

## **Should we keep teaching Human Anatomy same way as we have been doing it?**

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**Abstract:** Human Anatomy constitutes the point of outburst of all medical knowledge. The aim of this paper is to make a critical assessment of the way its teaching-learning process have been carried out during the last decades, taking into account the author's working experiences in different universities. Classical sociologist researching methods like questionnaires and interviews were used as well as some statistics and theoretical methods. The results are shown as answers to questions and they are faced up to those reported by local and foreign researchers. One of the two main medical paradigms or approaches determines the current approach of the teaching of Anatomy: biomedical or biosocial. Deep transformations to contextualize the teaching of this discipline are necessary to place the teaching of Anatomy to the level of the current development of the Medical Education and the Pedagogy.

**Keywords:** Anatomy, Didactics, Learning, Medical education, Methods, Particular methodologies.

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Date of Submission: 05-12-2018

Date of acceptance: 22-12-2018

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### **I. INTRODUCTION**

Anatomy is the science about the shapes and the structures of the human body; for it constitutes the point of outburst of all medical knowledge (Latarjet, 2005, p.1), and its teaching is included in the first years of study in the curriculum of all the medicine schools in the world.

Although the anatomical knowledge is very old, the structuring of Anatomy as a medical discipline started from the foundation of the first universities, such as Padua and Salamanca. This way, Anatomy acquired a class character. Gradually, the dogmatic teaching style was arriving to its end, allowing the entrance of the academic, didactic model that enables a better approach among the educating and the educator.

In the last decades of the past century, a social movement at world level carried out a revision on the educational aspects of the medicine. Since then, the number of hours for Anatomy and other Biomedical Basic Sciences has been reduced several times and the teaching-approach has been changing.

The depth and range of the disciplines concerning health sciences are growing incessantly but the macroscopic knowledge, which is indispensable for a practicing doctor, should not decrease in importance. The current information supplied by the dynamically developing disciplines may become outdated tomorrow but the majority of the details of Gross Anatomy have been known for hundreds of years and this knowledge is still valid today and without it, it would be impossible to carry out the simplest medical intervention.

In Cuba, the teaching of the disciplines belonging to the area of the Biomedical Basic Sciences has evolved in correspondence with its particularities and necessities; but always having as foundation the results of the pedagogic investigations that are carried out at world level. The concern for a style of productive learning that promotes the development of a creative thought and, mainly, aimed at eliminating learning by memory has always been latent in the valuable Cuban pedagogic tradition. (Cañizares, 2000).

Taking the previous considerations and the experiences of the authors as basement, this paper pretends to make a reflection about the way the teaching-learning process in Human Anatomy have been carried out during the last decades.

## II. METHODS

To avoid that only the opinions of the authors were included here, some classical sociologist researching methods as questionnaires and interviews were used.

Samples of Anatomy teachers and students of three different universities were taken: Aden University (Yemen), University of Medical Sciences of Villa Clara and of the Latin American School of Medicine (Havana, Cuba).

Theoretical methods: analytic-synthetic and inductive-deductive methods.

Empiric methods: 1) questionnaires to the students aimed at exploring how they assess the way Anatomy was taught and their level of satisfaction concerning their Anatomy learning; 2) questionnaires and interviews to the teachers aimed at exploring the knowledge of the didactics of Anatomy; 3) analysis of documents and 4) observation of classes.

In addition, statistical-mathematical methods were used in the processing of the obtained data.

## MAIN BODY

### III. RESULTS

#### **How is the the Human Anatomy program for medicine students in Aden University organized?**

The Anatomy Unit of the Aden faculty has been following a program of systematic anatomy with a predominant descriptive approach over the last years. The discipline is divided into three subjects (Anatomy I, II and III), which are taught through three terms in first and second years, with a total of 162 hours/classes distributed in three ways: lecture (82), practical class (64) and seminar (16).

#### **How is the Human Anatomy program for medicine students in Cuban Universities organized?**

It was also a discipline structured in three core subjects until the beginning of XXI century; when basic biomedical sciences were integrated into a new discipline firstly called "Morphophysiology" and posteriorly "Medical bases of medicine", formed by several subjects, which have been under progressive change.

Three of these subjects include a total of 136 hours of main gross anatomical aspects. Hours dedicated to giving lectures have been significantly reduced, meanwhile workshops have been introduced and with seminars and practical-classes are the predominant ways of teaching. Nowadays the trend is to teach a clinical anatomy, focused on living people and using as active ways and methods as possible.

So, both horizontal (e.g., anatomy-physiology-biochemistry) and vertical integration (e.g., anatomy with surgery) have been introduced throughout the curriculum.

