

Debate**HUMAN BODIES TO TEACH ANATOMY: IMPORTANCE AND PROCUREMENT – EXPERIENCE WITH CADAVER DONATION**

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RESUMEN

Este Debate fue propuesto para aportar diferentes puntos de vista y conocer la diversidad de circunstancias involucradas en la procuración y uso de cadáveres para la enseñanza de la Anatomía, a estudiantes de pre y post-grado, en el mundo. Un grupo reducido pero representativo de profesores de Anatomía de todos los continentes fueron invitados a participar. Se distribuyeron algunos lineamientos para que los escritos tuvieran similar orientación, aunque los autores podían incluir cualquier concepto que consideraran de interés para los lectores. Además de los profesores de diversos países, el Prof. Bernard Moxham (Presidente de IFAA) aportó al Debate la posición oficial de la Federación Internacional de Asociaciones de Anatomistas. Los panelistas acordaron en la importancia de utilizar material cadavérico para la enseñanza de la Anatomía, sin embargo, la provisión, las fuentes y los procedimientos utilizados para adquirirlos fueron algo diferentes de un país y/o universidad a otro. La experiencia de los países europeos, las limitaciones culturales en los asiáticos y africanos, y el retraso y los problemas estructurales en Sudamérica, son algunas de las particularidades que se señalan. Después de esta publicación se recibirán las preguntas y comentarios no solo de los participantes sino también de los lectores en general, las cuales serán respondidas y ambas, preguntas y respuestas, publicadas en el próximo número. Entonces, el Debate alcanzará su punto máximo al permitir a todas las personas involucradas en el tema, en cualquier lugar del mundo, participar y aportar información adicional.

Palabras clave: Enseñanza de Anatomía, material cadavérico, disección cadavérica, donación de cadáveres.

ABSTRACT

This Debate was proposed to provide different points of view and to know the diversity of circumstances involved in the procurement and use of cadavers to teach Anatomy, to pre and post-graduate students, all over the world. A reduced but representative group of professors of Anatomy of all continents were invited to participate. Some guidelines were distributed to give a common orientation to each paper instead authors were able to include whatever they considered to be of reader's interest. Within the professors from different countries, Prof. Bernard Moxham (IFAA President) supported the Debate with the International Federation of Associations of Anatomists official position. The panelists agreed about the importance of using cadaveric material to teach Anatomy, but the provision, sources and procedures followed to get them are quite different from one to another country and/or university. The experience of European countries, the cultural limitations in Asiatic and African ones, the delay and structural problems in South America, are some of the pointed peculiarities. After this publication we will receive the questions and comments, not only from the Debate participants but also from general readers, which will be answered and both, questions and answers, published in the next issue. Then, the Debate may reach its top point by letting involved people from all over the world to take part and provide additional information.

Key words: Anatomy teaching, cadaveric material, cadaveric dissection, donation of cadavers.

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Dr Namita Sharma (India)



Cadaveric dissection is, in India, an essential approach for imparting anatomical knowledge to undergraduate as well as post graduate medical students. Frequently, specialists use the relevant anatomical part of the cadaver for demonstrative dissection or for practising an innovative surgical technique. Virtual dissection hasn't really taken off in India. The pros and cons of each system, being beyond the scope of this essay, will not be assessed hereby.

It therefore is imperative to have a working system of body donation for medical education in this country. Any adult individual can opt for body donation. Unfortunately, there is no specific national program for the purpose or an organized drive to promote the same. Nonetheless, a general awareness amongst the people fuelled

by various non-profit voluntary organizations, radio talks, print media or even word of mouth has ensured an increasingly philanthropic attitude towards both organ and whole body donation over the last couple of decades. Sadly, an ever increasing young emigrant population has resulted in many elderly people being left alone and volunteering to donate their bodies in lieu of last rites has become a Hobson's choice for them. Thus, scarcity of cadaveric material in most of the medical schools of India is gradually receding. However, India being a medley of cultures, castes and religions, each governed by their individual customs; uniformity of acceptance for voluntary body donation is obviously not there. Most of the donated bodies across the country generally belong to the Hindu religion. Higher socio economic and educational levels however, cut across caste and religion and have a positive impact on the willingness to donate.

The process of donation is simple and largely congruous throughout the country; a person desirous of donating his body after death needs to fill in a form, get it signed by two witnesses (preferably next of kin) and submit the same to the recognized medical institute in which the final submission would be taking place. In return, the donor gets an information letter and/or an identity card. Subsequent to the donor's demise, the relatives need to be proactive in fulfilling the wishes of the donor. However, in case the relatives so desire, for sentimental or other purposes, not to donate the body of their loved one, the medical institution which was to receive the body cannot insist on the delivery of the same. Many times it has been noted that the relatives are discordant in their sentiments; in such a scenario, the spouse's wishes are respected. Sometimes, the relatives request for a small portion of the body's part (usually the terminal phalanx of a finger) in order to perform a token of the last rites. Whether or not to accede to such a plea rests entirely on the discretion of the receiving authority. Another problem frequently encountered involves a Hindu custom according to which, while disposing of the body of a married woman, some gold ornament is retained on her and the body is draped in new clothes. It is important thus, to confirm the presence of such adornments at the time of receipt the body, and return the same if present. Some institutions have experienced irate relatives appearing a variable number of days later demanding the return of the clothes and ornaments.

Apart from donated bodies, a major source of cadaveric material is unclaimed bodies. Prior to 1989, the Coroner was required to certify the cause of death of such bodies and avoid post

mortem. Now, the authority lies with the medical officer in the local Government Hospital in alliance with the law enforcement authority.

