for clinical communication and training by medical illustrators. CT and MRI modalities acquire 2D visual data spatially describing anatomy. Post-processing software applications can extend this data by generating 3D models from them. The raw image sets, capable of representing detailed 2D visual information of tissues, regions and systems may be used to synthesize remarkable 3D and even 4D representations as well. They are potentially a rich source of material for the medical illustrator due to constantly improving spatial resolution, grayscale/color contrast characteristics, and accessibility of non-specialist-accessible software capable of generating 3D models. Gaining access to these resources requires instruction in navigating a complex software pathway from raw image to finished illustration art. This pathway is comprised of multiple ordered steps, each one requiring the selection and execution of quantitative and qualitative decisions required of the artist. This project examined the efficacy for the application of these technologies to medical illustration. It accomplishes two things: 1) it compares, contrasts and illustrates volume projection and surface modeling techniques using both CT- and MRI-acquired

neck anatomy and 2) it describes the technical software pathway used from raw image sets to finished illustrations.

NORTON, Neil S., Margaret A. JERGENSON, and Laura C. BARRITT. Department of Oral Biology, School of Dentistry, Creighton University, Omaha, NE. An anomalous origin of the long buccal nerve arising from the lingual nerve.

The long buccal nerve typically arises from the trigeminal nerve in the infratemporal fossa and passes anteriorly between the superior and inferior heads of the lateral pterygoid. It descends inferiorly along the tendon of the temporalis prior to passing through the buccinator at the anterior border of the masseter. It supplies the skin over the buccinator and after passing through it, the mucous membrane lining its inner surface and gingiva along the mandibular molars. In dentistry, the long buccal nerve is not normally anesthetized in an inferior alveolar nerve injection. This is because the long buccal is enclosed with the tendon of the temporalis and is placed too far anteriorly from the normal injection site in the pterygomandibular space. We report an anomalous situation, occurring bilaterally, that was observed during routine dissection. In this cadaver, the long buccal nerve arose from the lingual nerve in the anterior border of the pterygomandibular space. While reports of the long buccal arising from the deep temporal nerves have been observed, this anomalous origin is unique. In this case, inferior alveolar nerve anesthesia would produce a complete hemianesthesia along the mandible since the long buccal nerve would have been additionally anesthetized.

OH, Chang-Seok, Hyung-Sun WON*[1], and In-Hyuk CHUNG[1]. Department of Anatomy, Sungkyunkwan University School of Medicine, Samsung Biomedical Research Institute, Suwon, [1]Department of Anatomy and Brain Korea21 Project for Medical Science, Yonsei University College of Medicine, Seoul, Korea. Morphologic variations of the prostatic utricle.

The prostatic utricle can be dilated, and developed to the müllerian duct cyst in elderly person. The anatomy of this structure, however, has not been described in details, and thus we investigated the prostatic utricle from 55 prostates of Korean male cadavers. They were dissected, or viewed by transrectal ultrasonography before dissection, or serially sectioned to be reconstructed into 3-dimensional structure. The prostatic utricle had a tube which communicated with the prostatic urethra through an opening on the seminal colliculus in 78%, but had not

a tube in 22%. When approaching posteriorly, the utricular tube was located between two ejaculatory ducts in 64%, or beneath them in 14%. The width and length of the tubes were 0.69-3.47mm and 5.96-13.72mm, respectively. The shape of utricular opening on the seminal colliculus was hole, or closed or open slit. The relationship among the openings of utricle and ejaculatory ducts were also diverse. The prostatic utricle could be captured by the ultrasonography only when its opening was hole, and the tube was located between the ejaculatory ducts. These results are expected to improve our current understanding of the prostatic utricle, and to be helpful for treatment of the müllerian duct cyst. (Sponsored by Grant No. E00002 from Korea Research Foundation)

OXORN*, Valerie M., Brian WONG, Lillia FUNG*, Amr ELMARAGHY*, and Anne AGUR. Divisions of Anatomy and Orthopaedic Surgery, Department of Surgery, University of Toronto, Toronto, ON, Canada. Morphology of the human pectoralis major muscle and tendon: A comparison of historic, photographic and digitized images.

A review of historic, photographic, and digitized images of the clavicular and sternocostal heads of pectoralis major muscle and tendon was conducted using historical plates, photographs of cadaveric specimens, and three-dimensional reconstructions of data from digitized cadaveric specimens. The muscle architecture as represented in the historical plates published from the sixteenth to the twenty-first century (e.g. Vesalius, Albinus, Bidloo, and Bourgery) was compared to dissections, as well as to 3D reconstructions of digitized data collected throughout the volume of pectoralis major. The muscle and tendon architecture of some of the early illustrations were found to be comparable to the morphology demonstrated in the 3D reconstructions of the digitized muscle in situ. However, a number of the illustrations did not compare, most notably due to various interpretations of tendon “twisting” and muscular attachment to the tendon. Therefore published anatomical illustrations are not always sufficiently accurate to be used as the sole source of information when new visuals are being developed. Anatomists, medical professionals and biomedical communicators should examine specimens as a primary resource.

OZAN, H.[1]*, N. KOCABIYIK[1]*, B. Demirel[2]*, and B. YALCIN[1]*. [1]Gulhane Military Medical Faculty, Department of Anatomy, [2]Gazi Medical Faculty, Department of Forensic Medicine, Ankara, Turkey. Pattern of connection between papillary muscle and chordae tendineae of left ventricle.

Mitral homograft replacement requires a good knowledge of the anatomy of the papillary muscles. In 60 (38 male, 22 female) cardiac preparations of various age (16-44 ages) branch distribution of the chordae tendineae and level of their fixation to the ventricular surface of the right and left cusps of mitral valves have been studied. Papillary muscles and chordae tentineae were examined with dissecting microscope then the geometrical arrangement of them were determined. We defined three groups of the left ventricular papillary muscle. In group I (43.3%, 52/120) the basal part and the apex of the muscle were undivided. In group II (30%, 36/120) there were two heads; in subgroup II/A (20%, 36/120) the base of the papillary muscle was undivided and in II/B (10%, 12/120) it was divided into two separate parts. In group III (26.7%, 32/120) the papillary muscle had three heads. In subgroup III/A (16.7%, 20/120) the base was undivided, while in III/B (10%, 12/120) it was made up of two. We also investigated 2 to 15 chordae tendineae originated from the apex of papillary muscle, ending in 9 to 60 chordal insertions into the corresponding half of the valve. Thus these results may be of a great value in endoscopic and conventional mitral valve replacement or reconstruction of the chordae tendineae and in mitral valve homograft implantation.

(Sponsored by B. R. MacPherson).

PARK, Hyo Seok*[a], Min Suk Chung*[a], and Jin Seo Park*[b]. [a]Department of Anatomy, Ajou University School of Medicine, 5 South Korea, [b]Department of Anatomy, College of Medicine, Dongguk University, Korea. Surface reconstruction of stacked contours by using the commercial software.

After drawing and stacking contours of a structure, which is identified in the serially sectioned images, three-dimensional (3D) image can be made by surface reconstruction. Usually, software is composed for the surface reconstruction. In order to compose the software, medical doctors have to acquire the help of computer engineers. So in this research, surface reconstruction of stacked contours was tried by using commercial software. The purpose of this research is to enable anatomists or medical doctors to perform surface reconstruction

to make 3D images by themselves. The materials of this research were 996 anatomic images (1 mm intervals) of left lower limb, which were made by serial sectioning of a cadaver. On the Adobe Photoshop, contours of 114 anatomic structures were drawn, which were exported to Adobe Illustrator files. On the Maya, contours of each anatomic structure were stacked. On the Rhino, superoinferior lines were drawn along all stacked contours to fill quadrangular surfaces between contours. On the Maya, the contours were deleted. 3D images of 114 anatomic structures were assembled with their original locations preserved. With the surface reconstruction technique, developed in this research, anatomists or medical doctors themselves could make 3D images of the serially sectioned images.

PARK, Jin Seo[1]*, Min Suk Chung[2]*, Hyo Seok Park[2]*, Zang-Hee Cho[3]*, and Yong-Wook Jung[1]*. [1]Department of Anatomy, College of Medicine, Dongguk University, Korea [2]Department of Anatomy, Ajou University School of Medicine, Korea [3]Neuroscience Research Institute, Gachon University of Medicine and Science, Korea. Seven Tesla MRIs and Advanced Anatomic Images of Cadaver Head.
The objective of this research is to present advanced MRIs and anatomic images of cadaver head, which promote better atlas, 3D images, and virtual dissection software of head structures including brain. To achieve this objective, we took 7 Tesla MRIs of a cadaver head by using the state-of-the-art MR machine; we serially sectioned the cadaver head with 0.1 mm intervals by using the same cryomacrotome as used for Visible Korean Human; we photographed the sectioned surfaces to make anatomic images with 0.1 mm pixel size and 48 bits color by using a digital camera. As a result, we got 312 MRIs with 448 X 576 resolution, 8 bits gray, and TIFF file format and 2500 anatomic images with 4,368 X 2,912 resolution, 48 bits color, and TIFF file format. In after, structures in the MRI and anatomic images will be segmented to produce segmented images and the segmented images will be stacked and reconstructed to produce 3D images.

