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- 'docendo ac discendo' - 'by teaching and learning'

In this issue:

Executive Board

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We would like to take this opportunity to show appreciation to all those involved with the production of the International Journal of Clinical Skills (IJOCS). Many thanks to all members of the Editorial and Executive Boards.

The International Journal of Clinical Skills looks forward to contributing positively towards the training of all members of the healthcare profession.

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Foreword

Head of Clinical Communication King's College London

Since its inception, the International Journal of Clinical Skills (IJOCS) has provided a unique platform for the teaching and learning of clinical skills in a variety of healthcare disciplines. It has become a well established peer reviewed Journal publishing a diverse range of clinical skills articles.

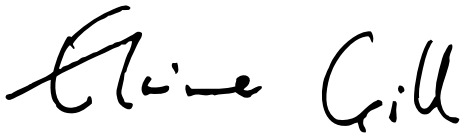
The Editorial Board consists of people active in the field of clinical skills teaching and this is reflected in the journals philosophy to encourage sharing of ideas and practice. Pertinent contributions aim to meet the current needs of researchers and practitioners.

Clinical skills teaching is going through a definite 'growth spurt' at present with increasingly responsive models, manikins and e-learning programmes - not dismissing financial investment that comes along with this. High quality clinical simulation is becoming more sophisticated as a teaching and learning methodology. The need to equip health professionals with the skills and competencies to improve patient-safety is one of the drivers behind this growth. However, alongside the purchase of the 'Sim'-men/women/babies and linked e-learning, let's not forget the importance of personal interactions through faculty support, i.e. experienced clinical teachers. In addition, simulated patients and the delivery of interprofessional sessions, bring clinical simulation closer to the realms of reality and validity, for both undergraduate and postgraduate health professionals.

The use of simulated patients, relatives and carers is well established in clinical communication education. More recently, additional interesting and innovative approaches to clinical communication teaching are in various stages of substantive core curricula and special study activity across medical schools in the UK.

The IJOCS is now established in the world of clinical skills publications by providing a niche specific arena that welcomes quality research, thereby promoting excellence in healthcare internationally. The wide range of papers covering research, discourse and reflection in clinical education and practice, plus the inclusivity of interprofessional approaches in one publication, raises the validity of this journal. There remains room for research based evidence to support teaching and practice of patient-centred clinical learning. The IJOCS welcomes additions to the literature that encourage critical debate.

Without doubt, the International Journal of Clinical Skills has continued to exceed its original ambitions and I wish it growing success.



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Perforator based soft tissue flaps for lower limb soft tissue defect cover – evaluation of a novel training model

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Abstract

Lower limb soft tissue non-viability and loss is a recognised complication of both trauma, metabolic and infective processes. The degree and site of loss may pose complex problems with regards to treatment planning and surgical care. Rotation flaps are a recognised method of such defect cover.

Training in this technique is difficult and the potential problems severe. In the UK training is further compromised by decreased junior doctor clinical exposure as a consequence of altered training patterns and working hour directives. Clinically relevant simulation may enhance training and assure better understanding of this approach both in plastic surgery and trauma & orthopaedics. We have developed a model as a teaching aid to develop surgical skills with regards to defect recognition, perforator detection, flap planning, dissection of a fasciocutaneous flap and subsequent defect cover.

Questionnaires were given to surgical registrars attending our MSc Trauma Surgery Course pre- and post-model use. The results demonstrate the teaching model is an effective educational tool and significantly improves assessment of these problems and the appropriate planning for this procedure.

Introduction

Soft tissue defects of the lower limb can present a complex reconstructive challenge, particularly when associated with an underlying long-bone fracture. Their management requires the co-operation of both orthopaedic and plastic surgeons. Reconstructive options will depend upon numerous factors, including the size and anatomical location of the defect, condition of the local tissues and the skill and experience of the operator. Local perforator-based fasciocutaneous flaps, based on perforating vessels arising from the posterior tibial or peroneal arteries, can provide a ready source of durable soft tissue and skin cover in some patients [1, 2]. However, designing and raising these flaps can be difficult and requires sound surgical judgement, a detailed knowledge of local anatomy and the necessary surgical skills and equipment to perform the task.