This move towards integrated teaching is likely to reduce the fragmentation of the medical courses, and motivate students for better learning. In the traditional curriculum, the emphasis had laid upon the acquisition of knowledge as against the development of skills. More attention has been given to the development of various skills, such as problem-solving skills, psychomotor or performance skills, attitudinal and communication skills in the current curricula.

#### **Which was the opinion of the medicine students about the human anatomy teaching-learning process at the Aden University?**

To have an answer to this question a sample of students of the different years were randomly requested. Two forms were prepared as carefully as possible -one easier for students of first and second years- and applied, fulfilling the known rules in these cases and without the presence of any anatomy teachers.

In table 1, they assess the quality of lectures, practical classes and seminars, the methods and ways of teaching and the evaluation system. In table 2, they self-evaluate the way they use the learning means and didactic materials to learn Anatomy. In table 3, the students of senior years give their opinions about the preparation they have in Anatomy and utility of knowledge, skills, abilities and habits they acquired in Anatomy for the coming disciplines.

#### **Which was the opinion of the medicine students about the human anatomy teaching-learning process in the two Cuban universities?**

The quantitative results of the questionnaire applied to a sample of students in two Cuban universities are summarized in the table 4. Most of the students said to be satisfied with what they have learned; however, near the third two parts recognized to be fairly prepared to apply this knowledge to new situations, and only around a third of them considered to be appropriately prepared.

Approximately half of them evaluated the degree of difficulty in the study of these contents as high.

A great number of students said that their lecturer used predominantly teaching ways that make them think, look for and discover the essential points.

During practical classes and seminars the most frequent activities were the identification of digital images, anatomical models and specimens; while the less frequent activities carried out were the experiments, the identification of radiological images and the identification on their own body (surface anatomy).

In general, the students preferred interesting classes, more dynamic or active, more applying or linked to the practice, more objective (showing more), combining different methods and better teaching aids and with better relationship between the content volume and the time.

### **Which was the opinion of the medicine teachers about the human anatomy teaching-learning process at the Aden University?**

To have an answer to this question a sample of teachers were interviewed, following the guide previously prepared. Most of them teach clinical subjects and they are assistant professors who had received systemic Anatomy in Yemeni faculties, but also some heads of departments and professors with many years of teaching experiences were included.

Most of them stated that students get to clinical subjects with a poor preparation in Anatomy. Some of the opinions are the following: “middle level”, “shortage in information”, “weak”, “under expected”, “only a few students are able to remember the anatomical knowledge when they rotate through E.N.T.”, “the students do not know anything when they enter in surgery: they have forgotten all Anatomy”, and “in the last years the preparation of students has diminished in quality...”

Except for three interviewed teachers, the rest of them said that they know the current Anatomy syllabus. That is why they gave the researchers opinions and suggestions about the different components of the Anatomy teaching learning process:

- The general opinion about the approach and ways (methods) was that they should change (only 3 considered them as good). They suggested as necessary to increase the applied approach. It means to teach less descriptive anatomy and emphasize on the clinical and functional correlation, introducing participative method as group-discussion. They also support the idea of “more time or reduce syllabus”.
- Some teachers were of the opinion that Anatomy should start in the first semester of first year. In addition, to introduce anatomical courses in senior years was suggested.
- To get some official connection between Anatomy Unit and the other clinical departments like Surgery was also recommended
- Most of them coincided in this idea: ‘the students need more practical than theoretical activities in Anatomy’. However, they also recognized that Anatomy Unit has a poor supply of specimens and models, and most in bad condition. Then, it is necessary to improve or look for new teaching aids.
- Concerning other teaching aids, opinions like these were heard: ‘there are enough anatomy books at the library, but the students do not like to use them’ and ‘it should be convenient to introduce videos and computing...’
- About the current evaluation system, the majority considered it as good, very good or excellent, but opinions like ‘there are so much systematic assessment activities’ should be analyzed.
- Regarding the formation of the Anatomy teachers in the whole history of the Aden Faculty, we found coincident criteria about the instability of the Anatomy staff because this unit is mainly used as transit: general physicians do not like this subject and they are not interested in teaching it.

### **How had Human Anatomy being taught in the two Cuban universities for the last decades?**

Nowadays the teaching-learning process is focused on the student activity more than the teacher activity. The current trends towards diminishing lectures and increasing other types of classes mean better technical (pedagogical) preparation of teachers. Lectures must be oriented to the general aspects and counselling and practical classes, workshops and seminars must be dynamic, participative. Many of the revised documents were not in accordance with previous ideas yet; it means that individual plans of classes and collective methodological orientations should be improved and updated.

