A 4-Task Skills Examination for Residents for the Assessment of Technical Ability in Hand Trauma Surgery

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OBJECTIVES: The aim of this study was to evaluate a 4-task skills examination model for surgical trainees as a method of assessment of the different technical skills essential in hand trauma surgery.

DESIGN: Using established validation methodology, construct validity was assessed by comparing the performance of 2 groups of residents in surgery (group A: residents with any formation in microsurgery and hand surgery and group B: residents with specific formation in hand or microsurgery or both).

PARTICIPANTS AND SETTING: Overall, 19 residents in surgery with different degree of formation in hand and microsurgery participated in the study. All the residents performed 4 tasks on synthetic models consecutively: task 1—Z-plasty, task 2—metacarpal fracture fixation, task 3—tendon repair, and task 4—end-to-end anastomosis. The running order was awarded in a random drawing and 4 independent observers scored each resident.

RESULTS: There was a significant difference in performance in the overall score between groups A and B and particularly for tasks 1 and 4. All participants felt the 4 tasks were good models to learn the procedure and recommended this approach to younger residents.

CONCLUSION: This approach was based on a 4-tasks examination is the first model of evaluation of the different technical skills required for hand trauma surgery for residents. The results show a good differentiation between residents that have microsurgical and hand formation and those who do not have. This easy model can be easily integrated in the curriculum of residents, who want to specialize in hand surgery. (J Surg 72:179-183. © 2014 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: simulation, hand surgery, surgical education, microsurgery

COMPETENCIES: Patient Care, Medical Knowledge, Practice-Based Learning and Improvement

INTRODUCTION

Surgical simulation currently plays an increasing role in the training[1] because the acquisition of surgical skills is one of the essentials of good surgical practice. Several simulators or models are available in numerous surgical specialties[2] and enable residents to familiarize themselves with the procedures and steps and can permit to shorten the learning curve.[3] However, hand surgery requires specific skills, but there is a lack of models because of the difficulty to obtain a synthetic and complete hand model. Nevertheless, some benefits of simulation can be obtained for beginner and intermediate surgical trainee without the need to have a high-fidelity simulation model.[1] The aim of our study was to evaluate the feasibility of a 4-task skills examination for surgical trainees, as a method of assessment of the different technical skills essential in hand trauma surgery: skin repair, tendon repair, fracture fixation, and microsurgical anastomosis.

MATERIAL AND METHODS

Residents

In total, 19 residents were recruited in all (13 in orthopedics and 6 in plastic surgery). The number of months of clinical experience as resident was reported. Their formation in microsurgery and in hand surgery was noticed (microsurgical or hand courses, diploma, or any specific formation in these fields). None of them was informed of examination details.

The first author, Quentin Qassemyar, works with the society CREAPLAST, Verton, France, in the creation of different models of surgical simulation. At the time of this study, there was no financial interest between both the parts.

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Z-Plasty (Task 1)

Residents were asked to perform a Z-plasty in a silicone skin pad of 8 × 8 × 1 cm^3 (CREAPLAST, Verton, France). They were also given a choice of instruments and a choice of suture ranging from 2-0 to 5-0 VICRYL (Ethicon, Inc. Somerville, NJ) and Dafilon (B-BRAUN Medical, Tuttlingen, Germany) (Fig. 1A). They were told to draw and to achieve a Z-plasty (Fig. 2A).

Fixation of a Metacarpal Fracture (Task 2)

This task aimed to test the familiarity with metacarpal fracture fixation. Each resident was asked to fix a fractured synthetic metacarpal bone made of polyurethane (CREAPLAST, Verton, France) with a miniplate and screws (Fig. 2B). They were also given a complete set of instrumentation including a motor, miniplates, and screws (Fig. 1B). For this task, they were allowed to use an assistant who was not familiar with this procedure (resident in ophthalmology without any experience in hand surgery).

Tendon Repair (Task 3)

For the tendon repair, the emphasis was on a simple repair of a straightforward zone 1 tendon repair. Residents were allowed to choose the method of repair provided that the principles of tendon repair were adhered to. They were also given a choice of instruments and sutures (Fig. 1C). The model used was a combination of digit skeleton made of polyurethane, the flexor sheath was reproduced with a fine transparent lamella of polyurethane, a single polyester plait reproduced the flexor digitorum profundus tendon, and elastics represents the pulleys (CREAPLAST, Verton, France) (Fig. 2C). There was no flexor digitorum superficialis.