In practise, the location of these perforating vessels is often identified pre-operatively using a simple hand help Doppler device. An appropriately sized & shaped flap can then be designed to rotate around the perforating vascular bundle, bringing uninjured tissue into the defect.

In the trauma setting, it is essential the orthopaedic surgeon has a sound knowledge of tissue cover techniques so as not to damage any tissues by primary orthopaedic intervention, which may be required by the plastic surgeon to cover the defect [3].

Traditionally, surgical skills and procedures are learnt 'on the job' with tutorage from senior surgeons. This is still the way many procedures and skills are learnt. However, with ever decreasing training times and less clinical contact due to course restructuring

and European Working Time Directives, the trainee has less 'on the job' opportunity to obtain these skills. Similarly, the operative theatre is often a stressful environment in terms of time and responsibility. It is also not an environment that is conducive to group teaching. In recent years simulators have had an ever-expanding role in medical skills education. They are used widely in many medical subspecialties, including plastic surgery, teaching important principles which may not be encountered with regularity [4]. Such simulation, although often difficult to validate, has been demonstrated to be an effective teaching aid and adjunct [5, 6].

The model discussed in this paper has been developed as a teaching aid to develop surgical skills with regards to defect recognition, perforator detection, flap planning, dissection of a fasciocutaneous flap and subsequent defect cover.

Aim

Several aims for the training model were decided:

1. Anatomical accuracy with regards to gross appearance of model and perforator location
2. Perforators to be detectable by hand held Doppler device
3. Ability to mark and raise a fasciocutaneous flap
4. Soft tissue handling to be as realistic as possible allowing rotation of flap and securing over defect
5. Maintenance of modelled vascular pedicle to enable a check of vasculature and therefore flap patency
6. Reusability
7. For the model to advance knowledge and competence with procedure

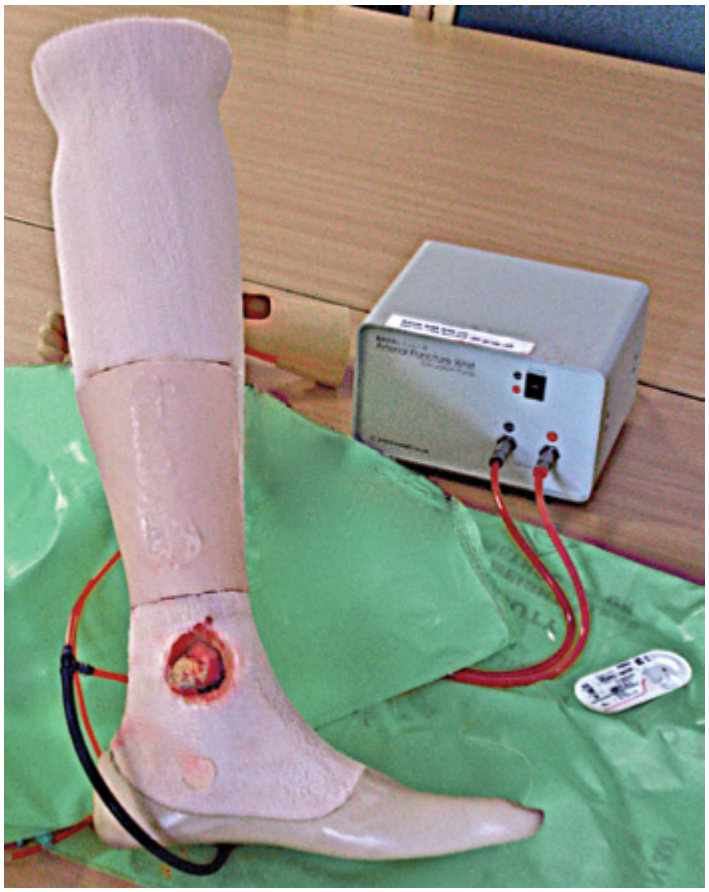
The training model

The training model 'leg' was fashioned from vacuum formed foam, which was then modelled to produce a realistic looking limb.

