

Expert Videotape Analysis and Critiquing Benefit Laparoscopic Skills Training of Urologists

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ABSTRACT

Introduction: Teaching laparoscopic skills has become the focus of the latest generation of hands-on laparoscopic courses.

Methods: Thirty-four practicing urologists, ages 31 to 61 years (mean, 46.6 years) with laparoscopic experience (range, 0 to 200, mean, 27.6 cases), 32 of whom had taken prior American Urological Association (AUA) laparoscopy courses, participated in an AUA-sponsored hands-on laparoscopic skills course over a 2-day period in August 2002 or March 2003. They all took a knowledge assessment examination and performed standardized tasks (rope passing, ring placement, and laparoscopic suturing and knot tying) at the beginning and the end of the course with a videotape analysis and critique. Prior to the repeat-skills assessment, each participant was individually critiqued and instructed based on a videotape review of their initial performance. The urologists also participated in a porcine laboratory and a pelvic trainer session totaling 6 hours between skills assessments. None of the participants had performed significant laparoscopic suturing prior to the course.

Results: Using Wilcoxon's signed rank test, the participants improved from a mean of 119.32 seconds to 98.36 seconds with the rope pass ($P=0.0001$), and with the ring placement from a mean of 9.70/minute to 12.09/minute ($P=0.0001$). All participants had significantly fewer false passes (mean, 9.35 compared with 5.21) during repeat skills assessments ($P=0.0001$). Participants

improved from 0.54 sutures/minute to 1.22 sutures/minute following the video critique and practice ($P=0.0001$). Degree of laparoscopic experience (number of cases), age of the urologist, and precourse knowledge (examination score) had no significant bearing on results in the initial skills assessment or in the improvement of task time (Spearman correlation coefficients).

Conclusion: Urologists with some laparoscopic experience (mean 27.6 cases) can improve laparoscopic skills using mentored videotape analysis and experience gained from a 2-day hands-on course. Prior knowledge, degree of experience, and urologist age had no significant bearing on performance in this setting.

Key Words: Laparoscopy, Mentoring, Videotape.

INTRODUCTION

Laparoscopic skills training has become very important to practicing urologists, particularly as laparoscopy is used more commonly to treat all aspects of genitourinary disease. At present, few teaching methods are in place to train urologists to perform more complex laparoscopic maneuvers, such a suturing and tying knots.¹⁻⁶ Evidence exists that more intense efforts in learning over short time frames may have benefit, although expert teaching is essential.⁷⁻¹⁰ In a 2-day hands-on course, we utilized videotape analysis and critiquing by experienced (at least 200 cases), fellowship-trained, laparoscopic urologists to help improve the techniques of the participants. It was our hypothesis that urologists with some laparoscopic experience (average 27.6 cases) could benefit from expert videotape critiquing and analysis, and these urologists could subsequently improve their laparoscopic skills in a relatively short time frame.

METHODS

Thirty-four practicing urologists, ages 31 to 61 years (mean, 46.6 years) with laparoscopic experience (mean, 27.6 cases; range, 0 to 200 cases), 32 of whom had taken prior AUA laparoscopy courses, participated in an AUA-sponsored hands-on laparoscopic skills course over a 2-

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Table 1.
Results of Videotaped Timed Tasks, Average (SD)

Task	n	Initial Attempt	After Mentoring	P Value
Rope pass (seconds)	33	119.32(95.7)	98.36(77.7)	0.0001
Ring placement (#/minute)	33	9.70(2.3)	12.09(2.8)	0.0001
Suturing (#/minute)	31	0.54(0.5)	1.22(0.6)	0.0001
False passes	33	9.35(10.2)	5.21(6.9)	0.0001

day period in August 2002 and March 2003. Thirty-three were videotaped and timed performing standardized tasks (rope passing, ring placement, and laparoscopic suturing and knot tying) on a pelvic trainer at the beginning and the end of the course (1 participant could not return for the second session) (**Table 1**). In addition, the number of false passes was recorded each day. J and S Video Associates, Houston, Texas, facilitated all videotaping, assessment, review, and audio transfer.

Initially, expert laparoscopists demonstrated the tasks, and lectures were given describing the techniques. Next, participants had their initial performances videotaped. The attendees then participated in a porcine laboratory and a pelvic trainer practice session totaling up to 6 hours between skills assessments. Prior to repeating the skills on videotape the next day, each participant received individual critiquing and instruction based on a videotape review of their initial performance. The instructors were all experienced laparoscopic urologists, each having performed over 200 laparoscopic procedures. All lecturing faculty members were fellowship-trained (SYN, SJS, JTB, JSW). None of the participants had performed significant laparoscopic suturing clinically prior to the course.