PARNANDI, Vandana*, Monica BRANIGAN*, and Anne AGUR. Departments of Surgery and Family and Community Medicine, Faculty of Medicine, University of Toronto, Toronto, ON, Canada. Level of comfort in first year medical students when disclosing difficulties, and reasons for non-disclosure.

Background: There is a growing concern about the level of stress encountered by medical students, particularly during the first year of study. Although a moderate degree of stress can promote creativity and achievement, intense pressure may impair student behavior, strain personal relationships and diminish learning. Objectives: To determine the types of difficulties and coping mechanisms used by first year medical students at the University of Toronto. The use of student support programs and reasons for non-disclosure were explored. Methods: An online survey was designed using a modified questionnaire (permission of K. Moffat, University of Glasgow). The class was e-mailed twice over a 2-week period and invited to complete the survey. Results: The response rate was 55% (110/202 students). Stress was reported to result from the following issues: academic (79.8%), personal (57.8%), financial (29.4%), and other (10.1%). The most commonly used coping strategy was 'receiving support from friends outside of school' and the least used was 'student support programs'. Reasons for non-use of support programs included: personal coping strategies sufficient (55.2%), fear and stigma (2.1%), unaware of programs (2.1%). Of the participants who used student support programs the perceived level of support received was varied. Conclusion: Family and friends are the main support networks of students. The methods of delivery of student support services need to be reassessed on an ongoing basis to be certain that the needs of the current student population are being met.

PETTERBORG, Larry J. School of Physical Therapy, Texas Woman's University, Dallas, TX. A learning portfolio for gross anatomy students.

Students entering professional programs may not be adequately prepared for the rigors of graduate education. Our PT students must successfully complete a full body dissection course in the first eleven weeks of the curriculum. These students are challenged to learn large volumes of material in a short period of time. To encourage students to reflect upon how they learn as well as what they learn, we require a "Learning Portfolio". This portfolio consists of a reflective essay on the unique learning experience of human dissection and documents supporting the main points of the essay. Specifically, the students are asked to compare their initial expectations of dissection to what it was actually like to dissect a cadaver, what they gained from dissection, what concepts were learned, the contribution of dissection to development of problem-solving abilities, and

adjustments in approaches to learning. To stimulate analysis of learning, the students complete a learning style inventory (http://www.vark-learn.com/english/index.asp) during the first week of class. Additional prompts facilitate reflection upon exam preparation and results. Most students report that undergraduate study habits are inadequate to meet the demands of graduate education. Course evaluations reveal that students view the learning portfolio positively. Excerpts from student essays will be presented.

PORTA, David J., Tyler A. KRESS*, Dave HALSTEAD*, Jeremy O. STATTON*, and Craig S. ROBERTS*. Department of Biology, Bellarmine University, Louisville, KY. B.E.S.T. Engineering Co., Knoxville, TN. Southern Impact Research Center, LLC, Knoxville, TN, University of Louisville Department of Orthopaedic Surgery, Louisville, KY. Drop-tower testing of cadaver legs: Experimental production of medial malleolar fractures from foot impacts.
During a fall, heal impact usually results in calcaneal, talar and tibial pilon fractures. We explored the engineering and anatomical results of vertical drops where the initial contact point was the ball of the foot- resulting in a violent dorsiflexion. Four matched pairs of human lower extremities were fresh frozen shortly after death and thawed prior to testing. The specimens were equipped with a PCB accelerometer and fixed to a drop-tower apparatus with the leg flexed between 10 and 25 degrees. The specimens were raised and dropped onto an instrumented force plate. Impact velocities ranged from 4.6 to 5.1 m/s. Peak accelerations experienced by the legs ranged from 23.4 to 36.5 G's and impact energy was calculated to be 216 to 271 joules. Testing was captured on 8 mm video (30 frames/sec) and a Photec IV High Speed Film camera recording the impact events at 1,000 frames/sec. Post-test radiographs were made and the feet were dissected. The most consistent finding was medial malleolar fractures in all 8 cases. The results are compared to one of the most popular grading systems utilized by radiologists and orthopedic surgeons- the Lauge-Hansen classification. Partially supported by Grant #F00-54 from the Fischer-Owen Orthopaedic Trust Fund)

PRABHU, Latha V.[c]*, Sampath MADHYASTHA[c]*, S. N. SOMAYAJi[a]*, K. L. BAIRY[b]*, and PRAKASH[c]*. [a]Department of Anatomy, Manipal-Melaka Medical College, Manipal, [b]Department of Pharmacology, Kasturba Medical College,

Manipal, [c]Department of Anatomy, Kasturba Medical College, Mangalore. Effect of prenatal stress and serotonin depletion on postnatal serotonin metabolism in Wister rats.

Prenatal stress in rats results in structural, physiological and behavioral alterations that persist in adulthood. Serotonin (5-HT) is an important neurotransmitter known to involve in these prenatal stress-induced behavioral alteration. The aim of the study was to investigate the effects of interrupted synthesis of serotonin (5-HT) and immobilization stress during different gestational period on brain serotonergic system of neonatal (postnatal day 15) and adult rats (60 days old). Pregnant rats were subjected to restraint stress three times daily for 45 min during day 3-14 (G 3-14) or day 14-21 (G 14-21) of pregnancy. Another group (p-CPA) of pregnant rats were injected with para-chlrophenylalanine (p-CPA, 400mg/kg/2ml, single dose, ip) producing 5-HT depletion on day 9 or day 17 of pregnancy. Following killing, tissues samples were obtained from various brain regions and serotonin and its metabolite 5-Hydroxy-indole acetic acid (5-HIAA) levels were measured. Several changes were observed in response to both stress and 5-HT depletion but no sexually dimorphic effect. Stress during last embryonic week showed a significant reduction of 5-HT and elevated 5-HIIA levels in early neonatal development but not later during adult hood. A significantly low level of 5-HT and 5-HIAA was observed in offspring from p-CPA treated on day 9 of pregnancy during neonatal development, but such decreased levels were maintained only in hypothalamus and frontal cortex during adulthood. The present study provides additional evidence that prenatal stress affects serotonergic neurons and it is possible that such changes may underlie the reported behavioral deficits in offspring of stressed female rats. These data also provide evidence that the critical period for prenatal stress-induced changes in brain 5-HT neurons were between days 14-21(during final trimester of pregnancy). The frontal cortex and hypothalamic serotonergic neurons are mainly affected by prenatal stress. The effects were almost similar during early development.

RANADE, Anu V.*, Rajalakshmi RAI*, Latha V. PRABHU*, Sampath MADHYASTHA*, PRAKASH*, and Mangala KUMARAN*. Department of Anatomy, Kasturba Medical College, and department of Anatomy, Yenepoya Medical College, Mangalore, KA, India. Role of antioxidants on reperfusion injury following testicular torsion in rats.

Testicular torsion is of primary interest to the mankind because of fertility problems for the patient and medico legal issues for the surgeons. Unilateral testicular torsion seriously interferes with subsequent spermiogenesis in about one half of the patients and produces borderline impairment in another 20%. Most often, surgical intervention is necessary to repair the torsion. However, testicular atrophy can result even after restoration of blood flow or reperfusion, depending on the severity and duration of torsion. The role of antioxidant enzymatic defense system against reactive oxygen species induced injury following ischemia and reperfusion has been studied by administering various antioxidants exogenously. It is evident from literature that role of oxygen free radicals and use of antioxidants in the prevention of testicular reperfusion injury following detorsion is conflicting. Therefore, the present study was designed to study the effect of testicular reperfusion injury following detorsion of the testis. Wistar strain male albino rats were used for this study. The results of this study showed that toxic oxygen free radicals might be involved in reperfusion injury and a “mixture” of antioxidants (vitamin E and C) can offer better protection as it can block the release of oxygen free radicals from many a sources. (Supporteded by Medical Education and Research Trust, Karnataka) (Sponsored by Lynn Romrell).

RAOOF, Ameed, Sabine HILDEBRANDT*, John STRIBLEY, Jose DAVILA*, and Alissa PULLOS*. Division of Anatomical Sciences, Office of Medical Education, University of Michigan Medical School, Ann Arbor, Michigan. Using the Audience Response System (ARS) as a Means for Enhancing Anatomy Teaching in a Large Class.

General issues of concern related to undergraduate anatomy education include the diversity of students’ backgrounds and motives that are reflected often unfavorably on their course performance. Objectives: 1.The effective administration of a relatively large class size. 2. The need for a closer follow up of students’ performance and attendance. 3. To enhance lecture effectiveness by encouraging students' interaction and participation. ARS Applications-fall 2006: 1. First-session class registration. 2. PowerPoint quizzes. 3. Practical quizzes. 3. Pop Quizzes. 4. Lectures. 5. Course’s major exams. Difficulties during application: 1. Software flexibility. 2. The lack of an interactive introductory module on the use of the system. 3. Computer compatibility. 4. Multiple use of the ARS by different sessions. Future Plans: 1. More consistent use of the system

during lectures and exams. 2. Readjusting exams length and frequency to ensure efficiency while maintaining validity. 3. It is hoped that an ARS that is dedicated to the course will eliminate many of the technical and time-consuming preparations.

