

# USE OF PLASTINATED SPECIMEN IN A MEDICAL SCHOOL WITH A FULLY INTEGRATED CURRICULUM

OTHMAN MANSOR, MBBS, M.Med. Sc.  
Department of Anatomy  
School of Medical Sciences  
University Sains Malaysia  
16150 Kubang Kerian  
Kelantan, MALAYSIA

## ABSTRACT

The Science University of Malaysia is the youngest of three medical schools in Malaysia, and the only one practicing the fully integrated system. Students are exposed to many disciplines at the same time. The Anatomy Department gives input to courses for students in Medicine (Yr. 1-3), Medical Technology (Yr.I), the Postgraduate Nursing and and the Masters Program in Surgery and Medicine. Students do not do cadaver dissections, but are exposed to four learning materials. These are prosected wet specimens, plastinated specimens, pots and models. In order to assist the department plan, the availability of teaching materials, a survey was conducted among medical students in various years. They were asked to grade each material in terms of handleability, realism, information, suitability for examination and condition of the specimens. The results showed that students generally preferred plastinated specimens. However, with respect to being most informative and most realistic, wet specimens scored the highest. In conclusion, plastinated specimens have a definite use and preference in teaching anatomy where detailed knowledge is not essential, but prosected wet specimens still have a place in our medical school.

## INTRODUCTION

The School of Medical Sciences, University Sains Malaysia, was established in 1979. It had its first intake of medical students in 1981. The school adopted an innovative curriculum with specific objectives of producing competent medical practitioners who would be able to identify themselves as part of the health-care team and people. (Roslani, A.M.M.1980)

The teaching-learning methods have been adopted to reflect the curriculum design which is summarized as SPICES, which is Student-centered, Problem-based, Integrated, Community-oriented, Electives and Spiral/Self-learning. The curriculum itself spans over 5 years, divided into 3 phases: Phase I being Year I; Phase II being yr. II and III, and Phase III being year IV and V. Phase I consists mainly of basic medical sciences; Phase II organ-system based, and Phase III clinical postings.

Phase I curriculum is divided into 13 blocks:

Cell & Tissue	Reproductive
Growth & Development	Nervous
Blood	Gastrointestinal
Musculoskeletal	Respiratory
Cardiovascular	Urinary
Endocrine	Host & Nutrition
Environment	

Students in Anatomy do not do cadaver dissections. Deep and detailed knowledge of anatomy is not really necessary. They are exposed to prosected specimens and other learning materials.

The teaching-learning processes in Phase II are designed as multi-disciplinary packages centering around clinical problems. The organ-systems are divided into 12 blocks:

Gastrointestinal	Musculoskeletal
Cardiovascular	Reproductive
Renal	Hemopoietic
Respiratory	CNS
Communicable Disease	Head & Neck
Psychiatry & Skin	Endocrine

Each block lasts for 5 weeks and the students are given a new problem each week. An example of an integration in the Gastrointestinal block is as follows:

## ANATOMY INPUT

Anatomy gives input to all blocks. Fixed learning module or FLM, forms an integral part of the problem based approach to learning. Such modules are prepared by staff members, and are displayed in the multi-disciplinary laboratory (MDL) so that the students can study on their own. Each module consists of posters, charts, diagrams, specimens, models, histology slides and X-rays. Each week, a different FLM is displayed. Students are encouraged to study the FLM in groups. It is in the FLM that plastinated specimens play their most important role. They are left in the MDL for students to study at their leisure as these specimens do not need to be kept in formalin as wet specimens.

The department of anatomy at University Science started to produce plastinated specimens in 1990. Due to lack of experience, funds and raw materials, only the silicone-impregnated specimens are produced. To date, there are over 100 specimens in the department, ranging from single organ to the whole thorax or limbs.

The practical examination in Phase I and II are in the form of objective structured practical examination (OSPE) or objective structured clinical examination (OSCE). There are usually at least 20 stations in each examination; each lasting for 3-5 minutes. A student will have to go through all stations, answering the questions based on the specimen or material placed at each station. Plastinated specimens are most suitable for such an examination as there is no formalin smell and being dry, there is no need for hand washing or wiping. Plastinated specimens are also used in postgraduate surgical examination.

