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Audiovisual material to see before the dissection: Human Anatomy and Dissection

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Abstract: At the Complutense University of Madrid there are different the disciplines that contemplate the dissection of the human cadaver inside your obligatory practices. In the above mentioned meetings, the teachers of Human Anatomy think every year a group of students that they present significant reactions of anxiety before your accomplishment, leading in occasions to the abandon of the subject. With the aim to diminish the response of anxiety of the pupils we appear the need of that these pupils were familiarizing themselves before with the dissection, before your real practice, across the exhibition to an audio-visual material that represents of the as veracious as possible from this situation. With this purpose there was realized the material audio-visual present of 23 minutes of duration.

Keywords: Educational innovation. Human dissection. Anxiety. Audiovisual methods. Video.

INTRODUCTION

Under an Innovative Educational Project of the UCM, our research group prepared audiovisual material entitled "Human Anatomy and Dissection: Introduction". It lasted 23 min, structured into 5 chapters:

1. **Introduction** (0-02'.05''): Brief description of the aim and method within a historical context.

2. **Importance of Anatomy** (02'.05''-05'.55''): Anatomy as the basis for medical practice and communication as well as the foundation for knowledge of the nature of living matter.

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3. **The Problem of Dissection** (05'.55'-14'.15''): Display of emotions and fears regarding death, contact with the dead, and breaking the taboo.

4. **Dissection** (14'.15''- 18'.30''): Exposure to the practice of dissection. Including recordings during different practice classes of Human Anatomy made in the dissection room of the Department of Morphological Sciences of the Medicine Faculty of UCM.

5. **Epilogue** (18'.30''-23´).

Later we transcribe the script of the same one

AUDIOVISUAL MATERIAL

Introduction

Ever since the first human being felt the need to help a fellow-man in his illness, he has understood that it is necessary to know the form of the human body in order to explain health and disease.

In our present stage of knowledge, the science that deals with the understanding and description of the form of the human body is Human Anatomy or Anthropometry.

To define any science accurately implies the combination of two factors: Object and Method. The object of Anatomy will be man, just as it is for other sciences such as Psychology, Anthropology or Sociology. It I precisely the method used by each one of them which gives it its defining characteristics. Thus the scholars of the School of Alexandria decided to investigate the most secret places of the intimacy of the human body; and they did so by resorting to the method that they had to hand. So it was that, with their primitive scalpels, they broke through the mystery that surrounded the human body. Indeed, precisely because this was the first method used, it received (apparently from Aristotle), the name of Anatomy (repeated cutting) and as a result of its etymology Anatomy is confused with Dissection. Nevertheless the fundamental point of Anatomy is not dissection but the conjunction of the parts in a functioning whole.

The importance of anatomy

- **The basis of Medical practice**

  During clinical examination the patient "puts himself in the hands" of the doctor, who has to be able to recognize and identify anatomical characteristics,

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not only on the surface -muscular masses, bony prominences- but also in X-ray images.

Diagnosis requires knowledge of the location of anatomical structures (RX, CT, RM….). The diagnosis of many neurological problems requires a fundamental knowledge of the routes of the central and peripheral nervous system.

In treatment, it is essential for competence in any field of surgery.

- **The basis of medical communication**

During a medical examination a doctor must observe and describe, and must communicate his clinical observations and findings to his colleagues, a communication that must be exact, complete and intelligible.

Goethe: What is most difficult? What seems simplest? To see what you have before your eyes. Indeed, to communicate the description of a three-dimensional object is rather a difficult task.

The knowledge of any branch of science is expressed with a specific terminology. In any group of structures with similar characteristics, the capacity of observation of the morphologist has always found something that is exclusive and distinctive to the individuality of a component of that group; and to ensure that each structural component has its own identity it receives its own name. In our case it is an anatomical term, which it receives for its structural differences, functional situation, properties, etc. To study Anatomy means to study a common language, applying it to different structures and precisely reuniting the structures identified in codified phrases.

This is why when anatomical terminology is properly examined it reveals the most noteworthy characteristics of the structure that it depicts; not forgetting that it also forms the pillars of medical terminology.

- **The nature of living material**

We tend to think that function alone is the basis of life.

We are used to seeing images in movement, to observing reality and appreciating the capacity of a human being for his or her ability to act.

But there is no underlying function without structure: in fact it would be senseless to investigate the function of any living organism without understanding its basic form.

