

Teaching of Anatomy in an Integrated Teaching Based Curriculum at the University Science Malaysia

NASIR AZIZ, *MOHD ASNIZAM ASARI, **RABAIL NASIR AZIZ

ABSTRACT

The School of Medical Sciences of University Science Malaysia is the pioneer university in Malaysia who introduced the curriculum based on Problem Based Learning (PBL). The basic education strategy practiced by School of Medical Sciences is based on student oriented, problem based, integrated, community oriented, elective and self learning (SPICES). Knowledge of anatomy is the foundation of effective clinical practice so anatomy is presented with appropriate changes during all phases of MD curriculum. Anatomy department is furnished with more than sufficient resource materials but anatomy museum has a unique role to play in integrated based teaching curriculum. Anatomy museum has been arranged on the basis of different modules or systems having plastinated, prosected specimens, video cassettes, models, MRI films, radiographs, ultrasound reports and teaching microscope. For structured living anatomy sessions in the clinical professional skill programmes, a fully equipped clinical skill laboratory is playing a vital role in integrated teaching curriculum of University Science Malaysia.

Key words: student oriented; integrated teaching; anatomy museum; skill laboratory

INTRODUCTION

Teaching of anatomy plays a specific role in both in traditional method of teaching and integrated teaching based curriculum throughout the world. Both of the systems have some merits and demerits. Integrated based teaching curriculum has been adopted by most of the medical schools. Problem based learning was first practiced in MC Master University, Canada in 1969. Since then many medical schools in different parts of the world have adopted this method of teaching¹.

Health campus, University Science Malaysia (USM) was established in 1979. In Malaysia, USM is the pioneer university who introduced Problem Based Learning (PBL) in undergraduate curriculum. The undergraduate medical programme (M.D) is conducted by School of Medical Sciences (PPSP). The undergraduate dental program is conducted by School of Dental Sciences (PPSG) in collaboration with PPSP. The undergraduate Health sciences programs are conducted by School of Health Sciences (PPSK) assisted by PPSP.

The course of M.D is completed in five years and comprises of three phases: Phase 1 (year 1) Phase II (year 2 and 3) and Phase III (years 4 and 5). Gross / basic anatomy is being taught to phase-1 students providing knowledge, attitude and skills by various tools like lectures, demonstrations, practicals, small group discussions (SGD), student's seminars

and self study tutorials. Teaching of anatomy to phase –II students is mostly the applied/ clinical. The students study the clinical anatomy with clinical problems in small groups of sixteen students in each group with one group leader under the supervision of a lecturer (tutor) and identify their learning needs. The clinical problems are presented as a written clinical scenario which is based on daily life problems.

New knowledge and skills are taught through different medias like skill laboratory, hospital ward duties, anatomy museum. The knowledge increases in both depth and breadth in a spiral fashion as the course advances (1). Anatomy museum plays a key role in self-directed learning particularly in a PBL curriculum. Anatomy museum of USM has been arranged in the form of blocks (systems) Each block has been arranged in the form of a module consisting of various teaching materials together to help in self directed integrated learning. It has been managed to facilitate or highlight issues in clinical anatomy for knowledge and skills.

The basic education strategy practiced by School of Medical Sciences can be summarized as SPICES which means:

S= student oriented , P=problem based, I=integrated, C=community oriented, E= electives = self learning

The knowledge of anatomy is the foundation for effective clinical practice. It involves basic scientific principles². Anatomy is therefore presented with appropriate changes during all phases of MD curriculum.

School of Health Sciences, University Sains Malaysia.

*School of Medical Sciences, University Sains Malaysia.