RAVICHANDIRAN, Kajeandra, Karan SINGH*, Nancy MCKEE*, and Anne AGUR. Division of Anatomy, Department of Surgery, and Department of Computer Science, University of Toronto, Toronto, ON, Canada. Physiological cross sectional area of extensor carpi radialis longus and brevis: an in situ computer modeling study.

Introduction: Physiological cross sectional area (PCSA) is used to predict maximal force of contraction in skeletal muscles. The PCSA of extensor carpi radialis longus (ECRL) and brevis (ECRB) has been previously calculated using limited architectural data based on a small number of fiber bundles (Murray et al.,2000). Purpose: To determine and compare PCSA of ECRL and ECRB as a whole, and regionally using architectural data obtained throughout the volume of each muscle. Methods: Previously collected digitized data of 8 formalin embalmed cadaveric specimens (180-240 fiber bundles/specimen) was used to determine PCSA of ECRL and ECRB, as a whole and for architecturally distinct regions. PCSAs were compared using paired-t test and ANOVA ($p<0.05$). Results: PCSA of ECRB (11.63 ± 4.48 cm^2) was significantly greater ($p<0.05$) than ECRL (5.19 ± 1.68 cm^2). In both muscles, the superficial region had a greater PCSA than the deep region. The PCSA of the lateral region of both muscles was significantly greater than the medial (ECRB 4.63 ± 2.27 cm^2 (lat), 2.17 ± 0.97 cm^2 (med); ECRL 2.04 ± 0.65 cm^2 (lat), 0.96 ± 0.45 cm^2 (med)). Conclusions: As previously reported, due to its larger PCSA, the ECRB is expected to generate a greater force than ECRL. Novel to this study is the quantification of PCSA regionally in ECRL and ECRB.

RAVICHANDIRAN, Mayoorendra, Laetitia LEON*, Karan SINGH*, Bernie LIEBGOTT*, Kenneth NORWICH*, and Anne AGUR. Departments of Surgery and Computer Science, and Institute of Biomaterials & Biomedical Engineering, University of Toronto, Toronto, ON, Canada. Three-dimensional contractile muscle model of mandibular elevation based digitized data from human cadaveric specimens.

Background: Previous models of muscles of mastication have been based on whole muscle volumes, rather than individual

fiber bundles. In our laboratory, a model of passive elevation of the mandible was created using the fiber bundle data (Leon et al. 2006). Purpose: To model elevation of the mandible on contraction of the medial pterygoid (MP), temporalis (T) and masseter (M) muscles, using previously digitized musculoskeletal data and the locations of the instantaneous centers of rotation (ICR) of the condylar head. Method: Digitized data from one cadaveric specimen was used to create a 3D model of the cranium, T, M, MP and lateral pterygoid (LP). The ICR were used to set constraints for contraction of each muscle. Depression of the mandible was passively modeled, whereas elevation was simulated by muscle contraction using Weighted Cluster Deformers in Maya™. Results: This model allowed visualization of elevation of the mandible following activation of the T, M and MP individually or as a group. Changes in length of individual muscle fiber bundles in each of T, M, MP and LP were obtained at any stage of mandibular depression. Conclusions: The use of ICR and digitized muscle fiber bundle data allowed for the creation of a detailed model of mandibular elevation, with the capability of documenting changes in length at the fiber bundle level.

RICHARDSON*, April D., Nathan F. JOHNSON*, and Jennifer K. BRUECKNER. Department of Anatomy and Neurobiology, University of Kentucky, Lexington, KY. Evaluation of podcasting as a learning tool for independent study of cross-sectional anatomy.

Learning is a dynamic process that mandates a multi-dimensional approach to teaching due to a vast diversity of learning styles. Recent advances in podcasting technology have inspired many medical educators to implement novel tactics in the instruction of anatomical sciences. Cross-sectional anatomy has been historically difficult for professional medical students to grasp due to one-dimensional presentations of anatomical structures and limited application of multiple learning styles. The following study examined the correlation between podcasting technology, a novel component of a multi-dimensional approach to teaching, and the ease of interpretation of cross-sectional anatomy. This study employs the use of verbal narratives and visual guidance in a series of cross-sections through the abdomen, head, and neck. The following results suggest a positive correlation between podcasting and student response, in that the surveyed population indicated an increased understanding of cross-sectional anatomy. Furthermore, if made

available, a majority of the students indicated that they would take advantage of the conveniences afforded by podcasting. Students also expressed an appreciation for this multi-dimensional teaching style and stated that this approach helped reinforce anatomical terms and relationships. This positive feedback warrants further development of supplemental tools that bridge technology and education.

RIDDELL, Thomas*, Zachary BAKER*, and Quentin A. FOGG. American University of the Caribbean, Sint Maarten, NETHERLANDS ANTILLES. Potential sites for extracranial-intracranial bypass using the maxillary artery.

Use of the maxillary artery for extracranial-intracranial bypass is increasing in popularity due to the potential for a high rate of blood flow. This technique requires passage through the cranial floor, thus connecting the infratemporal and cranial fossae. Reviewed articles did not specify structures that may be damaged during creation of this passage. This study aims to identify such at-risk structures in relation to the surgical preparation of such a bypass. Cadaveric heads (n=14) were dissected to reveal the maxillary artery, and to expose the bony “roof” of the infratemporal fossa. A 3x2 grid of 8mm2 regions was aligned along the superior margin of the maxillary artery. Each region, designated A1-3 and B1-3, was then drilled in order to enter the cranial cavity. The cranial surface was then examined for damaged structures. The middle meningeal artery, its anterior and posterior segments, and the mandibular division of the trigeminal nerve were regularly at risk. Drilling in the B3 region (postero-medial) caused damage in most structures, whilst the B1 region (antero-medial) never resulted in damage to these structures. The remaining regions resulted in variable damage through the sample population. These data suggest that there are safe regions for surgical communication between the infratemporal and cranial fossae, but that they must be carefully planned. Further study is required to test these results in a larger sample population and to test for finer structural damage.

RODRIGUEZ, Jolie R.* and Jeffrey SOSNOWSKI. Department of Pathology, University of South Alabama, Mobile, AL. A rare case of an intracranial ependymoma, possibly bilateral, in a patient with neurofibromatosis.

Neurofibromatosis is the most common of the phakomatoses, a group of hereditary disorders that also includes Sturge-Weber and tuberous sclerosis. Neurofibromatosis is a group of

diseases, with neurofibromatosis I (peripheral form) and neurofibromatosis II (central form) as the principle variants. Neurofibromatosis II patients often develop spinal ependymomas and, infrequently, intracranial ependymomas; reports of bilateral ependymomas are exceedingly rare. We report the case of a 29 year old male with a clinical history of neurofibromatosis who presented with a six week history of intermittent aphasia, dizziness, short term memory loss and headaches. Disruption of functional areas in the left temporal lobe, including auditory sensory processing, Wernicke's area and the hippocampus were confirmed when imaging studies revealed a left temporal lobe mass as well as a right lateral ventricular mass. Analysis of the resected neoplasm demonstrated pleomorphic, glial fibrillary acidic protein positive glia forming perivascular pseudorosettes. As no microvascular proliferation or necrosis was identified, the neoplasm is most consistent with an ependymoma, World Health Organization grade II/IV. While spinal ependymomas are well-characterized in adults with neurofibromatosis II, literature on cranial ependymomas is scarce. This case report represents the unique finding of an intracranial ependymoma, possibly bilateral, in a patient with neurofibromatosis.

ROSATELLI, Alessandro, Kajeandra RAVICHANDIRAN, and Anne M. AGUR. Division of Anatomy, Department of Surgery, University of Toronto, Toronto, Canada. Regional differences in human lumbar multifidus muscle architecture and intramuscular nerve distribution using 3D computer modeling.
Background: Previous investigation has revealed that lumbar multifidus consists of three architecturally distinct regions: superficial (SMT), intermediate (IMT), and deep (DMT). (Rosatelli et al, 2005). Purpose: To quantify the muscle architecture and intramuscular nerve distribution for each region of lumbar multifidus (MT). Methods: Fiber bundle length (FBL), fiber bundle angle (FBA), and tendon length data was collected for each region of MT for 10 formalin embalmed cadaveric specimens by digitizing and reconstructing MT in 3D using MAYA™. Using the same technique, the nerve supply to each region was delineated. Results: Average FBL differed significantly between regions (ANOVA, $p<0.05$) with SMT having the longest FBL (56.6 $\pm$ 1.0mm) and DMT having the shortest FBL (30.1 $\pm$ 0.6mm). Average FBA was not significantly different but increased from SMT (13.8 $\pm$ 6.8°) to DMT (18.2 $\pm$ 10.4°). IMT was absent at L5 in all specimens. Preliminary results show

that SMT, IMT, and DMT have independent innervation from the medial branch of the posterior ramus. Conclusions: The architectural differences and independent innervation found in SMT, IMT and DMT suggest functional differences between these regions. Normal movement/stability may be compromised in the presence of muscle pathology or denervation to one or more of these regions.

