

**CME Article**

# Cadavers as teachers in medical education: knowledge is the ultimate gift of body donors

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**ABSTRACT**

**In most of the medical colleges in India, unclaimed bodies from various mortuaries reach the dissection hall; and here, the body donors club has yet to gain the desired dimensions. In spite of all the adverse circumstances, the cadaver and the dissection both have survived the most rigorous test of pedagogical fitness – the test of time. Today, many of the Western countries have long donor waiting lists where cadavers are acquired as anatomical gifts or through body donor programmes. Thailand's approach to body donors offers a role model for resolving the present situation. The spirit of volunteerism reflects the drastic shift in public perception and a global change in approach is needed in the present time.**

**Keywords: anatomy, cadaver, dissection, donors, medical education**

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**INTRODUCTION**

Study of regional anatomy through cadaveric dissection is considered to be a unique feature of medical courses in India. The benefits of meticulous dissection mostly fall into three domains: knowledge acquisition and integration, skills, and attitudes.<sup>(1)</sup> Anatomical dissection is a time-honoured part of medical education. Bodies donated by patients themselves, for students to learn anatomy by dissection, is the ultimate gift, which needs continued appreciation by educators.<sup>(2)</sup> Cadavers are assigned to first-year medical students who will spend nine months of anatomy class dissecting and studying them. That is how the first-year medical students meet the cadavers: body wrapped in white cloth and covered with plastic, lying on a metal table. The cadavers become more than just lifeless bodies they have been assigned to work with. They are patients – people who donated themselves as the first ones to come under the scalpels of aspiring doctors. By the end of their first year, many students say they want to be donors themselves, explaining that they feel obliged to teach future

generations of doctors. They figure that their body is no longer of use to them, so why not let it be useful to someone else? It is about helping people plan the end of their lives.<sup>(3)</sup> The sensation of touch between physician and patient is essential. This is best learned early in the dissecting room.<sup>(4)</sup>

Apart from learning to cope with the overt “emotional confrontation” with the cadavers which assist anatomical learning, seven additional covert learning outcomes were identified by the students: teamwork, respect for the body, familiarisation of the body, application of practical skills, integration of theory and practice, preparation for clinical work, and appreciation of the status of dissection within the history of medicine.<sup>(5)</sup> The dissected cadaver remains the most powerful means of presenting and learning anatomy as a dynamic basis for solving problems. The manual skills learnt in the dissecting room are essential in almost every branch of the medical profession. Hands-on teaching on real cadavers is the first experience of the structural organisation of the body, both at the surface and in depth, and leads to a real understanding of the three-dimensional configuration of patients' anatomy. The student-cadaver-patient encounter is paramount in medical education. Better to learn on a cadaver how to use instruments than to experiment on patients.<sup>(2)</sup>

The student-cadaver encounter in medical education is the “nodal point” – the moment in time between stopping and starting; from absolute convergence to comparative divergence.<sup>(6)</sup> The “nodal point” in medical education can lead to the compassionate detachment that is essential if a physician is to cope with issues involving death and bereavement.<sup>(7)</sup> While dissecting a cadaver, the student encounters the reality of life, morbidity and mortality, the awesome responsibility of the physician caring for the patient. It is best to begin with the cadaver, the stillness reduces complexity and gives a better understanding of gross anatomy integrated with structure and functions which can then be extrapolated to the living. Dissection puts undergraduates at the sharp end of medical education.<sup>(8)</sup>

Dissection is the most important procedure at the threshold of medical undergraduate education and training. To have access to his or her own cadaver is a

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unique opportunity and privilege. It is an early encounter with mortality; often it is the first time that the students confront death. In the process, their manual dexterity and bonding by team work may develop and improve; a direct encounter with active and not passive learning. The students can have verification of facts from the primary source, will enjoy the art of discovery and check the interpretation of others. They may gain a three-dimensional understanding of the body, its variation and pathology. They acquire communication skills. This gives them confidence and enriches their clinical competence.<sup>(2)</sup>

### **ANATOMICAL GIFT PROGRAMME OF THE WESTERN WORLD**

The Uniform Anatomy Gift Act was passed in the USA in 1968. All 50 states of the USA ensured the right of a donor to bequeath her/his body to medical science for education.<sup>(9)</sup> The University of Massachusetts (UMass) donor programme was started by the late Dr Sandy Marks in 1971, when the University of Massachusetts Medical School opened.<sup>(10)</sup> The state's three other medical schools – Boston, Tuft and Harvard – each has a smaller body donor programme than UMass. The legally-sanctioned donation of human cadavers for medical training evolved over a long and difficult period. Before the 1900s, when it was common for grave robbers and prisons to provide bodies for medical dissection, little attention was given to their humanity. Unclaimed bodies were provided to the anatomists after the Anatomy Act of 1832. The care and respect with which today's students treat their cadaver reflects an evolution of attitude.