Body donation should ideally be within 6-8 hours of death considering the climatic conditions in a tropical country like India. In case this is not possible, the body may be retained in the mortuary. While accepting the body, performance of some kind of 'puja' or prayers is as per the protocol of the particular institution, but is not mandatory. Acknowledgement of the noble deed of the donor is in the form of a certificate carrying the photograph of the deceased issued to the relatives. This would serve as a memory of the donor and an inspiration to others. Subsequent to the dissection, the disposal of the remaining cadaver is either by burial or dispensed by the local municipal corporation after it has been certified as bio-medical waste.

For both donated as well as unclaimed bodies, 'Death Certificate' (by authorized medical authority) and the 'Body Disposal Pass' (by local municipal authority) are mandatory prior to being admissible for research and study purposes. This is relevant for the entire country. It is however extremely unfortunate that there are no laws in place for enforcement of knowledge of the medical history of the cadaver. Though almost all institutions proclaim 'body unacceptability parameters' including an HIV positive status, the truth is that there is virtually no check, especially while receiving an unclaimed body. Thus, it is highly probable that such infected bodies find their way onto the dissection tables of medical colleges. It may be further noted that dissection is done by the students with ungloved hands and older anatomists (and sometimes the younger ones too) discourage the students from using gloves with a rather ludicrous claim that the feel of the tissues with bare hands is crucial for acquiring anatomical knowledge. It is possible that certain medical authorities insist on the cadaver being free from infectious diseases prior to accepting them; if they do so, it is their personal endeavor to ensure the safety of the dissector.

In brief, Indian medical students have access to ample cadaveric material. However, efforts should be made to make available the medical history of the deceased and certain stringent laws need to be enforced to safeguard the dissector.

Prof. Dr. Fernando Martínez Benia (Uruguay)

There are two Medical Schools at Uruguay, a country with 3.4 million inhabitants: one public named as Universidad de la República (UdelaR)

with an annual number of 700 to 900 new students, and the private CLAEH receiving 40 to 60 every year. Both of them holds cadaveric material for anatomy teaching. CLAEH usually stimulates Problem-based learning and multi-disciplinary seminars, gathering professors and pupils of different topics as anatomy, physiology, histology and embryology, in order to discuss together, even though each one of them has his own academic schedule separated from the rest.



Particularly speaking about Anatomy, theoretical lessons are given by the most experienced teachers (Chair, full, associated or assistant professors), while practical lessons are in charge of current or former students, working with cadaveric materials, formaldehyde fixed pieces, dry bones and complementary diagnose images as MRI, CT scans or X-ray plaques. UdelaR practices a similar mechanism of teaching but, considering the higher number of students, the problem-based learning contact with tutor or professors is limited, while often charts and clinical rounds are performed. Practical lessons are shorter at UdelaR for the same reason, even though the Anatomy Department professors make a huge effort to maintain them as a must. There is an Anatomy Museum filled of anatomical dissections, acrylic and plastic models as well as scale sized reproductions of different organs and systems (basal ganglia, cardiopulmonary blocks, muscular system, etc.)

Both Medical Schools staff professors consider cadaveric material as the best way of learning anatomy in its whole context, understanding topographical considerations of every region in order to be able to practice invasive approaches and maneuvers. In this line of working, UdelaR organizes hands-on courses for specialists in areas as general surgeons, otolaryngologists, orthopedists or gynecologists for practicing over cadaveric specimens. The Anatomy Department collaborates during different Meetings organizing theoretic and practical courses (Latin-American

congress of anesthesiology, neuro-endoscopy Latin-American training course, etc.)

Cadavers reach UdelaR by different ways, directly by donation or through bodies of patients who died in public hospitals without family claim. In the last 5 years this supply has decreased, without identifiable causes. CLAEH has the same way of cadaver stocking.

It's important to remark two main points: 1) people who donate their bodies for anatomical study voluntarily signs a document at the Medical School in person, the institution gives back a letter signed by the Dean thanking such an action and assuring that the body will be burned after used. 2) Uruguay laws states that every citizen is a potential organ donor for transplant unless explicit negative, not including cadaveric donation for anatomical study.

The volume of cadavers entering each faculty is related to the population of the holding city; UdelaR is hosted at Montevideo city with 1.3 million people, while CLAEH is placed at Maldonado, a city with just 105.000 habitants. That's the reason why public Medical School receives a larger amount of anatomical material, even though both staffs of professors consider insufficient stuff for their academic practice. None of the Universities has an active program for catching potential donors, working in a separate manner with equal results. There is no national program for donation and reception of cadaveric material in our country.

Prof. Andreas H. Weiglein (Austria)



The Graz Medical School accommodates 360 medical and 28 dental students per year. Anatomy courses are taught during semester 1 to 3. For demonstrations during the lectures plastinated specimens and slices – particularly for neuroanatomy, corrosion casts – particularly for cardiovascular system, prosections and models (Somso) are used. Most of these are

accessible to students in the anatomical resource center every day. Fourteen personal computers offer all relevant interactive programs and the Graz dissecting course videos. The most important learning resource, however, are cadavers embalmed by the Graz Embalming Procedure by Thiel (GEP) - since the procedure was developed here by Prof. Walter Thiel and is still improved by the recent team guided by Prof. Dr. Dr.h.c. Friedrich Anderhuber. These cadavers are flexible as entirely relaxed patients during general anesthesia. Apart from bleeding and the color of blood, the tissues of the cadavers look like fresh tissue and have very natural consistency.

At the moment we receive 200-250 cadavers per year. Almost 100% are self donated bodies. Donations by the closest relatives are legal, however only accepted in social cases of financial problems. Also unclaimed bodies are dedicated to the nearest anatomy department by Austrian law, however, the city or county government usually pays for a regular funeral ceremony in these cases.