**Postgraduate student, University Sains Malaysia.

Correspondence to Dr. Nasir Aziz, Associate Professor of Anatomy, DepTT. of Biomedicine, E. mail: nasiraziz@kb.usm.my

Received July 15, 2007; accepted November 10, 2007

TEACHING OF ANATOMY IN PHASE-1 CURRICULUM

Anatomy is taught in conjunction with physiology, chemical pathology, hematology, nursing skills and bioethics as an integrated basic medical science course to correlate structure and function of the cell and basic tissues as well as embryogenesis. Teaching of phase-1 comprises of 35 weeks with two semester assessment examinations and one professional examination. Anatomy is being taught on the basis of systems (blocks), 2-5 weeks each. There are 12 blocks in phase-1. Teaching is based on lectures, demonstrations, practicals, student's seminars and small group discussions (SGD) i.e., self study. The curriculum is based on knowledge, attitude and skills for each block printed in the form of an 'objective book' and distributed to every individual student in the beginning of the course. The main aim of phase-1 teaching is to lay the foundation for the basic medical sciences in the subsequent phases.

TEACHING OF ANATOMY IN PHASE-II CURRICULUM

Phase -11 curriculum comprises of year 2 and year 3. Applied anatomy along with systemic embryology. Teratology and systemic histology is being taught in this phase. The feature of this phase that has attracted most attention is " Problem Based Learning (PBL), Fixed Learning Module (FLM) and elective programs. Anatomy plays a very important role in all of the programs mentioned above. Anatomy is taught in Blocks (systems) for 48 weeks each for year 2 and year 3. Each year consists of six blocks based predominantly on organ- system blocks consisting of variable number of clinical scenarios or problems. Students are divided into groups of sixteen in each group assigned by one faculty tutor who remains with the group throughout that particular problem. The tutor is not necessarily expert in medical field. He serves only as a facilitator. Majority of problems are discussed in three sessions during a week. Each problem consists of 3-4 triggers to be discussed for solving that problem. Students present and discuss the problem key points and explore their prior knowledge of the issue. Then they identify the hypothesis and learning issues for further independent or in groups. Students distribute learning issues among themselves and get required knowledge through textbooks, the internet, resource staff, skill laboratories, anatomy museum and audio-visual aids. To refresh their knowledge of anatomy, students are taken to the anatomy museum by the tutor where they can visualize the detailed basic and clinical knowledge about the problem under

discussion on specimens, models, plastinated specimens. Radiographs, charts, slides or videos. At present anatomy museum of USM is one of the ideal museums for problem- based learning. The next trigger commences with the discussion of the learning issues on which self study was undertaken. Students can acquire the requisite knowledge, skills and attitude concerning structure, function, pathophysiology, therapeutics, community health aspects, differential diagnosis, final diagnosis and management of the problem. Anatomy is involved in almost all the problems.

SKILL LABORATORY SESSIONS

The professional skills program that runs concurrently on various clinical problems each week throughout M.D phase-11 curriculum in well equipped " clinical skill laboratory". The main aim of this laboratory is to acquire relevant clinical skills and hands- on experience that helps them in clinical practice and diagnosis^{5,6,7}.

Most of the clinical problems are accompanied by a fixed resource session in anatomy museum or skill laboratory. USM has developed a unique type of skill laboratory with the idea to teach the skills of various systems of the body to expertise the students for their clinical knowledge. It helps the student's orientation, to discuss difficult topics and to relate the basic medical sciences and clinical practice. Among all the sections, anatomy, physiology and neuroscience sections are worth seeing.

HISTOLOGY

Most of the problems are designed with the objective of integration and correlation of normal and abnormal structure and function. All histological practicals run concurrently with relevant block and clinical problem. For example students studying gastro-intestinal (GIT) block also study histology of GIT during the period of PBL sessions like hemetemesis, intestinal obstruction and peptic ulcer etc. Students are able to recognize and interpret the normal and diseased histological features of the organs involved with clinical correlation. Histology laboratory is fully equipped with teaching facilities like teaching microscope and latest equipments for research like image analyzer.