Each instructor measured the time to successfully complete a standard rope pass drill, the number of ring placements that could be accomplished in 1 minute, and suturing (placing a single suture followed by knots tied/minute) both days. All participants were given copies of the videotaped skills performances and an audiotape of the assessment once they left the course.

RESULTS

Using Wilcoxon's signed rank test, the participants improved from a mean of 119.32 seconds to 98.36 sec-

onds with the rope pass ($P=0.0001$), and with the ring placement from a mean of 9.70/minute to 12.09/minute ($P=0.0001$). All 33 participants had significantly fewer false passes (mean, 9.35 compared with 5.21) during repeat skills assessments ($P=0.0001$). Thirty-one participants improved from 0.54 sutures/minute to 1.22 sutures/minute. ($P=0.0001$). Three participants did not complete the suturing exercise. Degree of laparoscopic experience (number of cases), age of the urologist, and precourse knowledge (examination score) had no significant bearing on results in the initial skills assessment or in the improvement of task time (Spearman correlation coefficients).

A questionnaire specifically addressing the value of the videotape critique was distributed following the course in August 2002, and 73% of respondents found the videotape critique session "excellent," and 27% found it "above average." Seventeen of 18 participants returned the survey. The possible choices ranged from excellent, above average, average, below average, to poor.

COMMENT

Most continuing surgical education following residency training focuses on procedural-based learning, teaching a "step by step" approach to performing the newer operations. The acquisition and transfer of new "skills" is often a secondary consideration to step by step or decision-based learning in standard postgraduate courses. Many believe the improvement of laparoscopic skills and control of outcomes is probably best accomplished from the operative experience and mentoring offered in formal postgraduate fellowships.¹¹ While individual instruction would be most effective, without a formal fellowship, individualized technique-based training is difficult to carry out in a standard animal laboratory course. In addition, individualized teaching is further complicated in the

animal laboratory setting, as the surgical assistant, surgical anatomy, and instructors are all variable.

Videotape analysis has been utilized in teaching various physical skills, including striking a golf ball and hitting a baseball. Teachers typically demonstrate the technique, and more advanced teachers will analyze the student's technique using both observation and videotape. Often by watching themselves, the students will improve faster. While this approach may not be peer-reviewed, most successful athletes review their own performances and subsequently make adjustments. Certainly, experienced laparoscopists review their own surgical procedures and analyze where they could have improved their technique (Personal communication, Steven J. Shichman, 2003).

Our preliminary report demonstrates that urologists with laparoscopic experience (mean, 27.6 cases) can improve their inanimate laparoscopic skills by using mentored videotape analysis and experience gained from a 2-day hands-on course. The degree of laparoscopic experience and urologist age had no significant bearing on the performance of these skills. Our data indicate that the selected tasks could be learned by most urologists ($P=0.0001$ for all tasks). While these skills may not be indicative of the precise skills used when performing laparoscopy, our results show that the teaching provided, in particular the individual videotape mentoring, helped the participants rehearse and improve their performance of these selected tasks. It is not surprising that age had no bearing, and no published reports indicate that the skills required for laparoscopy are affected by increasing age.

It is important to separate laparoscopic skills from performing laparoscopy, as patient selection, attaining access, understanding of surgical anatomy, and identification of pitfalls all are critical to successful procedures. However, to date, no cases have been reported of the use of videotape critiquing and analysis for teaching laparoscopic skills to urologists. This approach along with time to rehearse clearly helped the participants perform designated laparoscopic tasks better. In addition, these individuals strongly felt the session was beneficial. While randomization of participants to video assessment and no video assessment would answer the question more effectively, it was not practical in this learning environment and course time frame. Certainly, follow-up questionnaires after the course will best identify the durability of these skills.

Although both cognitive and technical skills are required

for learning and performing any surgical procedure, videotape mentoring allows for recording of participant's skill level, review, and critique of the technique, and subsequent measurable improvement. Further, ongoing "lessons" using videotape mentoring, perhaps via telementoring or merely mailed videotape reviews, could become an integral part of surgical education in urologic laparoscopy.¹²

In summary, we have shown that urologists can improve select laparoscopic skills on a pelvic trainer using expert-mentored videotape analysis and the experience and practice gained from a 2-day hands-on inanimate (pelvic trainer) and animal course. Prior knowledge, degree of experience, and urologist age had no significant bearing on each participant's performance in this paradigm. Further long-term follow-up of the participants will identify the long-term benefits that this training will have on their clinical practices.

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