

Course in Basic Surgical Skills

BACKGROUND The Basic Surgical Skills (BSS) course provides an introduction to basic surgical techniques. The course was held in Norway for the first time in 2009. This study was carried out to evaluate the learning outcomes of the course.

MATERIAL AND METHOD The participants from four consecutive courses were invited to take part in the study and were tested in three practical exercises immediately before and after the course. Their performance was measured using an Objective Structured Assessment of Technical Skills (OSATS) for two of the exercises and by time needed to complete the third exercise. The participants also undertook two self-evaluations of competence on each exercise, one prior to and one after completing the course.

RESULTS A total of 57 out of the 65 course participants were included in the study. The participants' scores were significantly higher for all three practical exercises after course completion, compared with the pre-course score ($p < 0.001$). The self-evaluations indicated that the participants felt more competent after the course.

INTERPRETATION The study indicates that the BSS course provides better basic surgical skills. In view of the lack of equivalent courses at core surgical training, consideration should be given to introducing this as a compulsory part of the surgical training in Norway.

Technical skills are necessary in order to practise surgery (1, 2). In Norway, surgical trainees have traditionally acquired these skills under supervision in operating theatres (3). There has been little standardisation of this teaching, and limited scope for objective feedback. Practical courses, such as the war surgery course and the Advanced Trauma Life Support (ATLS) course, have therefore become increasingly important in core surgical training and are now compulsory for the specialty of general surgery (4).

The BSS course was established in Norway in the summer of 2009 by Oslo University Hospital, Ullevål and the Norwegian Surgical Society (Norsk kirurgisk forening) (3). The course was originally developed by the Royal Colleges of Surgeons (RCS) of the United Kingdom to improve the basic training given to surgical trainees. In the UK, the course must be taken during the first year of specialist training. The objective of the course is to teach trainees a safe method for performing basic surgical procedures (5). The course consists of 14 exercises ranging from surgical hand scrubbing, gloving and gowning, to technical skills such as tying surgical knots, suture techniques, intestinal anastomosis, wound debridement, and laparoscopic exercises (6).

This study was carried out to evaluate the learning outcomes of the BSS course.

Material and Method

The BSS course was advertised on the website of the Norwegian Medical Association, and the applicants were given a place on the course on a first-come first-served basis. Participants on four consecutive courses,

organised by Oslo University Hospital, Ullevål during the years 2009–11, were invited to take part in the study. They were sent written information about the study in advance, and verbally consented to participate on the first day of the course. The participants were sent pre-course copies of the course handbook and DVD produced by the RCS (in English-language versions) as well as study information (6).

All the instructors had completed an instructors' course, and were informed about the study and trained to use the evaluation tools.

The participants were tested on the same three practical exercises immediately before and after the course. The learning outcome was defined as the difference between the score after and before the course. The exercises were:

- Exercise 1: Excision of naevus and skin closure (using porcine skin or synthetic skin model)
- Exercise 2: Mesenteric vessel ligation (using porcine intestinal specimen)
- Exercise 3: Laparoscopic simulator exercise, in which the participants passed a rubber needle with thread through ten rings placed at different angles in a specific order

The exercises were selected on the basis of performability and because they represent fundamental principles of surgery. Exercises 1 and 2 were scored using the Objective Structured Assessment of Technical Skills (OSATS) (7, 8). The OSATS instrument has reported high reliability and validity, and consists of checklists and a Global Rating Scale (GRS) (2, 7). The checklists are task-specific

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See Appendix at www.tidsskriftet.no/mansoorengappendiks

MAIN POINTS

The Basic Surgical Skills (BSS) course provides introductory practical training in core surgical techniques

The participants from four consecutive courses were tested in practical exercises before and after course completion, and their performance was measured using OSATS

The participants performed significantly better on the exercises after completing the course