The main reason for self-donation is to support and improve medical education (approximately 75%). Further reasons are economic or religious. We now receive close to 1000 testimonies per year and based on our statistics we will receive about 500 of them in seven years: the average time from signing the testimony to donation is seven years. The numbers are usually reduced by 50% caused by relatives that do not accept the will or by the cause of death (cadaver loss by cause of death such as burning, drowning in deep water, suicide or severe and untreatable infectious diseases (i.e. hepatitis C, D, E, tuberculosis, HIV and Creutzfeldt-Jakobs); the first, obviously for lack of the intact / entire body, the later, for the sake of the embalmers by minimizing their risk for infections.

There is no upper age limit for donation, but we introduced a lower age limit of 38 years. Some twenty years ago we saw an increasing number of young donors turning up within one year or less by suicide. Even if one may not prevent somebody from committing suicide, we reduced the number considerably. Usually humans under age forty do not think about what will happen to the remains after death, unless they had close contact with death, e.g. in case of close relatives or friends – particularly belonging to the same age group died or if they dealt with ending their lives themselves. In the latter, a final solution doing something positive (body donation) to help the living would encourage them to commit suicide.

The remains are buried in the earth of a very special graveyard in the forest. The short

ceremony is usually accompanied by a group of the anatomy department, sometimes a group of students – again usually the student tutors of the anatomy department and rarely from relatives of the deceased; although they are invited. Relatives frequently use the chapel of remembrance in the anatomy department for their last farewell. The cemetery is, however, maintained with the help of relatives with particular encouragement during all saints, christmas and easter days.

After 30 years the program has become completely self-directed. The main info source is mouth to mouth propaganda, which lead to donation rates close to 60% of the population in some villages.

The names along with date of birth and date of death are inscribed in the book of remembrance. The originals are collected at the institute of anatomy, a copy of this inscription is sent to the relatives. The header of this tombstone is a quotation of Prof. Thiel:

THEIR DEATHS BEAR THE HONORABLENESS
OF BEEING ALTRUISTIC HELP FOR THE
LIVING.

Prof. Jennifer McBride (U.S.A.)



The anatomy program at the Cleveland Clinic Lerner College of Medicine of Case Western Reserve University utilizes various educational resources and interactive experiences to aid in student acquisition and reinforcement of knowledge. These various resources, which include: clinical case reviews with a clinician, textbook readings, on-line course modules, fresh tissue cadaver prosections presented by surgical residents or fellows, radiological imaging review with a radiologist, plastic models, plastinated specimens, bone models and formalin fixed specimens, are part of a longitudinal approach to

anatomy education throughout years one and two (Drake, 2007).

Laboratory sessions in which organ specimens and prosected cadaver demonstrations are arranged, aid in the reinforcement of student knowledge initially acquired through reading, on-line module review and case discussion. The addition of cadaveric prosections on fresh unembalmed specimens offers several advantages 1) the prosections offer a 3 dimensional view of anatomy 2) color of the organs and structures is authentic and not altered by the chemical process of embalming 3) and because these preparations are presented by residents and fellows, students have the added benefit of learning the material from close peers who have had exposure to the clinical environment.

Cadaveric specimens are procured through the Cleveland Clinic Body Donation Program, a program established in the early years of the Cleveland Clinic. Currently, the program receives 150-200 donations a year, which is more than sufficient to account for the needs of medical education. External promotion of the program is facilitated through use of an internet web site and program brochures. In addition, hospital administrative services are aware of the program and are able to present the information to interested individuals as requested. Donation to the program requires that individuals be 18 years of age or older at the time of registration, alternatively next of kin may donate family members at the time of death. Intake of donations is facilitated by contacting the administrator for the donation program or through a paging system which connects with other members of the donation team (CCBDP, 2014). This way, receipt of donations can be managed at any time of day, regardless of weekends or holidays. Following death, healthcare providers or family members contact the donation team within a few hours of death to begin making arrangements for transport to the Cleveland Clinic facility. Donations are not accepted into the program if there has been severe trauma to the body, if an infectious disease [Hepatitis, HIV/AIDS, Creutzfeldt-Jakob disease, methicillin-resistant Staphylococcus aureus (MRSA)] has been documented or if the donor is morbidly obese (BMI > 40). Additional preclusions include organ, long bone and skin donation. However, individuals who also chose to donate corneas maintain eligibility to donate. After full utilization in approved educational activities, which takes no longer than 1 year, donors are individually cremated. Cremains are either returned to the family, or buried in the mausoleum at Cleveland's Lake View Cemetery. The donation program has a crypt for donor ashes which is dedicated to

those that have donated their bodies to the Cleveland Clinic Body Donation Program. All costs associated with the program, including transportation, cremation and burial at Lakeview Cemetery or return to loved ones, are incurred by the Body Donation Program.

The described program is specifically for individuals or family members interested in bequeathing themselves or loved ones to the Cleveland Clinic Body Donation Program. All procedures followed by program participants are in accordance with the laws regarding body donation. These laws are clearly delineated by each state. In Ohio, the Revised Code Laws in Chapter 2108 entitled, Human Bodies or Parts Thereof, define all aspects of anatomical gifts (ORC, 2014).

In honor of our donors and their selfless gift, we currently hold annual Memorial Services in which family members and their loved ones are invited to attend. The services are held in the Spring and include short presentations from the institute leadership, medical students in years 1 and 3, a surgical resident, and a representative from pastoral services. The formal ceremony is facilitated by the Director of the Body Donation Program with a reception following. The reception provides the opportunity for attendees to engage in conversation with the medical students and others involved in the administrative and educational efforts of the Body Donation Program.

Several medical schools in the United States maintain their own Body Donation Program with a similar structure. A few states have one collective donation program in which all schools (medical, dental, allied health etc.) rely on as a source of donated cadavers. Depending on budgetary issues, some programs place the financial burden of transportation and cremation of the donation on the family or next of kin. While the described program does not require that individuals sign up in advance some programs do, and will not accept donations of individuals without a donation form on file. Lastly, all programs prepare a list of criterion specific for intake of donations, but the extent of this list is variable and depends on factors such as facility/equipment limitations, donation size and previous medical history of the donor.