In 1983, students began hosting a memorial service for the relatives of the cadavers they studied during the year. It is a chance for the relatives to have closure in the loss of their loved one, and give them the opportunity to meet the medical students. In the UMass donor programme, there are about 4,500 people on the donor waiting list – their names all tucked into three drawers of a filing cabinet in Person's office, where the emotions of the death and dying, and the necessity of medical research each find a place. While some people decide to donate their bodies to spare their families the cost of a funeral, most do it out of altruism. Although it is rare for the school to turn down a donor, they do not accept bodies that are too obese, emaciated, or have infectious diseases such as acquired immunodeficiency syndrome. Many medical schools across the country are moving to teach anatomy through computer-generated simulations that save money and the time it takes to physically dissect a cadaver and organise a body donor programme. "When students dissect, they are in an explanatory mode and they are likely to remember

human anatomy better that way" said Dr. Carol Scott-Conner, president of the American Association of Clinical Anatomists. "It's also a rite of passage. The worst thing you can encounter as a young doctor is a dead body. If you get that first encounter over with earlier, it makes things easier". When the anatomy class is over, the cadaver remains are usually cremated at no cost, and returned to the family members. Some donors and families choose to have the remains interred at a Tewksbury cemetery run by the state's medical schools.<sup>(3)</sup> In the West, the most common way of bestowing more personal qualities on the cadaver has been to regard it as the students' "first patient".<sup>(10,11)</sup>

### **THAILAND'S APPROACH TO BODY DONORS**

Winkelmann and Guldner reported their dissection room experience in Thailand, where cadavers are acquired through voluntary donation.<sup>(12)</sup> In Thailand, cadaver donors are honoured with the special status of *ajarn yai* (a great teacher). Every year, Thai schools and universities regard and respect the body donors in a ceremony called *waikhru* (honour the teacher).<sup>(12)</sup> Two different ceremonies related to dissection courses are arranged to facilitate honour to cadaver donors: the dedication ceremony some days before the course session and the cremation ceremony at the end of the course. All the students and high officials including faculty members attend the aforementioned ceremonies. They, along with the relatives of the deceased and Buddhist monks, pray in the dissecting hall. The body donors (cadavers) are also present and are offered ritual flower bouquets. Their names are read aloud and they are awarded the title of *ajarn* (teacher). The Buddhist monks are provided a meal and gifts as a symbolic way of giving to the cadaver donors. The cremation of the dissected cadavers is a grander ceremony. A large procession, led by monks, proceed to cremation buildings where the medical students carry their *ajarn yai* according to their dissection groups. Booklets containing the donor's pictures, along with other relevant details, and notes of condolence and gratitude from both the faculty and students, are distributed to everyone.<sup>(13)</sup>

In the dissecting room, fear and stress experienced at the beginning of the course, gives way within a few days to a normal and relaxed atmosphere. Each dissecting table displays the personal details, and the cause of death of the cadaver. There is a possibility for further arguments on this issue as the students who treat cadavers like patients might later treat their patients like cadavers, which may lead to a negative effect on the medical socialisation.<sup>(14,15)</sup> Proposing and framing the concept of cadaver as a teacher, avoids the aforementioned problem as the cadaver is closer to a respected non-medical person than to a mere medical

object. The cadaver was called an “ambiguous man” by Hafferty to highlight its material as well as its personal qualities.<sup>(16)</sup> There is a general consensus among us that the Thai medical schools have succeeded in handling the above-mentioned ambiguity. We at present cannot judge whether the Thai approach will finally produce better doctors in the end, but we opine that it will help in dealing with human cadavers including their ethical aspects. Medical practitioners throughout the world at times face many ambiguities, which also include the different needs to show both detachment and empathetic care in their patient treatment.<sup>(17)</sup>