SAGA*, Tsuyoshi, Kengoh TANAKA*, Akira YAKEISHI*, Sadaharu KITASHIMA*, Keiichiro NAKAMURA*, and Koh-ichi YAMAKI*. Department of Anatomy, Kurume University School of Medicine, Kurume, Japan. An Anatomical Study of the Inferior Nasal Meatus Region of the Human Nasolacrimal Duct.
The inferior nasal meatus region of the human nasolacrimal duct consists of a duct and an opening that can have attachments. Some of these attachments in part consist of a huge part of the duct, a thin membranous structure upper the opening, and a hollow below the opening. The opening in the nasal cavity is very important for operations such as epiphora. We observed the inferior nasal meatus region of the human nasolacrimal duct in 100 cases of 50 adult Japanese cadavers at the gross anatomy laboratory of Kurume University School of Medicine. The results showed that the shape of the opening could be classified into 6 types: wide-open (17%), small-open (15%), pinhole (14%), fissure (32%), pseudo-obstruction (22%) and obstruction (0%). Most of the wide-open type opening were found in the upper part of the inferior nasal meatus. In the upper region of the opening, 86% of the cases had a huge duct and 44% a thin membranous structure. At the region below the opening, 85% had hollows that continued from the opening. These results are very useful to better plan an approach to the nasolacrimal duct and its opening, thus assisting towards successful outcomes of surgical interventions in the nasal cavity. (Sponsored by T. Sato).

SALKOWSKI, Lonie R.[1], Edward T. Bersu[2], Bruce H. Barton[3]*, Kazuhiko Shinki[4]*, and Kenneth H. Jones[5]. University of Wisconsin School of Medicine & Public Health, Department of Radiology[1] and Department of Anatomy[2], UW DoIT Academic Technology[3], UW-Madison Department of Statistics[4], Madison, WI and The Ohio State University, Division of Anatomy[5], Columbus, OH. Computer-based Anatomic Radiology Correlation (ARC) model of integration of clinical radiology anatomy into the medical gross anatomy curriculum.

Various methods of incorporating clinical correlations into medical gross anatomy curriculum exist. This pilot program investigated the utility and feasibility of incorporating radiology into the gross anatomy curriculum using small group computer-based teaching format. Four radiology units coincided with the gross anatomy dissections. Students received a pre-test and four unit computer-based single best answer exams. The 152 students had an 80.7% satisfaction of this method of instruction. Preliminary findings for 42-paired questions indicate that prior to the ARC curriculum students are significantly ($p=0.01$) better at identifying normal anatomy on plain films (33.19%) compared to cross sectional imaging (17.46%), and following this program they are equally proficient at identifying normal anatomy on both modalities (73.88% and 73.97%). Significant improvement ($p<0.0001$) existed in identification of normal anatomy on all modalities. The number of unanswered questions significantly ($p<0.0001$) decreased from pretest to post-tests. The type of questions not answered reflected the perceived complexity of the question. Students were more likely to answer a plain film question and less likely to answer cross-sectional imaging questions. This effective teaching method fulfills the basic requirements of normal radiologic anatomy in medical student education as outlined by the Alliance of Medical Student Educators in Radiology (AMSER). (Funded by the University of Wisconsin Department of Radiology R & D Fund and University of Wisconsin Assessment Fund)

SATO, Tatsuo, Hirokazu SAKAMOTO*, Sadaaki HEIMA*, and Yoko TSUBOI*. Professor Emeritus, Tokyo Medical and Dental University (Clinical Anatomy), Tokyo, Japan. Video demonstration of abdominal anatomy emphasizing the critical importance of visceral fusion fasciae.

In the process of understanding abdominal anatomy, it is important to consider the basic structural arrangement and relationships. In order to do so, the visceral fusion fasciae provide the key point. This dissection video clearly demonstrates the means by which these important fusion fasciae divide the abdominal organs (other than the left hemicolon) into three basic groups: upper, lower and posterior groups. In tracing these organ groups toward their axis, it is clear that all three groups are centered at one main axis point at the level of the L1 vertebra according to their arterial supply. The upper group is supplied via the celiac trunk, the lower group via the superior mesenteric artery and the posterior group via the renal arteries. This critical

axis point also serves as the convergence point for lymphatics and the distribution region for nerves. In this video, the valuable combination of schemes and step-by-step dissection facilitates clear comprehension of abdominal topographical arrangement.

SAXTON, Ernestina H.*, James D. COLLINS, Samuel S. AHN*, Hugh GELABERT*, David AGNEW*, and Alfred CARNES*. Departments of Neurology, Radiological Sciences and Vascular Surgery, UCLA, Los Angeles, CA. Adolescent thoracic outlet syndrome (TOS): MRI/MRA/MRV.
Adolescents are at risk for development of thoracic outlet syndrome. In TOS patients compression of the bicuspid valve (costoclavicular) within the veins of the neck and supraclavicular fossae and of the neurovascular bundles disrupts fascial planes, obstructs venous return and triggers complaints of upper extremity numbness and tingling; neck, back and leg pain; color and temperature changes; visual blurring and "floaters", and headache. Common factors predisposing to development of TOS in adolescents include congenital musculoskeletal abnormalities, trauma (acute, chronic or cumulative) and poor posture. These underlying abnormalities often are not recognized until the patient becomes symptomatic. Bilateral multiplanar MRI, angiography (MRA) and venography (MRV) display sites of vascular and neural compression. Abduction external rotation enhances TOS symptoms. This presentation, conducted on the 1.5 Tesla (GE Signa LX) with abduction external rotation, 4.0mm thickness and 512 x 256 matrix size, displays vascular compression (JNMA. 2003; 95:298-306) in four adolescent young women, one with Scheuermann's disease, a cheerleader and swimmer, a high school ROTC student and a volleyball player. Thoracic outlet syndrome is a clinical diagnosis. Early recognition and knowledge of the underlying landmark anatomy allow early intervention (for example, avoidance or correction of faulty athletic techniques) and prevention of irreversible disability.

SEDLMAYR, Jayc C.* and Jonathan J. WISCO*. David Geffen School of Medicine at UCLA, Department of Pathology and Laboratory Medicine, Division of Integrative Anatomy, Los Angeles, CA. Reassessment of the functional significance of the lesser trochanter.
The lesser trochanter is typically described as the area of insertion for the iliopsoas muscle exclusively. This singular function is peculiar given the large amount of femoral surface

area the lesser trochanter occupies. During the routine dissection of five hip regions, we have discovered that the tendon of the psoas muscle only inserts into a crest running from the superior to anterior aspect of the lesser trochanter, and is surrounded by four other muscles which have been traditionally depicted as inserting elsewhere on the shaft of the femur. The other muscles inserting into the lesser trochanter and nearby bony landmarks include 1) iliacus, which inserts fleshly into the anterior portion and into an inferior crest; 2) pectineus, into a ridge on the inferior surface; 3) adductor brevis, into a crest alsong the posterior surface; 4) adductor magnus, also into a crest along the posterior surface. Iliopsoas is separated from the adductor muscle group by a medial facing knob of the lesser trochanter that we hypothesize acts as a mechanical pulley. The functional significance of the lesser trochanter and the actions of psoas, iliacus, pectineus, adductors brevis and adductor magnus muscles are reassessed in light of these observations. (Sponsored by S. Metten).

SEIFERT, Mark F.[1], Ronald L. SHEW[1], Valerie D. O'LOUGHLIN[1], James J. BROKAW[1], Laura TORBECK[2]*, Robert L. OSGOOD[3]*, Dale W. SAXON[1], and James J. WALKER[1]. [1]Department of Anatomy and Cell Biology, [2]Department of Surgery, Indiana University School of Medicine, [3]IUPUI School of Education, Indianapolis, IN. Countering the Future Shortage of Qualified Gross Anatomists: A Proposed Education Track Ph.D. In Anatomy.

Several recent reports and symposia have signaled concern over an anticipated shortage of qualified anatomy instructors, especially in gross anatomy and neuroscience. Graduate training in anatomy over the past 20 years has progressively de-emphasized the learning and teaching of gross anatomy and has focused instead on training students to be competitive in cutting-edge biomedical research. One of the consequences of this pendulum change is that few current anatomy or basic science Ph.D.s are fluent in gross anatomy, and most are not selecting gross anatomy as their teaching field. Given the current national projection of graduate students intending to teach gross anatomy, coupled with the impending retirement of a past generation of classically trained anatomists, it appears likely that the demand for gross anatomy instructors will exceed available supply. In an effort to respond to this anticipated shortage, our Department assembled a committee of faculty from the Schools of Medicine and Education to develop an Education Track Ph.D.

in Anatomy. This track is designed to provide students with extensive training in the anatomical subdisciplines, educational pedagogy and assessment, and significant teaching experience. The goal of this proposed track, which is awaiting final institutional approval, is to produce doctoral-level anatomy educators who are equipped to teach all the anatomical subdisciplines and conduct rigorous, hypothesis-driven educational research and other scholarly work necessary for promotion and tenure.