A cavity in the limb contained an artificial tibia and fibula, enhancing the anatomical appearance of the malleoli which were palpable through the foam outer layer (Plastazote® Cosmesis Foam, Blatchford Prosthetic Products & Services, Basingstoke UK).

A soft tissue defect was created by removing a section of foam to the required depth – in this case, over the medial malleolus. This was cosmetically enhanced as seen fit (Figure 1).

Figure 1: The completed lower limb training model demonstrating oscillating pump and tubing circuit



A recess was created in the leg corresponding to the size of a removable artificial skin and soft tissue pad (Professional Skin Pad Mk 2, Limbs & Things Limited, Bristol, UK). Into this pad were secured loops of tubing, their position corresponding to that of perforating vessels in vivo. These are over a course of about 10 cm, starting 8 – 12 cm proximal to the medial malleolus, and approximately 3 cm posterior to the medial border of the tibia.

The tubing was fed up through the limb and the pad secured in the recess. The tubing was primed with fluid and formed a circuit which was connected to an oscillating pump (Circulating Pump Unit, Kyoto Kagaku Company Limited, Japan).

The fluid in the pump circuit was detectable by hand held Doppler and emitted a signal replicating arterial pulsation. This corresponded to the perforating vessels.

A rotation flap could then be planned around the perforators. The skin pad was dissected (Figure 2), thus raising a flap which was rotated to cover the defect. It was then sutured over the defect (Figure 3).

Figure 2: Dissection of the pre-planned flap

Figure 3: The flap has been dissected and secured over the defect

The Doppler device was then used to re-check the perforator. If kinking of the tubing ('vessels') had occurred, the signal would not be detectable; however, if the tubing was patent the signal remained.

Methods

The training model was used by surgical trainees (Specialist Registrars, n = 12) attending the MSc Trauma Surgery Course run at the University of Swansea, UK. No formal ethical approval was necessary, though ethical considerations were made by the trainees. Statistical analysis used SPSS 16.0 for Windows, Release 16.0.2 SPSS Inc 1989-2007.

Prior to use of the model the trainees completed a questionnaire based on a modified Likert scale [7]. The questions assessed their confidence with performing various aspects of a rotation flap.

Following use of the model, which required the detection of the perforators using the Doppler, marking of the chosen flap, subsequent dissection, rotation, securing in position and final Doppler assessment, a further questionnaire was completed. A copy of each questionnaire is shown in Appendix 1.

The results demonstrate an improvement in mean Likert scores for each trainee and also for cumulative scores for each question posed (Figures 4 and 5).

Figure 4: A chart demonstrating the improvement in mean Likert scores pre- and post-model use

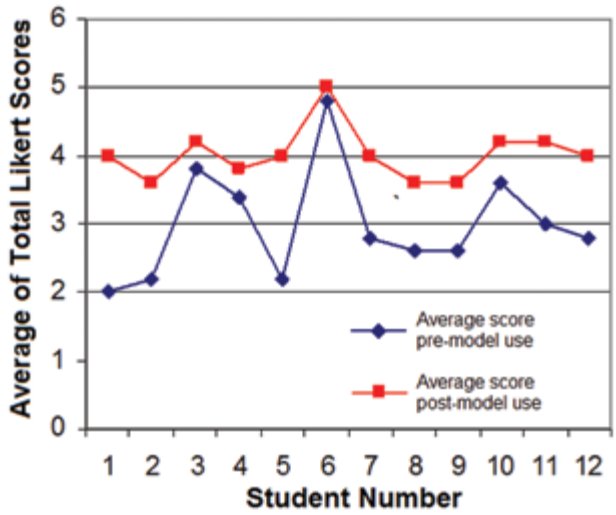
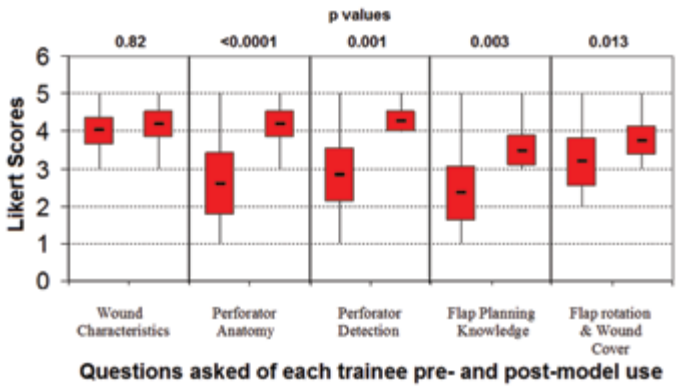