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Prof. José L. Bueno López (Spain)



In Spain, the teaching of human anatomy is organized in accordance to the "European Higher Education Area" regulations. In this context, each university offers its own undergraduate curricula. Contents of each of these curricula must meet a minimum, which is set by the Ministry of Education and Science of the Spanish Government. The temporal extent of each curriculum is also set by the Ministry. Teaching methodologies and horizontal and vertical managements of curricular contents are specific to each university.

As a result, the temporal placement of anatomical teaching varies among Spanish universities. For example, some schools/faculties of medicine teach all anatomy (embryology, histology, gross anatomy, neuroanatomy) within the first two years of their medicine degree, while in others anatomy extends well into the latest clinical courses.

Methodologies used in anatomical teaching also vary. Most medical schools, and many other university schools related to teaching of health sciences, ask students to dissect human cadavers, or to examine prosections, or both, as part of their anatomy laboratory course. In these schools, the study of human cadavers is considered extremely useful, so that it can be supplemented but never replaced by other means.

The national legal regulation of the procurement and use of cadavers to study anatomy is very unspecific. Then, each of the autonomous regions in which Spain is divided administratively has developed their own regulations for these purposes. Anyhow, in all Spain, the procurement and use of cadavers for anatomical study must

be done only by universities, provided that the university possesses dissecting room/s legally approved. Universities are also in charge of burial /cremation of human remains after dissection.

Procurement of cadavers for anatomical study is performed in Spanish universities through altruistic body bequest programs [1, 2]. There is no other legal way to obtain cadavers for anatomical study. The body donation must be done in donor's life. The donor must have intact mental capacity when signing the donation will. Universities keep registers of donors. Donor's cadavers may be eventually rejected in case of prior existence of certain serious infectious diseases; or of mutilation / dismemberment caused by traumatism, certain organ donations, autopsy and other.

Altruistic body bequest programs began in Spain in a small number of universities in the early Seventies of the Twentieth Century. Since then, many other universities have also developed programs, along with modernization of dissecting rooms [3, 4, 5]. At present, body donation programs for anatomical dissection are answered very well by the resident population in Spain. They provide, to universities that offer one of these programs, a number of cadavers more than enough not only for undergraduate but also for postgraduate anatomy teaching, including that for medical specialties and continuous formation. As an example, at the UPV/EHU we have a body donation program (which I personally started developing together with my departmental colleagues in 1981) in full operation. The list of donors exceeds 2,000 people nowadays, so that the admission to be donor has been temporarily closed because the number of deceased donors annually is over our capacity of usage. (Our policy is to reject no donor cadaver, except for the reasons discussed above.) In my opinion and the opinion of the Spanish Anatomical Society (SAE), the steady increase of donors in Spain over decades has no immediate connection with the recent economic crisis as suggested by some sensationalist media. It is convenient to say here that altruistic organ donation programs are extremely successful in Spain. The rate of organ donors per capita in Spain is very high, among the highest if not the highest in the world [6,7].

Altruistic body bequest programs in Spain began to be promoted by different ways. One was through visits paid to ambulatory centers and residences for the elderly. In such visits, the anatomists explained to the audience about the benefit that offers the study of human cadavers for the formation of profession and medical research. The donation process, particularities of the usage of cadavers and the final burial/cremation of cadaveric remains were also

explained. Another way to promote altruistic body donation was through the media (radio, tv and press). None of these procedures are followed nowadays. There is an "Asociación Nacional de Donantes de Cuerpo a la Ciencia (España)" [8]. Such an association is independent of university institutions. Donations are maintained by the general knowledge about programs and the "word of mouth" spread of this. Simple things help in this regard and dissection rooms often display memorial plaques to honor the donations and, in addition, medical/health-sciences schools erect, whenever is possible, monuments to donors at which the students, teachers and donors' relatives can conduct unpretentious memorials to honour the donors [9, 10].

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Prof. Beverly Kramer (South Africa)



The School of Anatomical Sciences, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, Republic of South Africa, has a proud history of utilizing the dissection of human cadavers for the teaching of morphological anatomy. In fact the majority of institutions in our country which teach human anatomy utilize dissection for teaching purposes. Since its early days, the staff of the School of Anatomical Sciences (previously called the Department of Anatomy), have held the principle that the teaching of human anatomy MUST be undertaken by human dissection. This principle was also held by the late Professor Phillip V. Tobias, during his tenure as Head of the Department and who was a renowned anatomist in both local and international anatomical circles. The academics in the School of Anatomical Sciences have always maintained that it is important for students to be able to observe the continuity, the relationships and the 3-dimensionality of structures of the human body and hence, the human cadaver is by far the best "model" to provide this.

The human cadavers are not only of importance in our School for full body dissection purposes by certain groups of students such as the medical students, but also for the provision of prosections (predissected specimens of specific regions or areas) for other courses; for students in occupational therapy and physiotherapy for example or for postgraduate students. In addition, the School utilizes prosected specimens for its Hunterian

Museum. This is an added teaching resource which students are able to utilize whenever they wish to do additional studying. The School also houses an important collection of skeletons, the Raymond A. Dart Collection of Human Skeletons which are an essential resource for both teaching and research. These skeletons have been derived from the cadaver population over many years. In addition, a recent addition to our teaching and research cadaver-based collections is the Paediatric Collection, which aims to collect human fetuses and neonates for study. We believe that all the cadaveric remains are of vast importance for the teaching and understanding of anatomy. The academic staff also makes use of plastic models, videos and other e-learning resources including 3-dimensional computed tomography scans for the teaching of anatomy. However, while the staff acknowledges that the latter are important additional teaching resources, they are not considered as substitutes for human dissection.