The BSS course is suitable for practical training in surgical skills

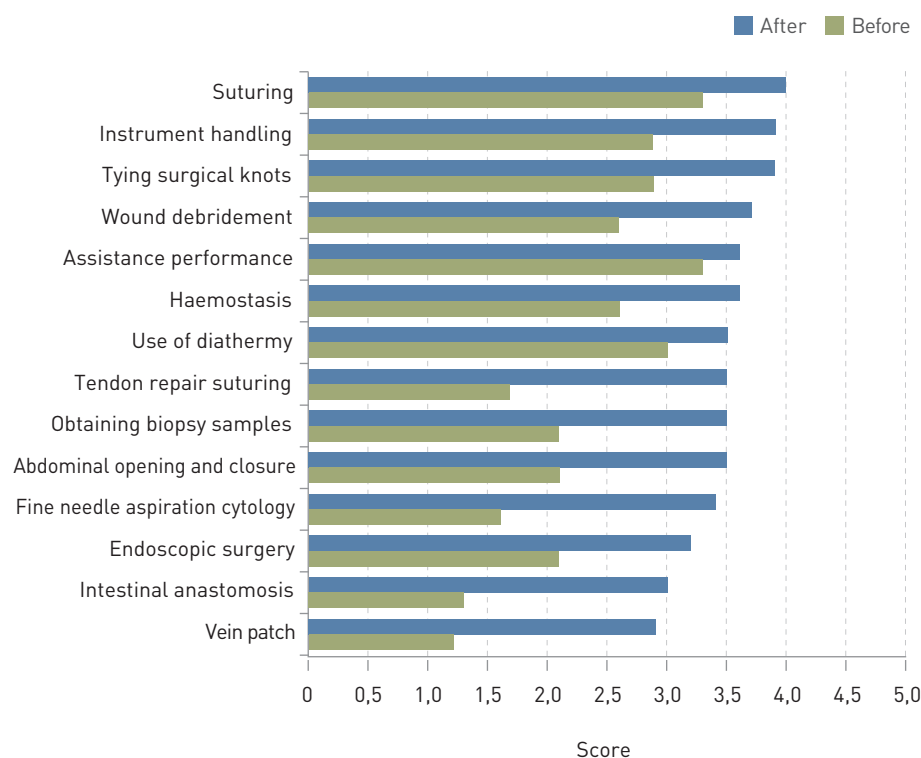


Figure 1 Self-evaluation form pre- and post-course for the 14 taught skills, with average pre- and post-course score (based on a 5-point Likert scale, where 1 means no skills and 5 indicates excellent skills)

Table 1 Before-and-after scores for the three selected practical exercises (n = 57)

Exercise	Tool	Score before		Score after		P value
		Median (CI)	Median (CI)	Median (CI)	Median (CI)	
Excision of naevus and skin closure	Checklist	9.0	[8.1–9.7]	11.0	[10.1–11.3]	< 0.001
	Global Rating Scale	18.0	[17.1–19.8]	23.0	[22.3–24.8]	< 0.001
Mesenteric vessel ligation	Checklist	5.0	[4.4–6.2]	8.0	[7.0–8.1]	< 0.001
	Global Rating Scale	16.5	[15.3–18.8]	23.0	[20.8–24.0]	< 0.001
Laparoscopic exercise	Minutes per obstacle	0.8	[0.7–1.1]	0.5	[0.5–0.6]	< 0.001

with a point-by-point description of the steps in each procedure. Using the GRS, participants are scored for their general skills such as tissue handling, economy of movement, choice and handling of surgical instruments, and knowledge and performance of the procedure. The maximum score for Exercises 1 and 2 was 42 and 39 points respectively. In Exercise 3, the participants were assessed on the time needed to pass each obstacle (see appendix).

The participants scored their own pre- and post-course skills for the 14 skills taught, on a 5-point Likert scale, where 1 represents no

skills and 5 represents excellent skills (9). To analyse possible correlation between previous experience and the degree of improvement, the results were calculated for three groups, stratified according to length of previous experience: 0–6 months, 6–12 months, and > 12 months, respectively. The results were then compared.

Statistics

The data were not normally distributed. We used non-parametric tests. The pre- and post-course scores for the group of participants were compared using the Wilcoxon

test. The Kruskal-Wallis test was used to analyse possible correlation between length of surgical experience and the learning outcomes. The significance level was set at 0.05. The statistical analyses were carried out in SPSS Version 19 (IBM, USA).

Results

A total of 57 out of 65 course participants (88%) consented to take part in the study. The participants were surgical trainees with surgical experience varying from 1 to 40 months, with an average of 13 months.

The self-evaluated competence for the 14 skills taught was better on all points after course completion (Fig 1). Overall, the participants performed better on the three practical tests after completing the course (Table 1). There was no correlation between the length of surgical experience for the three practical tests and the learning outcomes ($p = 0.9$).

Discussion

Assessed on the basis of the scores, the course participants improved their technical skills by taking the BSS course. Somewhat surprisingly, there was no correlation between the improvement and the participants' surgical experience. We expected participants with less experience to have better learning outcomes from a course in basic surgical skills than participants with more experience.

Participants' self-evaluated competence increased after course completion, as demonstrated in earlier studies (9, 10). The increase was felt to be lowest for the skills «Use of diathermy» and «Assistance performance», which were only taught theoretically (Fig 1). This may indicate that practical teaching should supplement theoretical teaching of technical skills.

Evaluating basic laparoscopic skills only in terms of the time needed to pass each obstacle clearly has its limitations. Our findings are, however, in accordance with the results of studies in which a number of variables were examined (11, 12). Studies have shown that simulator training is better than traditional textbook teaching, and that skills acquired on a simulator are transferable to the operating theatre (11, 13–18).

Successful surgical treatment of the patient requires the operator to maintain their practical skills. Several studies demonstrate that regular training is needed to maintain the level of skills (10, 12, 19). In our study, we measured skills immediately after the course, and the results provide no indication of long-term skills retention. It would have been desirable to have a control group as well, to examine skills retention in greater detail, but that was not practically possible. The study also had a limited number of participants, which may have affected the results.

Conclusion

The participants' skills in three basic surgical techniques were significantly better after completing the BSS course. The length of surgical experience does not appear to influence the learning outcomes. The study indicates that the BSS course brings a relevant learning resource to surgical specialisation in Norway.

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