SEIFERT, Mark F. and Ron L. SHEW. Department of Anatomy and Cell Biology, Indiana University School of Medicine, Indianapolis, IN. Introducing a Reflective Writing Exercise into the Gross Anatomy Curriculum.
During orientation day just prior to the start of our gross anatomy course, first-year medical students were given a reflective writing assignment as part of our competency-based medical curriculum. They were given the choice between two topics to write a short essay on. One topic dealt with their thoughts about the dissection experience in anticipation of the first day of gross anatomy lab, and the other dealt with their thoughts toward the donor in the context of learning anatomy and their medical education. This assignment was in partial fulfillment of Competency V: Self-Awareness, Self-Care, and Personal Growth. Essays from two consecutive class years (311 students) were evaluated. The majority of students (about 67%) chose to write about their thoughts in anticipation of dissecting while 28% chose to write about their thoughts toward the donor (~5% of the students wrote on both). This exercise was instructive to faculty in that students revealed multiple fears or anxieties previously unrecognized by us, such as fear of ridicule from peers should they faint in lab, fear of failing to dissect correctly, or fear of having or not having a strong emotional connection toward the donor. This exercise was viewed to be a positive experience by both students and faculty and when introduced at the start of the course helped students establish a positive professional attitude toward their medical education.

SEVERSON, Arlen R. Department of Anatomy, Microbiology and Pathology, Division of Anatomy and Cell Biology, University of Minnesota Medical School Duluth, Duluth, MN. Using team based learning (TBL) as an instructional strategy for learning normal and abnormal reproductive system development.

TBL is a well-defined instructional strategy used in education bringing together theoretically-based and empirically-grounded strategies for ensuring the effectiveness of small groups working independently in classes with high student-faculty ratios (e.g., up to 200:1) without losing the benefits of faculty-led groups of lower ratios (e.g., 7:1). In this study, each student was assigned to a group. A reading assignment along with learning objectives or issues related to the topic was provided for each student prior to the scheduled class period. Individual and group readiness assurance tests were given during the first scheduled class period, the tests corrected, and the answers discussed. Application exercises (clinical cases) with learning issues were given to each student, and each student's group was expected to evaluate the clinical case, investigate the learning issues, and raise additional questions related to the case. The clinical cases were discussed in a scheduled class period where each student group took turns presenting their answers to the learning issues and raising additional questions. A written five question subjective student evaluation of the learning strategy followed. Students responded positively to TBL and felt the application sessions using the clinical cases beneficial in establishing long-term memory regarding reproductive system development.

SHEEDLO, Harold J., Armando A. ROSALES, Robert ROUTH*, and Rustin E. REEVES. Department of Cell Biology and Genetics, University of North Texas Health Science Center, Fort Worth, TX. Summer Workshops in the Anatomical Sciences for Middle and High School Students.

Over the past years summer workshops have been developed allowing students from local middle and high schools to learn the genetics, public policy, and anatomical basis of disease processes that are causing problems in the US and world. For the past two years the one-week workshops have stressed human immunodeficiency virus and Avian flu. These summer workshops are presented by anatomy faculty and National Science Foundation (NSF)-funded graduate fellows from UNTHSC departments, clinical faculty who have specific knowledge of the disease, and faculty from the School of Public Health. Lectures are followed by hands-on application in a laboratory setting. Students learn the basis of diseases, how it is treated, and the impact that the disease has on society. An activity called "Mock Outbreak" is scheduled for the last day of the workshops to give the students an appreciation of the seriousness of the disease and its complications. In addition,

these workshops allow the students to tour the medical school affording them the opportunity to see for themselves the didactic atmosphere of a health science center. The major goal of these workshops is to engage the students and develop a genuine interest in science. (Supported by NSF, Grant #0440334).

PRABHU, Shiv*[1], Xiaoyong SU*[1], Charlie QIU*[1], Chi-Cheng CHU*[1], Brandi SCHMITT[2], and Rajit GADH*[1]. [1] Wireless Internet for the Mobile Enterprise Consortium (WINMEC), UCLA, Los Angeles, CA. [2]Univ. of California, Oakland, CA. SpecimenTrak: an RFID system for tagging and tracking anatomical specimens. Radio Frequency Identification (RFID) is a non-line-of-sight, automatic data collection and management system, which can impart unique identification to objects, assets, and personnel, and facilitate tracking and tracing in real-time whenever and wherever the tagged objects are located or moving about in the designated application or geographic domain. SpecimenTrak is an ongoing research program at UCLA – WINMEC RFID Lab will depict a Low Frequency RFID technology, its features and characteristics, and highlight those features, which will perform reliably in an anatomical services environment. The discussion will cover the architecture, different modules and features of the current version of the system. We will also discuss how SpecimenTrak system ensures automatic, accurate and real-time information tracking and management, which is being utilized in cataloging, tracking throughout the lifecycle, maintaining chain of custody, data error mitigation and verification, location assignment and identification, activity and event logs, improving accountability and productivity, security and anti-pilferage measures, and regulatory and protocol compliance monitoring in anatomical services. Some of the initial pilot study planning and results will be presented. In conclusion our own experiences on developing this RFID based solution and the potential of extending it to other healthcare needs will be shared. "(Sponsored in part by WINMEC, UCLA and Office of the President, University of California)"

PRABHU, Shiv*[1], Xiaoyong SU*[1], Charlie QIU*[1], Brandi SCHMITT[2], Chi-Cheng CHU*[1], and GADH, Rajit*[1]. [1]Wireless Internet for the Mobile Enterprise Consortium (WINMEC), UCLA, Los Angeles, CA, [2]Univ. of California, Oakland, CA. SpecimenTrak: a demonstration of the anatomical specimen tagging and tracking.

SpecimenTrak is an RFID-based Windows and Windows Mobile based system developed using the .NET Framework 2.0 at Wireless Internet for the Mobile Enterprise Consortium (WINMEC) RFID Lab, UCLA. It has two different modalities – 'desktop' station for preparation and administrative activities and 'mobile' station with secure wireless connectivity for location and inventory. The architecture is modular and intuitive. It captures the logic of the process workflow and streamlines the activities of a standard anatomical materials program. The activities supported by SpecimenTrak from cataloging of specimens at the point of preparation through to disposition will be explained and demonstrated. Different features in each of the modules, which guide the personnel through the workflow, will be highlighted. The association of the unique tag ID and the specimen code which facilitates identification of the specimen based on different parameters such as facility, date of cataloging, type, and donor will be discussed at length. The other feature of precisely locating a specimen with respect to a container and facilitating inventory audits in real-time will be shown. Issues such as complete data capture, mitigation of protocol and practice oversight, securing and minimizing the misplacement and improving productivity will be discussed. (Sponsored in part by WINMEC, UCLA and Office of the President, University of California).

SONG Wu-Chul*, Sun-Heum KIM*, Sang-Hyun KIM*, and Ki-Seok KOH*. Department of Anatomy, College of Medicine, Konkuk University, Seoul, South Korea. Microanatomy and classification of incisive canal using three-dimensional reconstruction of microCT images.

The nasopalatine nerve and a branch of greater palatine artery pass through the incisive canal. The incisive canal was connected inferiorly to the incisive fossa, and superiorly to the nasal floor bilaterally. Therefore, inferior part of incisive canal has one foramen, and superior part has two foramens. However, the morphology of the canal and the height which inferior one canal separates into two canals were not well defined. We investigated the general structure of incisive canal, and classified incisive canal into several types. The materials of the study were thirty-one maxilla harvested from human cadaver. The samples were scanned with microCT, and microCT images were three-dimensionally reconstructed. Most of incisive canal had one foramen in inferior part and two foramens in superior part, and the separating level was just inferior to the nasal floor. However

the morphology of middle part was various such as one canal, two canals, three canals, and even four canals. In case of two canals, they were also classified into separated or united types. The lateral morphology of the canal was classified into two types as straight (15cases) and curved (16cases) types, and the incidence of two types was similar.

SONG Wu-Chul*, Sun-Heum KIM*, Sang-Hyun KIM*, and Ki-Seok KOH*. Department of Anatomy, College of Medicine, Konkuk University, Seoul, South Korea. Topographic relationship between the zygomatic arch and coronoid process.
The zygomatic process and coronoid process of mandible were vertically overlapped each other in figures of almost all the textbook or atlas of anatomy. Their relationship was important in such case as the treatment of the zygomatic arch fracture. However, there was no definite study about their relationship. The purpose of present study was to investigate the vertical location between the zygomatic arch and coronoid process of mandible. The materials of present study were the three-dimensionally reconstructed CT images of Korean human cadavers. There were 29 males and 28 females, and the mean age was 51.7 years. The locational relationship was classified into three types. The type I was overlapped type (38.6%), the type II was tangential type (28.9%), and the type III was separated type (32.5%). The incidence that both sides showed same type was 73.7%. Although the most common type was overlapped type as figures of almost all the textbook or atlas, the incidence with other types was statistically significant. Therefore, it is important to know that the zygomatic arch was not always overlapped with coronoid process of mandible.