### DEBATE ON THE ISSUE CONTINUES

Jones et al have challenged anatomists to gather hard evidence to support assertions on the importance of dissection; notwithstanding it has survived the most rigorous test of pedagogical fitness – the test of time.<sup>(18)</sup> Oliver Beahrs, an internationally-acclaimed surgeon from the Mayo Clinic, and the first President of the American Association of Clinical Anatomists puts this more bluntly – “... today’s residents in surgery are learning their anatomy on sick patients for the first time in the middle of the night; operating without a firm knowledge of anatomy leads to increased mortality and morbidity”.<sup>(19)</sup> Lempp focused on a number of important learning outcomes that were reported by year 1–5 medical students in a British medical school, during the dissection sessions in the first two years of their training, as part of a wider qualitative research project in undergraduate medical education. His study highlighted the fact that dissection can impart anatomical knowledge as well as offer other relevant, positive learning opportunities to enhance the skills and attitudes of future doctors.<sup>(5)</sup>

In Singapore, 75% of medical students in all five years of their course found gross anatomy clinically relevant and 89% considered dissection helpful or very helpful in their understanding of gross anatomy. When asked whether dissection should be replaced by demonstrations in prosected specimens, 87% gave a resounding “no”.<sup>(20)</sup> A recent study, comparing personal dissection versus peer teaching of upper and lower extremities in Virginia, USA, has shown that although peer teaching was generally successful, first-year medical students preferred to dissect for themselves. The results are consistent with the contention that hands-on dissections enhance learning and confidence in the subject matter.<sup>(21)</sup> Snelling et al have recently reviewed the attitude towards dissection of 474 first-year medical and dental students.<sup>(22)</sup> In this study, students benefited from active practical dissection before a prosection-based tutorial on the subject. Active dissection remains popular with the students.<sup>(22)</sup>

### BARRIERS

The use of human cadavers for teaching purposes is surrounded by ethical uncertainties.<sup>(16,23,24)</sup> The dissecting room is an extremely expensive item in the Department of Anatomy in a medical school. It has a very extensive floor space, which now has to compete with molecular biologists with enormous research grants clamoring for more research laboratories. Many universities have not been able to afford or are not prepared to cover the cost of upgrading ventilation in the dissecting room to bring it up to the European Community Standards.<sup>(25)</sup> Cadavers are expensive, involving initial transportation and preparation, large space for storage and finally disposal, burial or cremation.<sup>(26)</sup> To obey every aspect of the Anatomy Act and respect those who have generously donated their bodies is much more expensive than a few computers. The financial resources of institutions are primarily directed to secure patient income and funding for research.<sup>(27)</sup> Overcoming barriers related to cadaver teaching requires more reciprocal links between hospital staff and medical schools, opportunities for consultants to understand and to comment on curricular and timetable developments, and, perhaps most importantly, recognition (in contractual, financial, managerial and personal terms) of the importance of undergraduate teaching in the competing triad of service, research and education.<sup>(28)</sup> Dissection in anatomy should be able to achieve the ideals of the profession in the new millennium, by acquisition of scientific knowledge with the help of tactile access of anatomy laboratory by humanistic attitude and behaviour.<sup>(29)</sup>

### DISCUSSION

Cadaveric dissection explained by drawing diagrams coordinates not only both halves of the brain, but also integrates science and art. Medicine is not only a factual science, but also an art as well.<sup>(30)</sup> Receiving the dead body within 48 hours of death, properly embalming it, keeping it in the formalin tank/cold storage/freezing chamber, maintaining it while being dissected, burying it after the job is completed, and procuring bones for the purpose of teaching, research and for display in the museum are the coordinated work of the whole department done for better teaching of anatomy.<sup>(31)</sup> Handling of the human structures and organs creates a photographic memory while dissecting.<sup>(31)</sup> As students wander from one cadaver to the next in the dissecting room, they will see anatomical variations associated with developmental anomalies keeping in mind the fact that human anatomical variation is common and often of clinical importance.<sup>(2)</sup> Bonds developed early run deep and are never forgotten. Small group teaching around a cadaver in the dissecting room facilitates the undergraduate to initiate bonding with