Figure 5: A box and whisker chart illustrating the median, interquartile and ranges for each score per question, pre- and post-model use



The two-tailed P value is less than 0.05 for the differences in scores for all students when considering questions 2 to 5 (p values: Q1: 0.82, Q2: <0.001, Q3: 0.001, Q4: 0.003 and Q5: 0.013) thus demonstrating a statistically significant improvement.

Question 1 shows no significant improvement pre- and post-model use. This question ascertained the trainees' confidence with wound recognition and assessment. As they were all senior trainees, already familiar with wound assessment and management, initial scores were high as would be expected and therefore an insignificant rise post-model use was not unexpected.

The results support an increase in the confidence of each student's ability to understand, plan and perform a rotation flap after having used the model. This training model is one of several being developed alongside the MSc Trauma Surgery Course at the University of Wales, Swansea, UK.

Simulation, such as the training model discussed, aims to provide as realistic an experience as possible, augmenting the trainees' teaching and assessment, thereby improving future confidence and surgical outcome.

Conclusion

We believe this training model to be an effective adjunct for the teaching and demonstration of surgical concepts and techniques required to perform a perforator based fasciocutaneous rotation flap. This study is small and for that reason is open to criticism, however, we believe it demonstrates the idea of the training model and its potential.

Teaching and training in complex surgical principles through the development of practical models and simulation is becoming core to surgical training ethos. Our training model is anatomically accurate, reusable, consistent and has shown to improve surgeon's operative confidence and understanding.

Some cosmetic and manufacturing refinements are necessary in order to facilitate easier production and increase reusability of the model. Such improvements are important for its practical success, though this example demonstrates the concept, its use and future potential.

Acknowledgements

Many thanks to the team at ALAC (Artificial Limb and Appliance Centre) Rehabilitation Centre, Morriston Hospital, Swansea, (UK) in particular Peter McCarthy, Clayton Ibbitson and Paul Drayton whose help with the materials and models has been invaluable. We would also like to thank the MSc students who took part in this research.

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Appendix 1: A copy of the questionnaire issued to surgical trainees pre- and post-model use

Rotation flaps for lower leg soft tissue defects				
Survey regarding competence and familiarity with procedure				
Please complete, circling an appropriate number for each question, which best describes your familiarity, ability and confidence with the procedures listed. *Scale: 1 = No Confidence; 2 = Minor Confidence; 3 = Undecided; 4 = Confident; 5 = Highly confident.*				
(Q1) Ability to recognise characteristics of the wound				
1	2	3	4	5
(Q2) Anatomical knowledge of location of perforating branches of posterior tibial artery				
1	2	3	4	5
(Q3) Ability to detect perforating branches with hand held Doppler				
1	2	3	4	5
(Q4) Knowledge of planning position and size of flap required to cover focal defect				
1	2	3	4	5
(Q5) Theory of raising flap, rotation and cover of defect				
1	2	3	4	5

The above questionnaire was then re-issued after training with the model, with the following sub-heading: *"We would like to assess the use of the simulating model. Having now used it and received teaching, please complete the following questionnaire again, circling an appropriate number for each question which best describes your familiarity, ability and confidence with the procedures listed"*

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