USING CADAVERS TO TEACH HUMAN ANATOMY IN A SMALL COLLEGE

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The ideal way to teach human anatomy labs is to have a small group of students doing their own cadaver dissection. This is not feasible in small colleges because of expense and space limitations. So students usually dissect cats.

In this paper, I would like to discuss the method we use at Winona State University. Here we use prosecuted cadaver demonstrations along with cat dissections. This compromise allows students many of the benefits of cadaver dissections without the space and expense problems.

Our present teaching method involves demonstrations on two prosecuted cadavers. Usually three demonstrations are arranged each quarter at the conclusion of the Muscular, Circulatory and Internal Organ System Units. The demonstrations are given when students have thoroughly learned the structure and relationships of the organs by dissecting their own cats (two students per cat). The instructor then demonstrates the organs to groups of about twelve students. Names, relations and functions of organs are reviewed. Special attention is given to the differences between cat and human organs. Later in the lab period, students are encouraged to review the organs demonstrated in small groups. This allows them to get a closer look than they could in the large group. Notes on the cadaver demonstration and a checklist are distributed to facilitate this review. We also encourage review by asking laboratory practical questions on the cadavers.

Initially, we had a single male cadaver. This specimen was dissected so that muscles, thoracic organs and abdominal organs could all be demonstrated. In order to do this, we had to leave half of the chest wall and abdominal wall intact. This compromise resulted in the destruction of some muscles and difficulty in fully viewing some internal organs.

Currently we use two cadavers. A male is used to demonstrate muscles and male reproductive organs. The female cadaver has had the entire chest and abdominal wall removed. Circulatory, internal and female reproductive organs are demonstrated on this specimen. We find the present system to work much better than a single cadaver, but the expense and space required for two tanks may make it impossible for some schools. We got along perfectly well for several years with a single cadaver.

We have found that almost all students accept the cadaver demonstrations very well. We thoroughly prepare the students for the first demonstration by discussing where the cadavers come from and how they are embalmed. We emphasize that students must treat the cadavers respectfully. The students' intense curiosity along with this preparation helps them get over any initial difficulties they have in viewing a dead body.

The cadavers were obtained from the University of Minnesota Department of Anatomy with the cooperation of David Lee. We had to demonstrate that we could maintain good security, that we would be respectful of the bodies and that we would make good use of them for teaching purposes.
The cadavers were prepared at the University by the usual "heavy duty" embalming procedure used for medical school specimens. The specimens were delivered intact in heavy plastic bags. We planned and carried out our own dissections (without previous human dissection experience). The dissection for purposes of demonstration is very time consuming, but is a great learning experience in itself.

The cadavers are each kept in their own stainless steel tank. Each tank is about three feet by six feet long. We wheel the tanks out to an open area for demonstrations and then store them in a corner. We keep the tanks secure with hasps and padlocks when not in use.

The cadavers are kept immersed in a solution of 25% ethylene glycol and 1/2% formaldehyde in water. During viewings, a lever mechanism allows us to hoist the cadavers out of the fluid. This method allows the cadavers to be kept for repeated viewings over a period of years. It is also more aesthetically pleasing than the usual embalming method because ethylene glycol is odorless and the formaldehyde in the room is minimal.

This method of preservation was developed by Dr. Calvin Fremling for the Nasco Company which uses a similar method to preserve animal specimens.

Our first male cadaver was well preserved after five years. It was finally replaced because of discoloration produced by a mold inhibitor we no longer find necessary. Some arm muscles also had become torn by repeatedly turning the cadaver over. The present specimens are in their second and third years and are doing well.

I would like to give interested readers some idea of the initial and maintenance costs involved. The big item, of course, is the tank which lists at about $3,500. Next comes the partial cost of preparing the body which is paid to the medical facility involved. We estimate this cost at about $500. This expense might be anticipated to occur every five years or so. The only other expense is a yearly change of ethylene glycol; 15 gallons at about $6.00 per gallon.

As you can see, the expense is not great after the initial purchase of the tank. If a reasonable number of students take the course, the expense is small compared to the yearly cost of cats.

We have found the benefits of having the cadaver demonstrations have been great. It has allowed students to get a much better perspective on the structure and relations of human organs. I also have the impression that the cadavers have added considerably to the status of our anatomy courses and have made students more serious about learning anatomy.

If I can be of help to anyone who might be considering getting cadavers for your school, please let me know.

ON THE SUBJECT OF FERNS
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It has been my experience after some twenty years of teaching, both at the