colleagues.<sup>(28)</sup> At Mount Sinai School of Medicine, New York, the anatomy course combines classic dissection with tools that the physicians and surgeons use. Students are introduced to the newest technologies available for viewing the body with hands-on experience in the laboratory. This requires an interdisciplinary approach with surgeons, physicians, and core anatomy faculty.<sup>(32)</sup> Some authors have suggested that classic dissection on cadavers may be replaced by the cyber cadaver.<sup>(33)</sup> If students use only models, images, audiovisuals or computers, they will not develop the requisite reasoning that comes from investigative dissection of real tissue in acquiring knowledge of the living.<sup>(34)</sup> A well-known saying is: "You will remember some of what you hear, much of what you read, more of what you see, and almost all of what you experience".<sup>(31)</sup> Dissection on cadavers is that precious experience which cannot afford to be missed even in this era of the medical reforms.

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**SINGAPORE MEDICAL COUNCIL CATEGORY 3B CME PROGRAMME**  
**Multiple Choice Questions (Code SMJ 200703A)**

	True	False
<b>Question 1.</b> A competent medical teacher should be able to develop the following qualities in their students:		
(a) Knowledge.	<input type="checkbox"/>	<input type="checkbox"/>
(b) Skill.	<input type="checkbox"/>	<input type="checkbox"/>
(c) Propaganda.	<input type="checkbox"/>	<input type="checkbox"/>
(d) Self-confidence.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Question 2.</b> Cadavers as teachers in medical education should provide:		
(a) Emotional bonding among peer group of students.	<input type="checkbox"/>	<input type="checkbox"/>
(b) Experience of investigative dissection actively.	<input type="checkbox"/>	<input type="checkbox"/>
(c) Fear and stigma.	<input type="checkbox"/>	<input type="checkbox"/>
(d) Passive learning.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Question 3.</b> Dissection is discontinued in many colleges in many parts of world as a result of:		
(a) Lack of interest among medical practitioners.	<input type="checkbox"/>	<input type="checkbox"/>
(b) Expensive cost of maintenance.	<input type="checkbox"/>	<input type="checkbox"/>
(c) Lack of requisite number of body donors.	<input type="checkbox"/>	<input type="checkbox"/>
(d) Ethical uncertainties.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Question 4.</b> Body donor programmes are related to dissection teaching on cadavers:		
(a) Many medical students opt for body donation after dissecting on cadavers.	<input type="checkbox"/>	<input type="checkbox"/>
(b) Cadavers donors are uniform throughout the world.	<input type="checkbox"/>	<input type="checkbox"/>
(c) More awareness among common people can help to improve the present situation.	<input type="checkbox"/>	<input type="checkbox"/>
(d) Voluntary donation of body by donors is better than unclaimed bodies for teaching purpose in medical colleges.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Question 5.</b> The following countries are role models in promoting dissection teaching by cadavers through body donor programmes:		
(a) Turkey.	<input type="checkbox"/>	<input type="checkbox"/>
(b) Thailand.	<input type="checkbox"/>	<input type="checkbox"/>
(c) USA.	<input type="checkbox"/>	<input type="checkbox"/>
(d) India.	<input type="checkbox"/>	<input type="checkbox"/>

**Doctor's particulars:**

Name in full: \_\_\_\_\_

MCR number: \_\_\_\_\_ Specialty: \_\_\_\_\_

Email address: \_\_\_\_\_

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(1) Log on at the SMJ website: [www.sma.org.sg/cme/smj](http://www.sma.org.sg/cme/smj) and select the appropriate set of questions. (2) Select your answers and provide your name, email address and MCR number. Click on "Submit answers" to submit.

**RESULTS:**

(1) Answers will be published in the SMJ May 2007 issue. (2) The MCR numbers of successful candidates will be posted online at [www.sma.org.sg/cme/smj](http://www.sma.org.sg/cme/smj) by 15 May 2007. (3) All online submissions will receive an automatic email acknowledgment. (4) Passing mark is 60%. No mark will be deducted for incorrect answers. (5) The SMJ editorial office will submit the list of successful candidates to the Singapore Medical Council.

**Deadline for submission: (March 2007 SMJ 3B CME programme): 12 noon, 25 April 2007**