Anatomy museum plays a vital role for PBL sessions conducted during M.D Phase-11 curriculum. For example when the students are exposed to a clinical problem of respiratory disease like "haemoptysis". Students need to correlate the structure and function of respiratory system. So the respiratory module in the museum contains skeleton of thorax, labeled plastinated specimens of nose,

pharynx, trachea and lungs, radiographs of chest, models of lungs, charts showing development of respiratory system with their anomalies, histology slides to study the features of trachea and lungs, diagrams to highlight the pleural reflections, blood vessels and their relations.

For "sectional anatomy" a cross sectioned plastinated whole body from head to pelvis is available for side- by- side for CT and MRI images at same levels.

DEMONSTRATION OF GROSS ANATOMY

The faculty members of anatomy department assist their students in their learning by regularly scheduled demonstration classes in the multi disciplinary laboratory (MDL) twice or thrice a week for at least two and a half hour. After the live demonstration for 30-40 minutes on closed circuit monitor system, students are free to discuss the issue related to fundamental morphology and/ or histology. At least three experienced, highly qualified subject specialists are present there throughout to assist the students to teach the skills.

Due to increased number of students and on the basis of feedback study from the students, whole class has been divided into sixteen groups of 16 -18 students in each group for individual attention to the students for teaching them the skills.

TEACHING CLINICAL ANATOMY

Gross anatomy is taught through wet or plastinated, prosected cadaveric specimens, videos and models whereas the relationships of different organs are better understood with the use of conventional radiographs, CT, FLM and MRI³ and are incorporated as learning materials in PBL sessions to build the knowledge of students as in living. To evaluate the knowledge and skills in integrated basic and clinical anatomy students are assessed by different methods like continuous assessment, multiple choice questions and objective structured practical/clinical examination (OSCE / OSPE).

Students must pass in professional skills, communication skills and community health program to move from one year to another.

ANATOMY MUSEUM

The museum plays a major role in the integration of basic sciences, clinical medicine and self- directed learning throughout the curriculum. The core concept of PBL curriculum depends upon the teaching resources which form the basis of self directed

learning. These resources include lectures, demonstrations in the museum, tutorials, laboratory classes, Professional skill sessions, computer programs, museum specimens, models, anatomical images, photographs, videos, anatomical charts, projection slides, transparencies and teaching microscopes.

Anatomy museum plays more important role in student based learning specially at a place where facility of cadaveric dissection is not possible. To fulfill the deficiency of dissection, the anatomy museum of USM is playing a prime role for teaching anatomy to undergraduate and postgraduate students. This museum has been designed to follow the principles of traditional. Problem based and system – orientated curricula⁴.

There are about twenty different modules or stations in anatomy museum. Each module represents a specific system and is equipped with labeled plastinated specimens, radiographs, CT Scans, MRI, models, charts, diagrams, histological slides, projection slides, dissected specimens, cross sectional specimens, embryology specimens and ultrasound imprints. Hundreds of charts, photographs explaining both basic and clinical anatomy with questions and answers are available for self study.

REFERENCES

1. Albanese MA, Michell S. (1993) Problem based learning: a review of literature on its outcomes and implementation issues. *Acad. Med* 68: 52-81.
2. Travill AA, (1977) The anatomical basis of clinical practice: an anatomy- learning program. *Med. Educ.* 11: 377 -379.
3. Reidenberg JS, Laitman JT, (2002) The new face of gross anatomy. *Anat. Rec.* 269:81-88.
4. Drake RL. (1999) Anatomy education in a changing medical curriculum. *Kaibog Zasshi* 74: 487-490.
5. Teichgraber UKM, Meyer JMA, Poulsen Nautrup C, von Reutenfeld (1996). Ultrasound anatomy: a practical teaching system in human gross anatomy. *Med. Edu.* 30:296 – 298.
6. Boon JM, Meiring JH, Richards PA. (2002) Clinical anatomy as the basis for clinical examination: development and evaluation of an introduction to Clinical Examination in a problem-oriented medical curriculum. *Clin.Anat* 15:45-50.
7. Tavares MAF, Silva MC (2002) Evaluation of clinical anatomy program in medical school of Porto by two cohorts of students. *Clin. Anat.* 15:56-61.