SOSNOWSKI, Jeffrey. Department of Pathology, University of South Alabama, Mobile, AL. An elective for senior medical students designed to integrate their clinical science knowledge with the basic sciences of anatomy and pathology from a clinical case perspective.
The goal of this course is to integrate the senior medical student’s knowledge of clinical sciences with the basic sciences of anatomy and pathology. Senior medical students will review anatomy and the pathogenesis of major diseases such as; hypertension, atherosclerosis, diabetes, obesity, sickle cell anemia, neoplasia and trauma from a clinical pathologic correlation. Senior medical students will be provided with fictional patients with chief complaints, vitals and minimal past

medical/surgical history. The students will create a concise history and physical exam focusing on abnormal clinical findings, labs, and imaging studies, related to the patients underlying pathologic processes. The students will also present gross and histopathologic changes related to the relevant organ systems. A focused medical and/or surgical treatment plan will also be provided by the medical students. Following the student's history and physical, organ pathology correlation and treatment plan, actual gross organs along with microscopic slides will be examined with the attending pathologist, highlighting relevant gross and microscopic anatomic and pathologic findings. This elective will provide senior medical students the opportunity to revisit anatomy and pathology with a focus on major diseases and a newly learned clinical knowledge providing a deeper understanding for their patient's diseases.

SPINNER, Robert J., Kimberly K. AMRAMI*, Huan WANG*, Bernd W. SCHEITHAUER*, and Stephen W. CARMICHAEL. Mayo Clinic School of Medicine, Departments of Neurologic Surgery, Orthopedics, Anatomy, Radiology and Laboratory Medicine, Rochester, MN. An anatomical explanation for the atypical appearance of intraneural ganglion cysts extending into the sciatic nerve: the significance of epineurial compartments.
We have previously demonstrated that fibular (peroneal) and tibial intraneural ganglion cysts arising from the superior tibiofibular joint may occasionally extend proximally within the epineurium to reach the sciatic nerve. The dynamic nature of these cysts, dependent on intraarticular pressures, may give rise to differing clinical and imaging presentations which have remained unexplained until now. In order to identify the pathogenesis and correlate the atypical MRI appearance of these unusual cysts, we have retrospectively reviewed our own experience (9 patients) and the published literature dealing with these types of intraneural ganglion cysts extending into the sciatic nerve. Then we designed a simple qualitative experiment in 4 fresh cadaveric limbs to test our hypothesis that a fibular or tibial intraneural cyst derived from the superior tibiofibular joint could ascend proximally into the sciatic nerve, expand within it and descend into terminal branches of this major nerve. Injecting dye into the outer epineurium of the fibular and the tibial nerves we observed its primary ascent, cross over and terminal branch descent patterns in 3 of 3 specimens as well as its cross over after an outer epineurial sciatic injection into the ‘‘other’’ division. Histologic cross-sections of the nerves at varying levels

demonstrated a tract of disruption within the outer epineurium of the nerve injected and the nerve (s) into which the dye, after cross over, descended. In no case did the dye pass into the inner epineurium or perineurium. Coupled with our clinical observations as well as operative and MRI findings, this experimental study provides proof of concept that sciatic cross over during filling of a common epineurial sheath, supports the unifying articular (synovial) theory, even in cases wherein patterns of intraneural ganglion cyst formation are unusual. These current observations allow us to understand intraneural ganglion cysts with a different, deeper degree of anatomic detail.

STAUBLE, J. Scott, JR. and Robert D. ACLAND. Department of Anatomical Sciences and Neurobiology and Department of Surgery, University of Louisville, Louisville, KY. The inguinal ligament and its attachments: tracking an anatomical error.
Most atlases and textbooks today indicate that the lowest fibers of the internal oblique and transversus abdominis muscles arise from the lateral portion of the inguinal ligament. Through a series of careful dissections on fresh cadavers, we have found that this account is false. The lowest fibers of these muscles arise from a thickened patch of the underlying iliopsoas fascia., to which the inguinal ligament itself is also attached. In this presentation we trace the long history of this anatomical error, and describe the steps that must be taken in dissection to avoid perpetuating it.

STEFAN, Cristian[1] and Nirusha LACHMAN[2]. [1]Departments of Cell Biology and Radiation Oncology, University of Massachusetts Medical School, Worcester, MA, and [2]Department of Basic Medical Sciences, Durban University of Technology, Durban, South Africa. The multicultural classroom and teaching strategies that facilitate collaborative learning and the understanding of the tree-dimensional organization of the nervous system.
Students taking neuroscience courses are faced with the complexity of the subject, the rather unfamiliar terminology associated with it, and the challenge to imagine intricate spatial relationships. An interactive instructional methodology that merges anatomical-functional-clinical approach with in-class exercises that encourage students to play the role of various structures, mimic their spatial arrangement, and reason deductively, was incorporated in the teaching of Neuroscience to Anatomy students at the Durban University of Technology (DUT) in 2006. Teaching in a multicultural environment is a common

situation everywhere in our days. The student population enrolled in the Neuroscience course at DUT was characterized by diverse ethnicity, each associated with its own rich heritage and diverse linguistic backgrounds. The novel interactive mode of presenting the material promoted student active participation in the learning process and at the same time collaboration among students as part of exercises that blended verbal and nonverbal communication in depicting and understanding the three-dimensional organization of the nervous system. These learning activities were combined with the use of plastinated specimens from the substantial collection developed by the Anatomy Department at DUT. This method was well received by students and positively reflected by exam results and high pass rates for the course.

STEFAN, Cristian[1,2], Charles MAYO*[2], Ancuta M. STEFAN[1,2], Alexandra SHERMAN*[2], Sathish K. DUNDAMADAPPA*[3], and Thomas J. FITZGERALD*[2]. [1]Department of Cell Biology and [2]Department of Radiation Oncology, University of Massachusetts Medical School and [3]Department of Radiology, University of Massachusetts Memorial Health Care, Worcester, MA. Virtual simulation instructional methodology that enhances the teaching of anatomy and strengthen its integration with radiological imaging.

The ability to imagine, visualize, and appreciate the human body's 3D organization and subsequently easily navigate among various 2D views is crucial not only for the effective learning of anatomy and interpretation of radiological images but also for a better understanding of pathological processes, principles of physical examination, and medical procedures. With these goals in mind, we developed an innovative instructional approach that uses the Eclipse Treatment Planning System (Varian Medical Systems) to reconstruct 3D anatomical structures. Our method allows a versatile and multifaceted approach in teaching and presents multiple advantages including a) the use of data from real subjects as opposed to model animation; b) the possibility of adding/removing structures in any preferred order and rotating them as desired; and c) an easy correlation between the 3D representations and sectional images. This methodology was introduced in our Human Anatomy course to complement and enhance dissection commencing with the Fall semester of 2006. It was very well received by the first year students and positively viewed by clinical faculty and students in the second, third and fourth year, who had opportunities to see demonstrations of our

work. Comments received from students will be incorporated and discussed in the presentation.

STEFAN, Cristian[1] and James A. WELU*[2]. [1]Departments of Cell Biology and Radiation Oncology, University of Massachusetts Medical School and [2]Worcester Art Museum, Worcester, MA.
Developing observational skills at the Worcester Art Museum for a greater appreciation of art and anatomy.
The study of the head and neck can benefit from exploring artists' depictions of the human figure and genre scenes. In the Fall of 2006, twelve of our first-year medical students responded to an invitation from the Head and Neck block leader of the Human Anatomy course and the Director of the Worcester Art Museum (WAM) for an interactive tour that focused on selected works from the museum's collection. The students were encouraged to use their observational skills and draw from their personal feelings in discussing the forms of artistic expression and to interpret various anatomical issues related to each portrait. The Director of the WAM offered an art-historical perspective, while the Head and Neck block leader discussed clinical considerations based on specific details presented in the paintings. All of the participants described this experience in positive terms. Their individual comments and suggestions are analyzed as part of the presentation. By targeting the power of observation, analytical thinking, and creativity, this approach taps emotional intelligence, promotes the retention and application of critical information to concrete, yet different settings and examples, and expands the role of the humanities in the medical school curriculum.

SUBRAMANIAM, Krishnan. Department of Anatomy, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia 50603.
Contemporary issues in the changing neuroanatomy curriculum: A cause for concern?
The traditional neuroanatomy curriculum is increasingly coming under threat. This has come about due to evolving new medical educational philosophies that emphasize integration, problem-based learning and systems-based modules. This study reviews and analyzes the range of curricula from the conventional to the contemporary. Results from other studies have also confirmed that the neuroanatomy curriculum is indeed drifting away from the traditional to the modular- diluted formats. Proponents of the conventional format argue that the time-tested hands-on approach involving brain dissections ignite curious minds to

appreciate the complex structure of the human brain. Opponents philosophize that content has to be reduced to enable the curriculum to focus on knowledge of relevance to clinical practice. The majority of educators are left with no choice but to tailor the curriculum to fit the hours allocated which often results in arbitrary decisions that are not pedagogically sound. In one extreme case, the entire neuroanatomy course consisted of four lectures and two demonstrations conducted by one teacher. The advent of digital technology has further eliminated teaching and learning hours thus minimizing contact hours. Neuroanatomical education may be neglected in the foreseeable future. In conclusion efforts must be made to implement a standardized core curriculum.