The School teaches anatomy to students undertaking medicine, dentistry, pharmacy, physiotherapy, occupational therapy, nursing, speech and hearing sciences and medical science students. In addition, students undertaking professional degrees return to the School for postgraduate courses in anatomy. The School also trains postgraduate scientists in Master of Science and Ph.D degrees. Cadavers are utilized for teaching in most of these courses and thus the requirement for cadaveric tissues each year is considerable. The cadavers used in our School are sourced from either bequests, donation of body or from unclaimed bodies. The latter are obtained under the Human Tissues Act of (Chapter 8, section 62-64, National Health Act of the Republic of South Africa, No 61, of 2003). Matters pertaining to the acquisition or the use of human cadavers, falls under the jurisdiction of the Inspector of Anatomy in our provincial area.

The donation program in our School consists of bequests by individuals. Any individual can add a codicil to their last will and testament, bequeathing (donating) their body to a medical institution. Donation forms can also be obtained from an administrator in our School. These forms, which are returned to the School for safekeeping, notify the School of the individual's intention to donate his/her body to the School. On the death of the individual, a close relative or the patient's doctor notifies the School of the death of the individual. Permission to receive the body is given by the Inspector of Anatomy once all legal documentation has been approved. The period of donation may be stipulated in the codicil and may range from the cadaver being donated for an academic year only, to those remains being

retained by the School for further teaching and research purposes. In the event of remains being donated for a set period, at the conclusion of this period, the School cremates the body and returns the ashes to the donor's relatives, if this has been requested.

At various times in the history of the School, when cadaver numbers have markedly decreased, the incumbent Head of the School has made an appeal to the community via the media, to consider bequests in the interests of the training of our professional students. This has generally resulted in an increased number of intentions to donate.

At the beginning of each new intake of undergraduate students to our anatomy courses, the School holds a "Dedication Service" which all students, staff of the School and senior staff of the Faculty including the Dean, attend. At this poignant service which takes place in one of the dissection halls of the School, the students are provided with the history of anatomy and of dissection. The cadavers are dedicated to the training of the students. At the close of the dissection period each year, a further ceremony is held as a "burial" service and as an opportunity to give thanks for having the privilege of learning from human cadavers.

Dr. Phil Blyth (New Zealand)



The use of cadavers is the cornerstone of clinical anatomy teaching within New Zealand. There are two universities with medical schools, located in Auckland and Otago. Both universities teach medical students as well as allied health profession students, and post graduate surgical courses. The medical intake is around 280 students at each school.

Both schools have an introductory ceremony at the start of the year. The Wakanoa 'to remove tapu' (Auckland) and Whakawātea 'to clear the

way' (Otago) ceremonies incorporate the indigenous Maori perspective on death and appropriate rituals. Students and staff from all cultures appreciate these ceremonies.

Within the medical programmes, full body dissection is included as part of integrated "Body Systems" type curricula. The dissection takes place in groups of ~8 students per table over the second and third years of the respective medical programme.

Embalmed human tissue is used for dissection as well as prosections. The majority of embalming is performed using commercially available fluid, using either gravity or pump driven intra-arterial infusion with venous drainage. Cadavers are stored for more than 6 months prior to use. Both schools utilise the skills of paid and selected medical student prosectors.

Both schools also use a range of locally produced plastinated specimens, including S10 Silicone impregnated and coloured prosections as well as E12 sheet plastination. In addition some potted specimens usually incorporating pathology, are used.

To aid with clinical integration both schools use examples of radiological images, such as x-ray, CT, ultrasound and MRI within the laboratory setting. Both schools are either using (Auckland) or exploring the ability to use pre-mortem clinically acquired images and laboratory investigations from donors within the laboratory setting. Consent for these images and results are obtained from the donor or relatives.

Ultrasound (of volunteer students) is also used in applicable sessions. Both schools utilize body painting of students to teach surface anatomy. Online activities such as podcasts and quizzes are a particular feature of the Otago curriculum.

Auckland students examine for pathological features during the course of dissection, with visiting pathologists and residents aiding interpretation, and these are presented at the conclusion of the year in the style of an autopsy. Auckland utilizes radiology residents as part of their demonstrator team. Both schools also use retired and practicing clinicians. As expected both schools use more traditional methods such as lectures, textbooks and commercial anatomical models.

At the conclusion of the dissection the majority of cadavers are cremated, and ashes are either returned to the family or scattered at a local cemetery.

Each school runs a bequest programme, with dedicated administration staff liaising directly with potential donors and their families. The bequest programmes are governed by the New Zealand Human Tissue Act (2008). The donor programmes are similar, with communication and letters

of consent placed on file from donors. Both schools reserve the right to grant final acceptance post mortem. Reasons for possible inability to accept a body include consideration of infectious diseases, rapid onset of dementia (as a possible indicator of Creutzfeldt Jacobs disease), trauma, requirement for coronial autopsy, excess body weight, or death outside the particular acceptance region. Due to the generous support of the bequest programme at times donation exceeds the schools' capacity. The Human Tissue Act stipulates that no person may veto a decision to bequeath their body, however consideration and respect of the family is of importance to the bequest programmes.

A documentary called "Donated to Science" was released in 2009. This documentary follows the story of people who donate their bodies and the students who learn from the experience. It was made in conjunction with the Otago School of Medical Sciences.

Both schools have an annual non-denominational Thanksgiving ceremony. The Auckland ceremony is held within the university chapel, and attended by staff members. The Otago ceremony takes place alternatively in Dunedin or Christchurch and includes active involvement by staff, students and relatives of the deceased.

Both schools are indebted to the donors and their families for their bequests and their support of this most special education.