All this means that Medical Science is based on the deepest and most exact possible knowledge of the structure of the human body, and its Dissection is an essential way to learn its basic architecture[1].

The problem of dissection

Ever since man began to think about himself an idea, mythical or rational between his present and his past, has been a constant leitmotif of all cultures: death, along with the questions: Where do I come from? Why do I exist? This is one of the three great enigmas in any human being. But there is nothing in the life of man which is more set about by fear, uncertainty, mysticism and superstition than his own death. And human dissection is intimately associated with the fact of living by and for death. Before the dawn of civilization, primitive man was doubtlessly more aware of the meaning of death than of the other two enigmas.

Very soon man, in the course of his evolution, compared the state of death with sleeping and called it “eternal sleep”. Among his first reactions to this condition there appeared terror and flight, later to formulate the specific idea of “life during death”, reflected in ghosts or spirits and probably developed from the interpretations that he gave to his dreams, to his shadow, to his reflection in water and to other peculiar phenomena. It was logical, given his mentality, to conclude that all human bodies were inhabited by a spirit, a vital principle responsible for all their activities, to which he gave great flexibility, the power to travel, and move around and even to be in different places at once: explaining death as being due to a supernatural or mystical force; man being condemned to die by the evil influences of an enemy - generally a wizard or a diabolic spirit.

Be that as it may, contact with the dead was frightful and considered dangerous or even contagious. The fear of ghosts led to the burial- or cremation- of the dead, the idea of getting rid at the same time of the body and the demon who might dwell within.

Primitive concepts of death were transmitted at the birth of civilization. In ancient China demons, ghosts, vampires and werewolves inhabited the land, and could get up to all kinds of mischief; in Babylon the dead spread terror, and they did everything in their power to avoid them. The inhabitants of early Egypt were polytheists and were very worried about their departed; they soon developed the transcendental concept of immortality and possible retribution in another world (image from Psychostasia: weighing of the soul) that, together with the concept of reincarnation, meant that interference in the world of the dead was absolutely forbidden.

But anatomical science was not born in an identifiable time or place, and nor has it developed uniformly over the centuries[2]. The first outlines of its history were drawn with coarse and uncertain lines at the dawn of humanity. Fragmentary anatomical

observations are found in the prehistory of all peoples, a time when very scant homespun morphological knowledge was only helped by simple visual observations made during the carving-up of animals.

The anatomical ideas found among the peoples pertaining to superior primitive cultures (India, China, Mesopotamia and Egypt) were obtained from three different sources[3]:

- The observation of animals at the time of ritual sacrifices.
- The observation of mortal or disfiguring traumatic wounds, abundant in military campaigns.
- And embalming, which gave the Egyptian culture rudimentary and sometimes erroneous notions about the structures of the human body.

Although respect for human remains has always restrained the investigative impulse, the first document that may be regarded as dealing with human anatomical research is to be found in the writings of a Greek doctor and Pythagorean philosopher of the fifth century B.C.: Alcmeon of Croton, regarded as the father of Anatomy.

However, it was a century later with the School of Alexandria when medicine in general and Anatomy in particular acquired a natural scientific base for the first time, when at the initiative of men such as Herophilos of Chalcedon and Erasistratus of Cea the fear caused by the human corpse as a base for structural and functional knowledge was overcome.

This anatomical boom was sporadic and with the hegemony of Rome human anatomical research was abandoned. In the second century A.D. Galen of Pergamum, the final star of Ancient Medicine was to be the pioneer in the use of the descriptive method in Anatomy. The anatomists of his time, including himself, took it for granted that animal and human bodies were similar, which explains why his anatomical studies are prone to the drawback of transferring to man the observations done on animals. In his more than 500 writings, considered the best compendium of Anatomy of classical antiquity, he already includes the idea that form determines function.

His belief that the creation of the structure of the human body had a divine origin made him popular among Christians, Jews and Muslims. The Authority that these attributed to him throughout the Middle Ages, together with the moral and religious prejudices that regarded the dissection of cadavers as ungodly, obstructed the birth of true scientific Anatomy and therefore the development of Medical Science.

The human body was of no importance: rather it was viewed with scorn. Salvation of the soul was paramount. Life was seen as a half-way house between two eternities. Witches and those possessed by demons abounded, and to punish them

with death - sometimes followed by the anatomy of their body- became a reality of those times.