TAYLOR, Jessalyn* and Jeffrey SOSNOWSKI, Department of Pathology, University of South Alabama, Mobile, AL. Identifying age related cellular changes in brain compared to neoplastic cytological features with cytological smear preparations.
Properly identifying the normal limits of brain cell cytological features, as the brain ages, compared to pathologic atypia is crucial in diagnosing brain neoplasms and inflammatory changes during neurosurgical intraoperative consultations. Cytological tissue smears yield less cellular artifact compared to frozen sectioned tissue; however, non-pathological cellular atypia exists but has not been well characterized. Smear preps were prepared from cerebral gray matter, white matter, deep gray matter and cerebellum of autopsy brains. The following cytological stains were used; hematoxylin and eosin, Papanicolaou for nuclear features, and Romanovsky for cytoplasmic features. Neurons, astrocytes and oligodendrocytes were evaluated under a light microscope for cellular atypia. Our preliminary data demonstrated astrocyte and neuron cellular atypia in aged brains. Astrocytic atypical features included irregular nuclear envelopes and mild pleomorphism also seen in astrocytic neoplasia. Neuronal atypical changes included pleomorphic stripped nuclei which resembled neoplastic astrocytes. These atypical changes may be induced by technique, ischemia or age. Currently, data is being collected on various age groups to identify age related cellular atypical features. A well defined normal range of brain cell atypical features will aid pathologists with the diagnosis of brain neoplasms during intraoperative consultations.

TERRELL, Mark. Division of Anatomy, Ohio State University Medical Center, Columbus, OH. From research into practice: Cognitive-based instructional designs in the anatomy classroom.
A meta-analytical review of research in educational psychology results in the synthesis of three fundamental theories associated with cognitive-based learning (information processing theory, metacognitive theory, and social constructivist theory). These theories have been advancing a paradigm shift occurring in medical and higher education from simply providing instruction to producing student learning. This presentation will present data that tests the hypothesis that instructional designs based on the theoretical foundation of human learning will increase student long-term learning, transfer of knowledge, and constructive collaboration. Cognitive-based instructional designs were developed and systematically implemented into the anatomy lecture, and included guided notes, cooperative learning, and collaborative assessment. Data collected and evaluated over a 3-year time period (n = 2,400 students) strongly supports the research hypothesis. Therefore, instructional designs and student learning can be improved when the theoretical basis of learning is considered when developing innovative instructional tools.

THOMPSON, Jess L., Jane M. MATSUMOTO*, and Christopher R. MOIR*. Division of Pediatric Surgery and Department of Radiology, Mayo Clinic, Rochester, MN. Presurgical delineation of anatomic details for successful separation of thoracopagus-omphalopagus conjoined twins.
The birth of conjoined twins occurs in approximately 1 in 50,000 to 1 in 100,000 deliveries, and the majority are either stillborn or die early in life. Through 2000, approximately 100 separations of conjoined twins have been documented. Prior to attempting separation of a pair of female thoracopagus-omphalopagus twins, it was important to delineated shared organ systems in order to formulate an operative plan and prepare for possible postoperative exigencies. A variety of radiographic modalities were used; including high-resolution computed tomography, ultrasound, and swallow studies; which demonstrated conjoined structures of several organ systems. A portion of the pericardium was shared, but the myocardium was not. Ectopic cordis was observed. The liver was fused, two gallbladders were present, and there was a large bridging portal vein that crossed the hepatic isthmus of one twin to the conjoined twin's portal venous system. Replaced hepatic arteries originated from the superior

mesenteric arteries. Each twin had two separate kidneys, colons, and rectums. The pancreases were not well visualized, and it was not possible to determine the amount of shared small bowel. Computer modeling was used to determine the amount of skin needed to close the incisional defect, and tissue expanders were placed subcutaneously.

TRELEASE, Robert B. and Antoine ROSSET*. Division of Integrative Anatomy, Department of Pathology and Laboratory Medicine, David Geffen School of Medicine at UCLA, Los Angeles, CA, and Hôpital Cantonal Universitaire de Genève, Geneva, Switzerland. Living anatomy: Transforming clinical imaging data for virtual reality learning objects.
Previous publications have demonstrated the scientific and educational value of three dimensional (3D) reconstructions of anatomical structures from cadaveric datasets, such as the Visible Human Project. With continuing advances in image processing and resolution, it has become practical to use clinical imaging to develop multidimensional digital models to teach living anatomy, with computed tomography (CT) and magnetic resonance (MR) data. By adding other dimensions of functional data and metadata, one can produce virtual reality (VR) "learning objects". These standardized interactive 3D multimedia modules can be used in a variety of applications and Web-based educational resources. We have created such VR learning objects from rendered and "stripped" CT and MR data sets, with specific examples of surface- and volume-rendered head and neck, thoracic, and arterial visualizations. While providing access to a range of normal variation and pathological live anatomy, transformation of clinical imaging data also speeds the production of VR models, compared with reconstructions from segmented cadaveric sections and specimens.

TUBBS, R. Shane, Marios LOUKAS, John B. SLAPPEY*, Mohammadali M. SHOJA*, W. Jerry OAKES*, and E. George SALTER. Department of Cell Biology, University of Alabama at Birmingham, Department of Anatomical Sciences, St. George's University, Grenada, Department of Education, Harvard Medical School, Boston, MA. Tuberculosis and Lung Disease Institute, Tabriz Medical University, Tabriz, Iran, Department of Surgery, Division of Neurosurgery, University of Alabama at Birmingham, Birmingham, AL. Clinical anatomy of the C1 dorsal root, ganglion, and ramus: a review and anatomical study.

Discrepancies abound in the literature regarding the anatomy of the C1 dorsal roots, ganglia, and rami. The present study was performed to elucidate further the anatomy of these structures and to review their clinical relevance. 30 adult cadavers were used for this study. C1 and C2 spinal nerves were identified in 100% of the specimens examined. In 46.6% of specimens, C1 dorsal rootlets were identified and of these, 28.5% had an associated dorsal root ganglion. In 50% of specimens, the spinal accessory nerve joined with dorsal rootlets of C1. C1 in these cases did not possess a dorsal root ganglion. There were no significant differences between left sides, gender and age (Student's t-test; $p>0.05$). Additional knowledge regarding the C1 dorsal roots, ganglia, and rami may be of use to the clinician who treats various pain syndromes including medically and surgically intractable occipital neuralgia.

WANG, Huan*, Guixin SUN*, and Yudong GU*. Department of Neurologic Surgery, Mayo Clinic, Rochester, MN and Department of Hand Surgery, Huashan Hospital, Fudan University, Shanghai, P.R. China. Anatomic characteristics of the medial antebrachial cutaneous nerve and its clinical implication.
Anatomic details of the medial antebrachial cutaneous nerve can be useful in preventing inadvertent nerve injury in surgeries, and facilitating harvest of the nerve as a graft. This study investigates the course, size, dissectable length, and branches of the nerve and focuses on its compatibility to C7 nerve root as being a graft candidate in contralateral C7 transfer. A total of 22 upper limbs in 11 cadavers (3 fresh and 8 embalmed) were dissected. Medial antebrachial cutaneous nerve arose from the medial cord in all specimens and traveled medial to the brachial artery. In 18 limbs of 9 cadavers, the nerve divided into anterior and posterior branches 7.68 ± 3.36 cm (3.34 to 12.56 cm) proximal to the medial epicondyle. The nerve in 4 limbs of 2 cadavers presented as one single trunk above elbow. Dissectable length of the nerve was 258.17 ± 20.82 mm. Diameter of the nerve at the origin was 3.03 ± 0.16 mm, while that at the distal end was 2.96 ± 0.23 mm. Anterior division and posterior division of C7 nerve root had a diameter of 3.72 ± 0.44 mm and 4.12 ± 0.62 mm respectively. Medial antebrachial cutaneous nerve can be considered as a good graft candidate for contralateral C7 transfer in brachial plexus reconstruction. (Sponsored by R. J. Spinner).

WASSERBURGER, J. Max, Terry F. LANPHIER*, Tarnjit S. SAINI*, Margaret A. JERGENSON, and Neil S. NORTON. Departments of Oral Biology, Oral & Maxillofacial Surgery, and General Dentistry, School of Dentistry, Creighton University, Omaha, NE. 3-Dimensional demonstration of the clinical anatomy of the pterygopalatine fossa using cone beam computed tomography.