Relevant links

The New Zealand Human Tissue act can be found at <http://www.health.govt.nz/our-work/regulation-health-and-disability-system/human-tissue-act>

Details about the Auckland programme for the bequest of human bodies can be found at <https://www.fmhs.auckland.ac.nz/en/sms/about/our-departments/anatomy-with-radiology/our-department/bequests.html>

Details about the Bequest Programme at the University of Otago can be found at <http://journal.nzma.org.nz/journal/121-1274/3076/> Details about the documentary "Donated to Science" can be found at <http://prnfilms.co.nz/?cat=4>

Prof. Mirna Duarte Barros (Brazil)

In Brazil, many health-related undergraduate courses use human cadavers for dissection or to demonstrate structures in prosected specimens during practical lab sessions in Morphology.

Plastic models, CT scans and MRIs, online atlases and video-dissections have been recently included in educational settings as supple-

mentary material, and are not considered sufficient to replace the experience of manipulating or dissecting anatomical specimens.



Although fixation procedures do interfere with the texture of soft tissues, in comparison to what will be observed *in vivo*, anatomical preparations are still considered the best way to visualize topographical landmarks and anatomical variations, for example, in pathways of vessels and nerves, allowing for the student to establish relationships between different organs, *in situ*.

Universities that are linked to major city hospitals or to public services of *post mortem* inspection, such as São Paulo University – ICB (USP) and Santa Casa School of Medical Sciences (FSM SCSP), usually receive a significant number of specimens, usually enough to fulfill research and educational demands. Institutions that are not associated to such public services and/or are not related to any teaching hospital, on the other hand, usually deal with legal issues to obtain cadavers, and have a scarce number of specimens to work with.

For more than a year, FCMSCSP has been negotiating with authorities to obtain permission to donate cadavers to other teaching institutions since this institutions has the privilege of being associated to a large and traditional and hospital complex, receiving unclaimed corpses on a regular basis. From the specimens used in the anatomical lab, only 15 to 20% are obtained from body donation programs.

Since unclaimed bodies are lowering in number throughout the country, some major educational institutions, such as USP–ICB and Federal University of Health Sciences, Porto Alegre (UFC SPA) have successfully implemented programs and campaigns for body donation (Info provided by Prof. Dr. Edson Liberti and Prof. Dr. Andréa Oxley, respectively).

The program implemented by USP–ICB, request donors to fill out forms and provide signed documents stating the concurrence of three family members. After death the body is directed

to the Anatomy Department, which takes the responsibility for preparation and provision to the practical lab sessions and, in due time, for the burial procedures in the tomb of the University of Sao Paulo. This program is based on law 010.406-2002, article 14 and is promoted by academic community, radio, TV and magazines. UFCSPA launched its program in 2008, considering that the Brazilian Civil Code of 2002 stated that: "it is allowed for any citizen, with scientific or altruistic purpose, to donate either parts or his/her own body after death." This program was fully approved by the local ethics committee, under the register CEP-UFCSPA No 408/08, and also insures that the process of donation follows the terms of the law, requesting documents that include: "Statement of Donation of Organs and Remains, "Informed Consent", "Statement of Testimony to Declaration of Donation" and e "Form to Registered Donator".

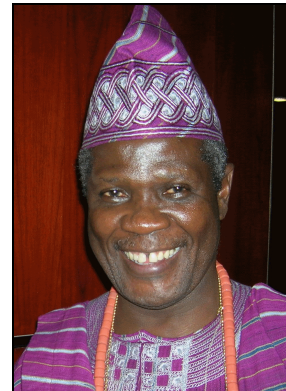
A divulgation campaign consisting of interviews and flyers to inform the population takes place in the state of Rio Grande do Sul and uses different types of media, such as radio, TV stations and newspapers. By accessing the University Web-portal it is possible learn about the whole process and also to download the documents required for donation. This program allowed for a Dissection Workshop in the university and also for preparation of specimens, to be used in a public exhibition that takes place annually in the Museum of Anatomy.

The Brazilian Society of Anatomy provides specific instructions to potential donors as well as crucial information on the importance of body donation to health-allied teaching institutions <http://www.sbanatomia.org.br/doacao.php>.

Ogueri Duru and Prof. Oladapo A Ashiru (Nigeria)

We teach anatomy with didactic lectures using multi-media projected power-point slides and practical sessions use cadavers, histological slides, anatomical models, prosected parts, museum specimen and skeleton. The cadaveric material is considered very important and all students are expected to have a hands-on experience in the dissection of the human body. We do not have enough cadavers making the cadaver-student ratio to be low. Currently we have about 10 to 20 students per cadaver. All our cadavers are virtually unclaimed or abandoned bodies from public hospitals. In Nigeria it is considered taboo for an individual to donate his body for dissection. Also individuals and families attach so much premium to giving what is

considered a befitting burial to their dead relations and loved ones. Cadavers have never been acquired through donation in the more than 50 year history of the department of Anatomy of the College of Medicine, University of Lagos, Nigeria. It is same for virtually all the medical schools in Nigeria. There are therefore no protocols for a body donation program though we would be willing to accept donated bodies.



As a pragmatic solution the Nigerian Anatomical Council, presented a paper to the Federal Ministry of Health through the Minister. The objective of the paper was to ensure that there is a Government policy towards the support education for body donor program and also enable Anatomy departments have access to unclaimed bodies from public Mortuary. By so doing these departments may be able to get a good number of cadavers to add to their list.

In summary it is our suggestion that there is a need for IFAA to establish a global policy on strategies for getting bodies for the purpose of medical education. Such policies are developed, through IFAA and then WHO to the various Governments the dearth of bodies for dissection may compromise the teaching of Anatomy and thereby affect the quality of medical education.