When different types of classes were observed, it was found that: 1) some lectures were still taught in a traditional way, with prevalence of descriptive explanation (expositive method) leaned on visual teaching aids, 2) most of practical classes were carried out with computers because tridimensional teaching aids like specimens and models were not always available. On the other hand, the use of surface and radiological anatomy was not ideal, 3) the most frequent type of seminar was through questions and answers. The seminars planned as problematic seminars were developed based on health problems but in fact, they were not always problematic, 4) in workshops the use of clinical cases was common, where the students should solve them applying their knowledge. In some occasions the signs and symptoms were given so that the students could say the possible location of the lesion and, in others the students should precise the possible consequences of a given condition.

According to the questionnaire, most of the teachers considered problematic teaching as a teaching method, even though they were not able to distinguish it from problem-based learning (PBL). More than half of them did not know the typical categories of problematic teaching as a didactic system. Many of them were hesitant to recognize the problematic exposition and the heuristic conversation as methods that promote active learning and some chose the wrong teaching methods.

Cuban teachers become aware of the need to change the traditional way of teaching Anatomy. Nevertheless some of them were not still pedagogically prepared to do it successfully; the authors of this paper were overjoyed when they found a significant number of Anatomy teachers trying to apply productive teaching-learning methods in practical classes and seminars.

#### **IV. DISCUSSION**

Learning Human Anatomy involves more than just recognizing and naming structures in the body; it also means knowing the spatial and functional relationships of those structures. This also requires learning hundreds of new terms and anatomical relationships in a relatively short time. Meanwhile, its teaching is changing: medical schools worldwide are moving away from dissection and lectures to a more integrated course, where basic science and clinical skills are taught simultaneously. (Nieder, 2002; Aziz, 2002 & Parker, 2002).

A study performed at Dutch fourth-year medical students found no significant difference between anatomy test scores of problem based learning (PBL) and non-PBL students and another one from the same authors, about Student perception analysis on these integrated courses, reported a lack of confidence in their basic science knowledge, especially concerning Anatomy, when they start as junior doctors. (Prince, 2003 & Prince, 2000)

A study to highlight the relevance and necessity of the knowledge of Gross Anatomy on family physicians was carried out in Spain. The data obtained showed that Gross Anatomy was fundamental in the physical exploration and the interpretation of image techniques. They would increase the number of practical lessons and the clinical view. (Mompeó-Corredera, 2003). The same author verified that modern medicine students consider appropriate the use of the fixed human material and that the employment of the computer resources does not seem to have full acceptance for the study of the discipline. (Mompeó-Corredera, 2014).

In Cuba, Chi Maimó and collaborators found features of the traditional way in the teaching-learning process of Morphophysiology at Havana Medical University. Their conclusions point towards the necessity of the student's leading role in their learning activity. (Chi Maimó, 2011). According to the studies carried out by Morales, one of the limitations for the teaching of the core content of the discipline Morphophysiology with integrative focus resides in the determination and application of teaching methods that facilitate the work with its contradictory features. (Morales, 2012).

Since it has been found to be a useful and effective educational strategy to produce graduates who are good problem solvers, teaching-learning methods and ways are changing in Cuban Medical Education. This approach also underlines 'learning how to learn' and stimulates self-directed learning as a central, pervasive objective of the teaching-learning process. (Enríquez, 2009 & Gutiérrez, 2010).

Now it is clear that the teacher's main task is to teach to learn. Therefore, in the educational activity the road for which the students arrive to a result is more important than the result itself. The necessity of the appropriation of the knowledge by means of the activity of the students has its theoretical foundation. (Rodríguez, 2005).

In the students of the Medical Sciences, it is particularly important -from the first years - to develop the productive cognitive activity, which allow them to appropriate of the clinical method, of the logic that distinguishes it and of its different stages. It is its premise of first order in the quality of the medical attention they will offer as future health professional. This means that in the special didactic of the Basic Sciences, to use the logic of the professional method as teaching way is needed. (Sarasa, 2013).

The need of Anatomy-teachers having high quality is a serious problem to solve in any Medicine faculty. As early as in 1973, Blevins stated: "The objective of transforming the traditional teaching of the anatomy in an active dynamics directed to the clinic needed the formation of anatomists able to manage the renovated matter." (Blevin, 1973, p. 265) Nevertheless, a survey administered by the American Association of Anatomists at the beginning of 2000 in USA, anticipated having difficulty finding qualified Gross Anatomy teachers. It was explained by the trends of graduate students to lose interest in Gross Anatomy courses over the years, in part because recent advances in the sciences have caused the study of anatomy to become increasingly focused on its molecular and cellular aspects.

Some may wonder if Anatomy is literally dissection and the current trend is towards elimination of dissection, is Anatomy what the anatomist does or what he does not? It depends on the perspective; but it must be accepted that the perspective is changing.