## THE SURVEY

In order to help plan the availability of learning materials in the department, a survey was conducted among 189 Yr.II and Yr.III medical undergraduates who were exposed to all

types of specimens or learning materials in the teaching of anatomy for over two years. The specimens are pots, which are prosected specimens in sealed glass jars; wet specimens, which are specimens soaked in formalin; plastinated specimens; and plastic models. They are asked to give scores on five properties of the specimens namely: handleability, realistic quality, information, suitability for practical examination and the condition of the specimens. The responses are recorded as favorable or unfavorable.

## RESULTS

Results revealed that in terms of handleability, plastinated specimens scored the highest, being the most favorable. Wet specimens are considered to be more realistic and more informative than plastinated ones. For examination, both plastinated and wet specimens are preferred. The wet specimens are considered not to be in good condition unlike the other specimens. This means that both plastinated and wet specimens have their own roles in anatomy. Models will continue to be used to complement the biological materials as these models demonstrate certain structures more clearly.

## DISCUSSION

There is no doubt that students prefer to handle plastinated specimens, rather than wet specimens which are unpleasant to the nose and fingers. Pots and models are also dry, but one cannot touch the potted specimens, while models are not realistic. In terms of being informative, wet specimens score the highest, the reason being such specimens are softer than plastinated specimens, and thus one can study the deeper tissue with more ease. Wet specimens are also considered to be more realistic as structures can easily be differentiated between each other as each one has different texture, feeling, and color. Plastinated specimens are preferred for practical examination possibly because students do not want to get their hands dirty during such stressful exercise. However, wet specimens are also favored for examinations. This is possibly because the students can easily manipulate the specimens in order to identify the structures more systematically, for example to follow the course of a nerve deep to the muscles and around the bones. For obvious reasons, plastinated specimens remain in good condition, almost like models and pots. In our department, only the good specimens are plastinated while the old, partly damaged ones are kept as wet specimens. The latter are still used in teaching as there is an acute shortage of such specimens. From the survey, it is obvious that students do realize that our wet specimens are in poor conditions.

## CONCLUSION

In conclusion, we have seen that in the integrated system of a medical curriculum, plastinated specimens have significant roles in the teaching of gross anatomy. They are favored because of their handleability in the class as well as in examination. As such, specimens remain in good condition for a long time, are material-saving, and cost-effective. Wet specimens still have their place in certain aspects.

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## REFERENCE

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## PLASTINATED PATHOLOGY SPECIMENS AT ROOM TEMPERATURE IN THAILAND

CHURAIRAT KULARBKAEW<sup>1</sup>, PETER COOK<sup>2</sup>  
WIBOONCHAI YUTANAWIBOONCHAI\* AND  
GUNTHER von HAGENS<sup>3</sup>

<sup>1</sup> DEPARTMENT OF PATHOLOGY, FACULTY OF MEDICINE, KHON KAEN UNIVERSITY, KHON KAEN, THAILAND.

<sup>2</sup> DEPARTMENT OF ANATOMY, SCHOOL OF MEDICINE, UNIVERSITY OF AUCKLAND, AUCKLAND, NEW ZEALAND.

<sup>3</sup> ANATOMISCHES INSTITUT I, UNIVERSITÄT HEIDELBERG, HEIDELBERG, FEDERAL REPUBLIC OF GERMANY.

## INTRODUCTION

Plastination is a relatively new process (1982) that is now widely used to preserve perishable biological specimens with high water content. In this technique, tissue water and lipid are replaced with curable polymers. The completely impregnated specimen is cured by a gaseous vapor.

Dr. Gunther von Hagens of the University of Heidelberg, Germany, developed the suitable polymers and four variations of plastination techniques based on the same fundamental process providing for difference of specimens, (von Hagens, 1979a, b, 1985/1986, 1987). Silicone impregnated specimens (S-10) are resilient and flexible and are mainly used in teaching purposes. Whole organs, limbs, student prosections and even whole bodies may be plastinated with the silicone impregnation method. Specimens produced with polymerized emulsions (P.E.M.) are as opaque as the silicone specimens but are rigid and to some extent breakable. The use of this technique is in production of thick body slices exhibiting a sharp contrast between fat tissue, which shows up white, and all other more intensively stained parenchymas. Transparent body or organ slices