The Pterygopalatine fossa is a pyramidal shaped fossa located on the lateral aspect of the skull between the infratemporal fossa laterally and nasal cavity medially. It contains the maxillary division of the trigeminal nerve, third part of the maxillary artery, pterygopalatine ganglion, and the nerve of the pterygoid canal. These major nerves and vessels supply the upper jaw, hard and soft palates, and nasal cavity. These nerves and vessels communicate with the infratemporal fossa, foramen lacerum, nasopharynx, middle cranial fossa, nasal cavity, orbit, and oral cavity through seven foramina or fissures. Being a small and relatively hidden area to observe with multiple nervous and vascular associated structures, the pterygopalatine fossa has traditionally been a difficult area for students to learn. A recent advance has been the emergence of cone beam computed tomography (CBCT) in dentistry. CBCT provides 3-dimensional reconstruction imaging of the hard tissues of the entire head at a sub millimeter resolution. The amount of time required for a scan is brief with lower radiation dosages than standard radiographs. In this study, we sought to use CBCT to 3-dimensionally reconstruct the pterygopalatine fossa to explain the clinical anatomy of this important region.

WINESKI, Lawrence E., Perry RIGGINS*, Christopher MAY*, and Rebecca SEALAND*. Department of Anatomy & Neurobiology and Division of Information Technology Services, Morehouse School of Medicine, Atlanta, GA. Organization of the face.

At the Morehouse School of Medicine, human gross anatomy, embryology, and histology are integrated in a single course (“Human Morphology”). The aims include reducing passive learning in classroom lectures, providing anytime/anyplace learning flexibility, and emphasizing active learning in labs. One step in achieving these aims has been the production of a series of interactive, computer-based study guides to replace selected traditional lectures. “Organization of the Face” is our latest program. This utilizes audio instruction (user-driven or automatic), both commercial (edited and permission granted)

and original artwork, original photographs and video clips of anatomical specimens and clinical scenarios, optional scrolling text with thumbnail images, and optional note-taking and text printing features. It is organized around eight chapters, each based on specific learning objectives: (1) Introduction, (2) Anatomical regions and facial skeleton, (3) Development, (4) Scalp, (5) Facial muscles, (6) Innervation, (7) Vasculature, (8) Parotid gland. Self-testing is included throughout. Initial student response has been strongly positive, especially regarding the accent on imagery and the independence this format allows. (Supported in part by NIH P03 1B040107 and G12-RR03034)

WISE, Gary E., Shaomian YAO*, and Veronica PRPIC*. Department of Comparative Biomedical Sciences, Louisiana State University, LA. Differentiation of stem cells in the dental follicle.

The dental follicle develops into the periodontal ligament. Cells of the follicle may be able to differentiate into cell types other than fibroblasts, suggesting that stem cells may be present. Thus, it was the aim of this study to determine if stem cells were present in the follicle and if they could be induced to differentiate. Dental follicle cells were cultured in MEM medium and then transferred to a medium that promotes stem cell growth. After 4 days, the cell culture was then stained with Hoechst 33342 to identify the stem cells. About 5% of the population was identified as stem cells. When the follicle and stem cells were placed in an adipogenic differentiation medium for 2 weeks and stained with Oil Red O for adipocytes, approximately 4% of the cells stained positive. To enrich for stem cells, cultures were treated with Doxorubicin hydrochloride to kill the majority of the non-stem cells. Adipogenic treatment of the remaining cells led to adipocyte formation, supporting the hypothesis that the surviving cells were stem cells capable of becoming adipocytes. Thus, stem cells are present in cultured dental follicle cells and are at least pluripotent as seen by their ability to differentiate into adipocytes. (Supported by NIH grant DE08911-16 to G.E.W.).

WON*, Hyung-Sun, Wonsug JUNG*, Chang-Seok OH†, and In-Hyuk CHUNG. Department of Anatomy and Brain Korea21 Project for Medical Science, Yonsei University College of Medicine, Seoul, †Department of Anatomy, Sungkyunkwan University School of Medicine, Samsung Biomedical Research Institute Suwon, Korea. Anatomic relationships between the ulnar nerve and medial intermuscular septum in the arm.

The entrapment syndrome can occur when the peripheral nerve passes through the fascia. But there seemed not to be enough information about the ulnar nerve (UN) and the medial intermuscular septum (MIS) of the arm, through which the nerve runs. This study was performed to investigate the passage of the UN in the MIS. Fifty arms of 25 Korean adult cadavers were used. The UN ran under the MIS at the middle third of the arm in all cases, and at the same level as the highest origin of the medial head of the triceps brachii in 50%. The passage of the UN in the septum could be classified into 2 types, according to whether it was wrapped by the fibers of the septum or penetrated simply the fascia. In 68%, the UN penetrated simply the fascia. And in the cases of being wrapped by the fibers, the distance between the entering and exiting points was 5-55mm. The internal brachial ligament was observed in 14%, and a tendinous slip from the triceps fascia to the brachial fascia crossed the UN posteriorly in 12%. This study is expected to improve the understanding of the ulnar nerve entrapment syndrome in the arm. (Sponsored by Grant No. E00002 from Korea Research Foundation).

YAO-COHEN*, Morgan, Bradley MORGANSTERN*, David DARCY*, Joshua SCHIFFMAN*, Tommy SWANSON*, Todd R. OLSON, and Sherry A. DOWNIE. Department of Anatomy and Structural Biology, Albert Einstein College of Medicine, Bronx, NY. Unilateral complete agenesis of mesonephric duct derivitavies in an 82-year-old male cadaver: embryology, anatomy and clinical considerations.

Correlated urogenital anomalies were discovered during dissection of an 82-year-old male cadaver. The dominant anomalies were agenesis of the left kidney, ureter, seminal vesicle, vas deferens and epididymis. Additional non-urogenital anomalies were observed (not reported here). RENAL ANOMALIES: In the absence of a left kidney and related vasculature, the left suprarenal and testicular veins emptied into a truncated “renal” vein. The right kidney was large (13.8 cm long, 6.1 cm wide and 3.2 cm thick) and had two veins and three arteries serving it. The middle artery was the size and position of a typical renal artery and had 3 segmental branches. The smaller diameter superior and inferior arteries supplied the superior and inferior poles respectively. The inferior vein received one of two right testicular veins. A single elongated renal pelvis drained into a single unremarkable ureter. BLADDER: Gross morphology was notable in having two diverticula, one on each posterosuperior

corner, the left being larger. The left hemitrigone was absent due to agenesis of the left ureter and ureteric opening. GENITAL DUCT SYSTEM: The left seminal vesicle, vas deferens and epididymis were absent. The right seminal vesicle and vas deferens were typical and the vas was patent. The tail and body of the right epididymis appeared normal but the head was very small. TESTES: Both testes were present, equal in size and fully descended. Two smooth 'stones' were found at the posteroinferior pole of the left testis near the site of the scrotal ligament. CONCLUSIONS: Ipsilateral agenesis of the kidney and ureter together with absence of the seminal vesicle, vas deferens and epididymis is a rare condition caused by failure of development of the related mesonephric duct during early embryogenesis. These findings motivated first year medical students to explore the innate relationship between anatomy, embryology and clinical correlations.

ZOLLER*, Lawrence C. Department of Biomedical Sciences, University of Nevada Las Vegas, School of Dental Medicine, Las Vegas, NV. Virtual Dissection in the Teaching of the Anatomical Sciences.

There is an ongoing debate as to whether dissection of cadavers is valuable in teaching the anatomical sciences. Considerations for or against its use include moral, ethical, educational and financial. At UNLV School of Dental Medicine, in lieu of actual dissection or prosection of cadavers, we have started what we refer to as virtual dissections. Presentations are given by students in which they use pictures and models of dissected material and describe the specific areas as if they had performed the dissection themselves. Structures are noted and related to subjects presented in lecture. A survey was submitted to the students eliciting their opinion on the experience. The vast majority felt that although it was not a totally satisfactory replacement for the dissection of a cadaver, in its place it provided them with a valuable learning and teaching experience. They felt that the use of this teaching tool enabled them to have a greater understanding of topographical and spatial relationships than if they had been to lecture alone. They also felt that presenting material to their classmates and working in groups was very valuable. Other insights from the students will be provided in the presentation. (Sponsored by T. Ma)

Awards and Recognition

The Ralph Ger Student Platform Presentation Award:

The AACA Student/Resident Platform Presentation Award. To be eligible for the award the Student/Resident must be first author and presenter. The best of these presentations are judged by a panel set up by the Career Development Committee. The winner receives a cash award of $600 U.S. and a certificate suitable for framing.

The Sandy C. Marks Jr. Student Poster Presentation Award:

The AACA Student/Resident Poster Presentation Award. To be eligible for the award the Student/Resident must be first author and presenter. The best of these presentations are judged by a panel set up by the Career Development Committee. The winner receives a cash award of $600 U.S. and a certificate suitable for framing.

Presidential Travel Award:

To be eligible in the competition for this award, the platform presenter must be a regular active member of the AACA and submit a publication-ready manuscript to the Editor-in-Chief of Clinical Anatomy - Dr. Stephen Carmichael. The electronic confirmation of that submission must be received by May 15, 2007. The best of these presentations are judged by a panel set up by the Program Secretary and the winner is entitled to up to $1500 in reimbursable travel to the 2008 AACA meeting in Toronto, Canada. The winner will submit travel receipts after return from the meeting and the Treasurer will mail the individual a check.

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