Prof. Luis E. Ballesteros (Colombia)

In the Industrial University of Santander for anatomy teaching, cadaveric specimens are used, but also osteological material, blocks of organs subjected to dissection, and others subjected to injection of the vascular beds.

Recently was inaugurated a laboratory with an Anatomy 3D Atlas. In Colombia, the 56 medical programs (about 4,500 graduates per year), 15 do not use cadavers in anatomy practices arguing the difficulty of obtaining cadavers,

added to the high toxicity of formaldehyde, the environmental problems generated by amphitheaters and the unavailability of physical spaces. Practices at these institutions consist on the use of web material, specialized software and anatomical simulation models.



The vast majority of Colombian teachers have expressed in different events that the use of cadavers for anatomy teaching is essential and contributes greatly to the knowledge construction of this basic area in the training of doctors and other health professionals. I consider that the use of technological applications constitute excellent teaching resources as a complement but do not replace the impact of cadaveric specimen at the optimum learning of this discipline.

Unfortunately, in recent years there has been seen a decrease of the cadaveric resource, because the high number of institutions that require cadavers, also the changes in the legislation, eliminating the state grant of cadavers who do not have identification (NN) or deaths in nursing homes, arguing that these bodies enters in the chain of custody of the state.

In Colombia it has been established that individuals who died by natural causes in university hospitals and whose bodies remain in the morgue for a period greater than 20 days are considered unclaimed and can be donated to universities. The state grant process requires multiple bureaucratic procedures that delay the delivery of cadaveric specimens, which helps in a considerable number of cases that they eventually will be deteriorated and not useful for teaching purposes. Anatomical parts from scientific and legal autopsies performed by the pathology departments of the universities and the Institute of Legal Medicine are received. The Ministry of Health regulates this donation. This resource has been able to supply the progressive decrease in cadaveric specimens, which now have to extend their stay in the amphitheaters

although their conservation status and academic utility are not the ideal.

In Colombia, there is legislation that sets out the procedures for organ donation and bodies, but civic culture on this aspect is precarious; for that reason, the universities have not implemented this mechanism for obtaining cadavers for anatomy teaching.

Prof. Bernard J. Moxham (Wales – IFAA)



High up on a wall, within the Dissecting Room (DR) at Cardiff University, is a marble plaque designed and constructed by one of the United Kingdom's most distinguished artists, Tom Phillips, commemorating those who bequeathed their bodies for anatomical examination. It reads: *Alive we thought beyond our lives to give our bodies as a gift for you to read.*

This work reminds our students (in medical, dental, healthcare and biomedical science studies) that working in the DR involves consideration of the community and ethical basis of anatomy.

Cardiff University is fortunate in having a very large DR. This is needed since up to 1000 students per year use the DR. We are also fortunate in having a medical course that greatly values the importance of anatomy in clinical training. Each year it receives up to 50 bodies for anatomical examination and many requests for the people of Wales to be considered for a bequest when they die. Our anatomy courses rely on practical dissection to the extent that, for the medical course, only 5 gross anatomy lectures are delivered. We believe that students should read their books and then develop their anatomical knowledge and understanding through the act of dissection. Within the UK, the use of cadavers is commonplace but is becoming less time consuming. Cardiff stands out for its reliance on practical tuition of the subject.

As for all our Medical Schools in the United Kingdom we operate under an act of the UK Parliament = The Human Tissue Act – that has, as a fundamental principle the need for all bequests to be obtained by witnessed “informed consent”. This Act replaced an Anatomy Act as a result of a scandal in Pathology in the UK where informed consent was not in place for retention of human material. The Human Tissue Act requires that there is a “Designated Individual” within an institution who is trained in the legal niceties and who takes responsibility for the DR activities and for the bequests for anatomy. Witnessed informed consent means that no unclaimed bodies are permitted and indeed, as laid out in the IFAA’s guidelines for donation of bodies for anatomical examination (see the IFAA website), the use of unclaimed bodies is deemed unethical. There is as a consequence of the Human Tissue Act much bureaucracy but this is deemed necessary and proper to ensure ethical practice. Periodically, the UK authorities send inspectors to the School to ensure that there is proper legal practice. The care of anatomical material is not confined to the bequest; health and safety issues are important, as are matters pertaining to recognizing who can, and who cannot, enter the laboratory. Furthermore, cadaveric material must always be tagged to ensure that disposal by cremation and burial is for that individual with no “foreign” material included. Permission from the bequeather must also be obtained during her/his life to allow photography and retention of parts. These parts must be appropriated tagged and catalogued according to law. Our donation programme conforms with the requirements of the Human Tissue Act. Although we do not advertise our services, many enquiries are received. On enquiry, a memorandum is sent to the individual explaining the process and, in particular, informing her/him that there is no financial gain (the programme pays only for the funeral arrangements) and that there may be reasons why, at the death, the donation may be refused (e.g. for health and safety reasons, because of an excess of donations for the student courses, because the cause of death may result in too much damage to structures and render the body unsuitable for teaching or research, because of the body is too fat or thin). The potential donor then fills in a form with personal information and this is filed at our School together with an official form that is witnessed to indicate that there is informed consent. The potential donor is required to keep copies of the forms with her/his will and testament and to notify next-of-kin of her/his wishes. Note that the relatives do not legally have a veto on the donation of the body at death. At

death, the School’s donation officer talks with relatives and physicians to ascertain whether the donation is appropriate and then to make arrangements with the School’s undertakers.

In common with most School’s in the United Kingdom, great care is take to inform students of the arrangements for body donation, to instruct them in ethical matters, and to explore and discuss matters relating to death. At our School, the students have in recent times been required to undertake a “medical humanities project” where short stories, poems or dramatic scenarios are written to reflect on matters of mortality. In addition, there is a non-religious “thanksgiving event” at the end of the anatomy course where staff and students talk about the gift of donating bodies for the students’ benefit and where poems and statements are read. Finally, bodies are also used for students to preform specialized dissections that lead to dissection prizes for the benefit of the students’ Curriculum Vitae, and for the production of good teaching prosection material. Some of these dissections are purely anatomical but some relate to the observation of pathologies in the material.