End-to-End Anastomosis (Task 4)

For the last task, residents were asked to perform an end-to-end anastomosis of a 1.3-mm diameter of silicone tube (CREAPLAST, Verton, France) (Fig. 2D). A complete set of microsurgical instruments and sutures was given to each resident (Fig. 1D). Adjustable binocular loupes with a ×4.5 magnification were available for each anastomosis.

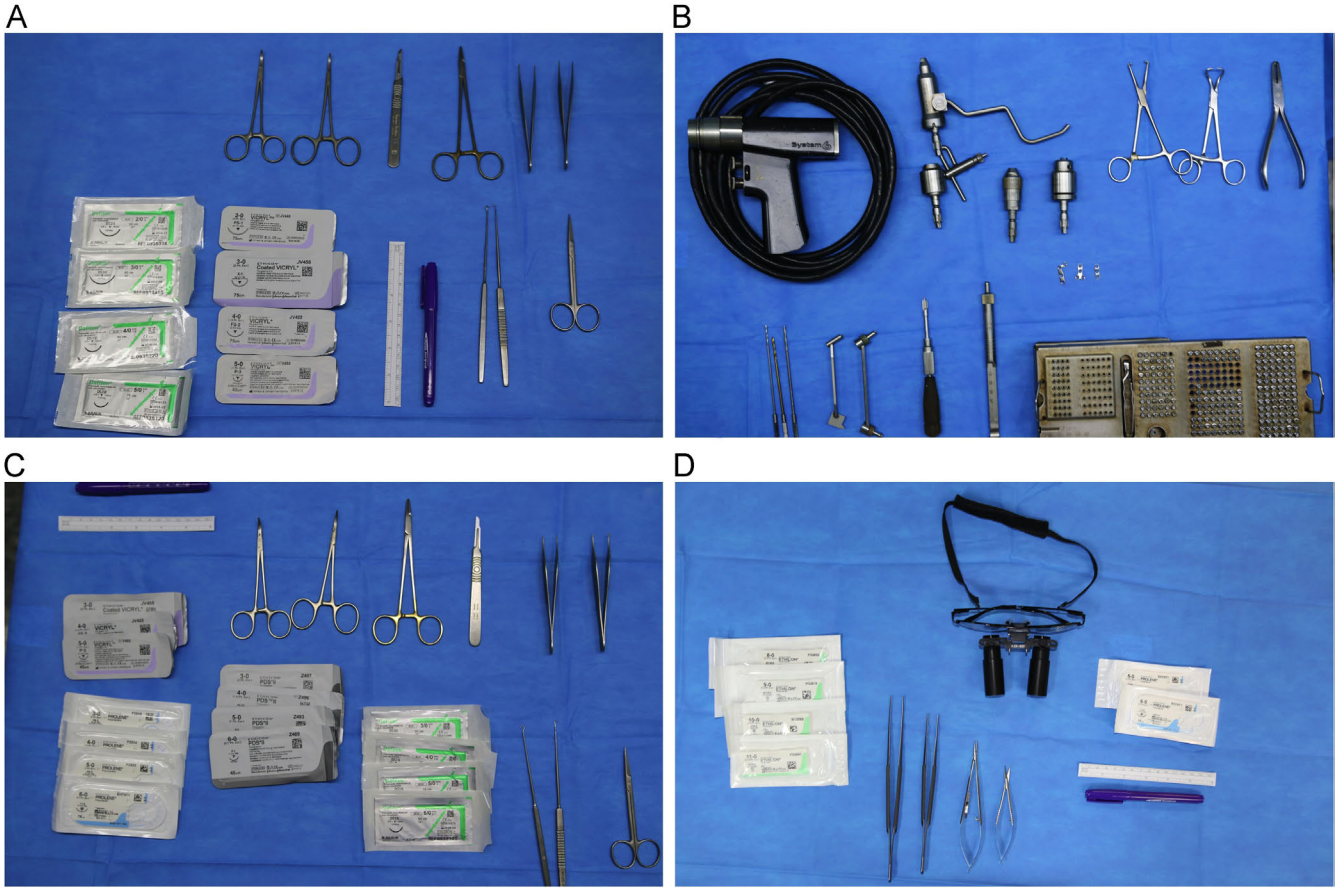

FIGURE 1. Material and instruments used for each task: (A) task 1, (B) task 2, (C) task 3, and (D) task 4.