#### **V. FINAL CONSIDERATIONS AND RECOMENDATIONS**

One of the two main medical paradigms or approaches determines the current approach of teaching Human Anatomy: biomedical (which focus the bio-psychologist processes as natural) or biosocial (which focus them from a historical-social point of view). Following the first approach, the teaching of Anatomy shows a strong descriptive character and it is mainly characterized by the encyclopedism. From a didactic point of view,

it depends on reproductive teaching methods and the empiricism and the metaphysical focus is appreciated, which led to the perception of Anatomy like a dead science. Following the second approach, the tendency is towards the productive ways of teaching Anatomy, with a dialectical focus of the anatomical science that bases the constant change of the organism, the interactions among its parts, and with the environment.

The key point is not about making formal transformations related to quantities and classification of contents, number of hours or types of classes. Deep transformations to contextualize the teaching of this discipline are necessary to place the teaching of Anatomy to the level of the current development of the Medical Education and the Pedagogy.

That is why to work on the following aims is suggested:

1. The academic authorities and the staff should be aware of the need to assume the challenge.
2. To make clear the conception about the object of study of the Human Anatomy: it is not only the study of the human body, but also the study of the human beings in their biological and social dimension (environment, context).
3. To organize the teaching of the discipline on the basement of a system of objectives, skills and social values that allow solving the cognitive problems in the coming disciplines.
4. To assume the teaching of an applied Anatomy (functional and clinical), which surpasses the descriptive approach. Descriptive Anatomy impoverishes the creative thought and drives to an encyclopedic learning.
5. To update and systematize the productive ways in the teaching learning process.
6. To get a balanced distribution of theoretical and practical activities. The trend should be reduce the former and increase the last.
7. To improve the teaching aids, mainly renewing specimens and models. An alternative option to counterbalance lack of them in some places could be introducing new technology (TIC's) in the Anatomy teaching-learning process. It is pertinent to emphasize that Anatomy is a visual science of the configuration of the body, and thus the success of learning and understanding depends largely on the quality of dissection and/or the illustrations of the human structures.
8. To offer a bigger space in the classes to the Anatomy in living people, which would contribute to develop not only direct observation skills, but also to introduce clinical, radiological and socio-demographics methods and familiarize students with them.
9. To update the evaluation system. Some transformations are required to make our exams more objective or less formal. The teachers should start by introducing self-assessment procedures using different types of questions to train the students and to help them uncover areas of weakness.

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**APPENDICES**

**Table # 1:** Students from Aden university asses the quality of lectures, practical classes, seminars, the teaching methods and the evaluation system

In %	Lectures	Practical C & Seminars	Teaching methods	Evaluation system
Very Good	19.8	15.4	23.4	20.7
Good	48.6	45.1	45.1	41.4
Acceptable	20.7	33.3	22.5	22.5
Bad	10.8	1.1	9	15.4

**Table # 2:** Students from Aden University self-evaluate the way they use the teaching aids and didactic materials to learn Anatomy

In %	Textbook	Atlas	Sheets	Guides	Specimens
Very Good	22.5	72.1	46.8	37.8	11.7
Good	23.4	22.5	41.4	35.1	20.7
Acceptable	15.4	4.5	7.2	16.2	28.8
Bad	17.1	0.9	2.7	3.6	36.9
Not used	21.6	0	1.8	7.2	1.8

In %	Models	Charts	Plain X ray	The body
Very Good	20.7	15.4	12.6	18.0
Good	33.3	30.6	27.9	36.0
Acceptable	36.9	30.6	35.1	27.0
Bad	7.2	12.6	17.1	4.5
Not used	1.8	10.8	7.2	14.4

**Table # 3:** Opinion of senior students from Aden University about the preparation they have in Anatomy and the utility of knowledge, skills and habits they acquired in Anatomy for the clinical disciplines.

	Preparation	Utility
Very Good	20.9	25.4
Good	43.3	41.8
Acceptable	32.8	31.3
Bad	3.0	1.5

**Table # 3:** Opinion of Cuban students about the human anatomy teaching-learning process

Questions	Possible answers	Number	X <sup>2</sup>	Significance
1. Are you satisfied with what you have learned of Anatomy?	Yes	218	335.4	P < 0.01
	No	21		
2. Do you feel prepared to apply this knowledge to new situations?	Adequately	85	130.6	P < 0.01
	Average	149		
	Inadequately	5		
3. How do you evaluate the degree of difficulty in the study of Anatomy contents?	Low	9	94.92	P < 0.01
	Average	109		
	High	121		
4. Which teaching way did your Anatomy lecturer predominantly use?	...make repeat by memory...	14	324.7	P < 0.01
	...make think and discover...	211		
	Others	14		

José Osvaldo Enríquez Clavero. "Should we keep teaching Human Anatomy same way as we have been doing it?". IOSR Journal of Humanities and Social Science (IOSR-JHSS). vol. 23 no. 12, 2018, pp. 80-86.