In addition to commemorating the kind gifts of the donors to anatomy by way of the Tom Phillips plaque, we also have a brass plate at the entrance to the DR where a donor’s name is drawn out each decade for inclusion to personalize our gratitude. We also have a special place within the university precinct where there is a memorial and where the ashes of the donors following cremation may be spread.

For further information regarding body donations in Europe, the reader is referred to a paper by Reiderer et al (2012) The legal and ethical framework governing Body Donation in Europe *Eur J Anat*, 16 (1): 1-21.

Prof. Subramaniam Krishnan (Malaysia)



Malaysia is made up of a multicultural, multiracial and multi religious society with about 60% of the population being made up of Muslims; the rest are Christians, Hindus, Buddhists, Taoists and a small community of folk religionists. Under Asian cultural and religious traditions, a dead Muslim must not be defiled (read dissected) and must be buried by sunset; likewise, the Hindus and Buddhists cremate the same day. As a general rule, families never agree to elective autopsies. Therefore, formal body donor programmes have never been instituted at any stage in Malaysia's history although the country has the largest number of medical schools relative to its population. So, how do we get the cadavers? Prior to the oil crisis in the seventies, cadavers could be obtained from India through agents but the Indian government put a stop to export of cadavers and body parts when the Arabs (who do not donate their own bodies) came a shopping!

Parallel to this arrangement, there have always been those patients from hospitals as well as old folk's homes that did not have any relatives or next-of-kin. Under the Malaysian Anatomy Act, the Hospital Administrator has the authority to release these (non-Muslim) unclaimed bodies to Medical Schools for teaching and research. There was thus a sufficient supply of cadavers for undergraduate dissection courses until about two decades ago when responsible religious bodies and guilds, having become aware of this provisions in the Act, began claiming these bodies as their social responsibility and gave them a decent burial or cremation depending on the religious tradition and rites. As a result, the supply of cadavers was drastically reduced. It was also around this time that the Malaysian regulatory Council started adopting the problem-solving, systems based educational philosophies. Under this approach, dissection by regions could not remain as the appropriate pedagogical strategy for anatomical learning. Hence, professionally prepared prosections and plastination technologies were adopted nation-wide. This was a paradigm shift which transformed the dissection hall from formalin infused hands-on experience to a smart and neat outfit where students did not hold a scalpel or forceps to dissect. This drastically reduced the demand for cadavers which now only became display material.

Whilst this transformation was taking place, it then suddenly dawned on the anatomists that there will not be sufficient cadavers available for surgical training and other skills related courses in the future. This was when the University of Malaya, the leading medical school began a voluntary body-donor programme. In order to get this message to the future putative donors, we

contacted the National Transplant Resource Centre for organ donations. Consent forms for whole body donation after death were displayed at the Centre and prospective donors started enquiring as details of the Anatomy Department and contact person were provided. Potential donors were also invited to visit the Department of Anatomy for a tour and explanation of how the body would be used and the remains ethically disposed afterwards. There was a deluge of enquiries as well as familiarisation visits, but the actual response was disappointing. This was because of a clause in the donor form for a formal signature by the next-of-kin who had to inform the department of the death (this was based on the advice by the legal department); claim of the dead body could only be done after notification of death, issuance of burial permit and completion of the appropriate religious ceremony. Not even half of the consented donor bodies were ultimately received in the department as the relatives refused to release the bodies after the religious formalities and final rites. Some bodies were even claimed from the Anatomy Department within a couple of weeks after death for religious burials or cremations.

In summary, body donor programs have not been successful or effective in Malaysia due to cultural and religious constraints. The current availability is still based on unclaimed bodies which reach the medical schools if they are not "intercepted" by the socially sensitive religious organisations. There is a recent expensive alternative- import of bodies from the Philippines.

Prof. Susana N. Biasutto (Argentina)



In Argentina, Anatomy course is developed in the first or first and second year of Medicine career, depending of each School/Faculty curriculum. The way to approach to the anatomical knowledge is different too, but clinical orientation

is always present, as the regulating national institution (CONEAU) has imposed this tendency. In this way, Anatomy related to the identification of anatomical structures in diagnostic images is particularly relevant.

The importance of dissected and prosected human corpses is doubtless for professors, students and even for the general population; only minimized, sometimes, by the university authorities who pretend to reduce costs by propitiating technological resources against cadaveric ones.

Instead of the above mentioned cadaveric-based teaching/learning, most of the departments of Anatomy in Argentina are actually receiving a reduced group of corpses, usually insufficient to guarantee an adequate learning and obviously a great interference for research.

There is not national, provincial or local program for donation of dead corpses for university teaching and research. Laws for organ's donation for transplantation are not applicable to this aim. However, to sign a donation will is legally possible for living people who usually informs the Department of Anatomy of the decision. In those

cases, donation finally depends on the dead relatives.

In the framework I explained, we have not limitations for accepting body donations, except active infectious diseases.

Most of the cadavers we get are, and historically were, unclaimed corpses from public hospitals, mainly those admitting patients with chronic diseases; but law protection is permanently reducing this access.

We need a donation program and the "Asociación Argentina de Anatomía Clínica" is interested to work on. Universities in Argentina usually have some radios and television channels which could facilitate the general promotion and students will certainly collaborate to the word of mouth spread. Our main problem is the financial resources to develop and organize it, to keep it working with the necessary continuity, registries, etc. A specific law could be important but not essential for the donation itself; however it is required to establish the responsibilities on each instance of the process (costs of the donation will, cadaver transportation, registries, burial or cremation, etc.).