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الطبيب/ أحمد صبحى هويدى
ماجتسير الجراحة العامة

تحت إشراف
الأستاذ الدكتور/ إكرام إبراهيم سيف
أستاذ جراحة التجميل
كلية الطب - جامعة عين شمس
الأستاذ الدكتور/بول مال آرثر
أستشارى ومدير مركز مرسای لجراحة التجميل
وأستاذ جراحة التجميل
جامعة ليفر بول - المملكة المتحدة
الدكتور/ أمير سمير البربرى
أستاذ مساعد جراحة التجميل
كلية الطب - جامعة عين شمس
الدكتور/ ياسر عبد الله عبد العزيز
أستاذ مساعد جراحة التجميل
كلية الطب - جامعة عين شمس

كلية الطب - جامعة عين شمس
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Assessment and Development of Training Models in Plastic Surgery

Thesis

Submitted for Partial Fulfilment of MD Degree in
Plastic Surgery

Presented By

Ahmed Sobhi Hweidi

M.B. B.Ch., MSc. in General Surgery

Under the Supervision of

Prof. Ikram Ibrahim Safe MD.

Professor of Plastic & Reconstructive Surgery
Faculty of Medicine, Ain Shams University

Prof. Paul McArthur FRCS(Plast), PH.D

Consultant and Clinical Director of
Mersey Regional Plastic & Reconstructive
Surgery Center, Whiston Hospital.
Professor in Plastic Surgery, Liverpool John Moores University, UK

Dr. Amir Samir Elbarbary MD.

Assistant Professor of Plastic & Reconstructive Surgery
Faculty of Medicine, Ain Shams University

Dr. Yasser Abdalla Abdalaziz MD.

Assistant Professor of Plastic & Reconstructive Surgery
Faculty of Medicine, Ain Shams University

Faculty of Medicine - Ain Shams University

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List of Abbreviations

Abb.	*Full term*
BAPRAS	British Association of Plastic, Reconstructive and Aesthetic Surgeons
bf	Bifrontal
CAM	Controlled active movement
CMF	Craniomaxillofacial
FDP	Flexor digitorum profundus
GRS	Global rating scale
HS	Highly significant
NAC	Nipple areola complex
OSATS	Objective structured assessment of technical skills
PIP	Proximal interphalngeal joint
PVC	Polyvinyl chloride
RCS	Royal College of Surgeons
S	Significant
SD	Standard deviation
sob	Supraorbital bar
ST	Specialty training
TMS	Training media specifications
TNA	Training need analysis
TPD	Training program design
TRAM	Transverse rectus abdominus muscle flap
VR	Virtual reality

INTRODUCTION

The apprentice model of medical training dates to the antiquity when Egyptians would apprentice young boys to become master mechanical healers [1]. In the modern times the apprenticeship system for surgical training was introduced by **William Halsted** (An American surgeon and one of the "Big Four" founding professors at Johns Hopkins Hospital) at the end of the 19th century [2 3]. This system was adopted widely at that time and remains the cornerstone of surgical training more than a century later [4].

The Halsted system provides skill acquisition by the surgical trainee through a one-on-one teaching situation on a real patient, with an emphasis on graded responsibility summarized by the adage 'See One, Do One, Teach One' [4 5]. Aspiring surgeons have traditionally been introduced to their craft in the operating theatre. Firstly, the trainee helps the trainer and observes the procedures. Then gradually the trainee assumes the role of operator under supervision of the senior surgeon until sufficient skill and confidence have been developed to operate independently. Eventually, the trainees teach the procedure to their junior colleagues in similar fashion[6].

Although this system has been successful in transferring surgical skills and knowledge from one generation to the next,

several authors have suggested that this model is no longer acceptable to either the surgical profession or to the well-informed public [2 4 7]. Trainers are under increasing pressure to perform procedures in a more cost effective manner, including shortening operating times and improving outcomes [8]. Medico-legal constraints and the introduction of reduced working hours, all diminish the time available for teaching and training in theatres [2]. Many of these rules were imposed because of serious medical errors that were significantly injurious to patients. The days of 'See One, Do One, and Teach One' have gone and we have entered the era of evidence and outcome based medicine, where a new concept in surgical training has been introduced, 'see many, learn from the outcome, do many with supervision and learn from the outcome, and finally teach many with supervision and learn from the outcome' [5].

Nowadays, in the global economy, final outcome is more important than how much input applied. Applying this concept on surgical education, it would seem reasonable to focus efforts on making surgical education more productive, rather than defining the training program by the number of hours worked. Educational programs should strive to allow trainees to engage in meaningful and beneficial activities. The random opportunities of the current apprenticeship system need to be replaced by a curriculum or learning system that meets the needs of the surgical trainees and their future. Therefore, most of the surgical training programmes are now adopting a

competency based rather than a time based system for training[8-10].

To cope with the current changes in training programs, surgical educators have turned to other methods of teaching operative skills in surgical skills laboratories where the trainees can learn operative skills on training models. Such laboratories have been developed not to replace the operating room experience, but rather to supplement it [11]. Surgical skills laboratories are being used now in many surgical specialities including laparoscopic surgery, urology, otolaryngology and vascular surgery as substantial part of the curriculum [12-15]. Skills laboratories are considered educational hubs where training models and simulators provide a unique opportunity for repetitive skills training with the exploration of possible outcomes in a risk-free environment that can maximize the educational experience and reduce the time of training for surgeons in both simple and complex surgical techniques [10].

In an effort to establish surgical skills laboratory training on a firm educational foundation many training bodies have begun implementing a phased approach to introduce comprehensive surgical skill curriculum using training models and simulators in general surgery [16]. It is believed that a similar plan should be applied to plastic surgery, being currently one of the most technically demanding specialities. Although the surgical literature is abundant in editorials, concept, and feasibility articles describing the potential of training models