During the Late Middle Ages there again arose a remarkable interest in the philosophy of nature in general, which brought about a reassessment of the dissection of the human body. In the fourteenth century the universities of Bologna, Florence, Montpellier, Naples, Prague and Venice carried out dissections. At that time in Spain the Monastery of Guadalupe received a Papal dispensation to that effect, and King Juan II of Aragon allowed the University of Lerida to carry out anatomy on the bodies of executed criminals.

In the Renaissance period Anatomy, the first recognized natural science, laid the foundations for the later evolution of all Medicine, thanks to authors such as Achillini, Valverde de Amusco, Riolan, and Vesalius: men with open minds who stood up to the prejudices of the time. Many famous painters also carried out dissections: Leonardo da Vinci, Michelangelo, Dürer or Titian, aware of the importance of the knowledge of muscular structures in developing their extraordinary works of art. But Anatomy and more particularly dissection also had their detractors, with the suggestion that this was an undercurrent of the Renaissance.

The need for dissection: Two authors, Condillac and Piaget, will help us to understand the need for Dissection.

For Condillac sensation is the basis of all knowledge (sensualist analysis); and according to Piaget's concept of operativity, sufferers from aphasia are better able to remember objects that they have previously handled.

In dissection, structures are manipulated and the tactile sensation is added stereognostically to our mental image, allowing us to remember with greater ease structures represented two-dimensionally.

In addition the development of diagnostic tools such as computerized axial tomography, magnetic resonance or echography provides new challenges to the capacity of professionals and students of health sciences in conceptualizing the three-dimensional relations of Anatomy. Not in vain have anatomists devoted centuries to the development of an appreciation of the transformation between two-dimensional and three-dimensional conceptualization.

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Dissection

To dissect (lat. *dissecare*, to cut) a region is to uncover the different anatomical elements which form part of its constitution, conserving at the same time, as far as possible, the essential relationships.

In the first place, it is necessary to place the body in the so-called "incision position" extending the muscles, vessels, and nerves of the region to be studied.

The region should be dissected level by level, from the integuments to the skeleton; in general we normally find three levels [(4)]: skin and subcutaneous cellular tissue; an aponeurotic layer: the superficial aponeurosis and the deep or subaponeurotic layer, more or less complex, but always containing muscles, vessels and nerves.

1. **Skin and subcutaneous cellular tissue**

   As a rule the skin and subcutaneous cellular tissue are dealt with simultaneously, cutting one or several flaps that fold outwards, and which normally include superficial vessels and nerves, sometimes ganglia or even, as in the case of the neck, cutaneous muscles.

2. **Superficial Aponeurosis**

   This is found immediately afterwards and constitutes the first important level of the region. It is the one that envelops the muscular components, and septa often come up from its deep fascia dividing different compartments, important for clinical and surgical purposes.

3. **Subaponeurotic layer**

   After cutting and folding back the superficial aponeurosis, we penetrate into the region under study.

   The muscles, in most regions, are subdivided into two layers: one superficial and another deep.

   The vessels and nerves should be dissected with much caution and less precision, if we are carrying out a dissection for topographic purposes. If we were to do it very meticulously, clearing them of the fat that surrounds them and, above all, cutting all the fibrous tracts that support them, we would turn them into floating cords which would acquire artificial relationships.

   Once the dissection is finished, when all the anatomical elements in the region have been identified, it is advisable to mount it.

To mount a preparation is to present it in such a way that the observer who examines it can, with a simple glance, recognize everything that should be visible in the region.

Epilogue

We have seen the methodological need for Dissection and looked at aspects related to the historical importance of Anatomy. So anyone who has studied their history cannot help being struck by the attitude of the surgeons and the anatomists of the past as far as their vision of the human body are concerned. In general, they were impressed by its beauty, architecture and complexity; leading them, generally speaking, to adopt philosophical approaches in spite of frequent vilification, and showing an extraordinary faith in the theoretical and practical value of the subject.

The students of Health Sciences at the UCM at the present time still enjoy the privilege of being able to study Human Anatomy by carrying out dissections on human bodies. Thus they have the opportunity to become familiar with the human body, learning their way through direct experience and proving that the outstanding characteristic of the human body is its complexity, which leads inexorably to its morphology. Through dissection students of Health Sciences have the opportunity to become personally familiar with the human body, learning their way through direct experience.

In addition human dissection is a unique opportunity to prepare students for certain situations that may be met during their professional careers. The dissection of a body is thus not only a technical exercise of skill: beneath its emotional aspects lie the relationships between biology and human psychology, so we can affirm that dissection is truly a way for mankind to study and know mankind.

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