The Effect of Preoperative Warm-up on Intraoperative Performance

The Johns Hopkins University, School of Medicine

Principal Investigator: Kimberley E. Steele, MD, FACS, PhD candidate

Statement of Funds: There are no other funds for this related project pending or on hand through other sources.

SUMMARY

Background: While surgical simulation has become an integral part of the surgical training curriculum, the timely practice of a warm up training technique has not been well established. Additionally, the surgical resident or fellow's self-perception regarding their ability to perform a surgical procedure versus the objective performance assessment by their attending surgeon has not been studied in laparoscopic surgery.

Objective: To assess the impact of a preoperative laparoscopic training warm-up exercise on the intraoperative laparoscopic performance of surgical residents and fellows.

Methods: We plan to conduct a one year (2014 – 2015) randomized control trial involving surgical residents who are postgraduate years 1, 2, 4, and 5 and minimally invasive surgical fellows as study participants. All residents and fellows are required to perform 5 basic tasks as are prescribed by the Fundamentals of Laparoscopic Surgery (FLS). Four out of five of these tasks will be deemed warm up tasks. All residents, regardless of participating in this study, will enter with the same surgical skill level due to the instruction that they receive in their surgical training curriculum. Those residents and fellows who do participate will be randomized to either warm up or no warm up prior to being assigned to a laparoscopic surgical procedure that is routinely performed according to their postgraduate year and skill level. Participants will rate their own intraoperative performance on 3 previously validated global rating scales for laparoscopic performance as well as one scale specifically designed for laparoscopic cholecystectomy. The attending surgeon will also assess the participant's performance using the same scale(s) respectively.

Analysis: Mixed measures ANOVA, Spearman's Rho, Student's t-test

Implications: Assessing the effect of preoperative warm up training on intraoperative laparoscopic surgical performance could have multiple implications. For one, this study design can evaluate the effect of warm up using FLS tasks. Secondly, the validation of perceived self-assessment of warm up training as compared with an external objective assessment (by faculty) of the same surgical performance using the same scale for measure may inform educational practice and standard policy regarding laparoscopy. Additionally, to our knowledge this is the first time the effect of warm up on laparoscopic surgical performance will be quantitatively assessed in surgical residents and fellows.
As the adage states, “practice makes perfect.” Simulation has been used for centuries for teaching technique and procedural skills. (1) As the resident work hours decrease, there has been a stronger emphasis on proficiency in the simulated setting prior to performance in the operating room. The Accreditation Council for Graduate Medical Education (ACGME) mandates that all surgical residency programs incorporate a simulation and skills lab into the curriculum. Laparoscopy represents a separate more advanced skill set when compared with open surgery. Residents and novice learners often have difficulty with tasks unique to this field of surgery including depth perception, loss of haptic feedback, fulcrum effect, and limited range of motion. (2, 3) The use of both low fidelity (box trainers) and high fidelity (virtual reality simulators) trainers have been extensively studied and validated as effective tools for teaching laparoscopic skills to novice learners. (2-8) Proficiency-based virtual reality training has also been validated as a tool for error reduction in novice laparoscopic cholecystectomy. (3) The question of whether simulation in laparoscopy is useful and necessary has been answered. Some authors have even stated that simulation-based medical education is an ethical imperative. (3, 9) The remaining questions are how to best use simulators in curriculum construct and design.

The majority of the literature is centered on scheduled training sessions where residents practice on a simulator, either low or high fidelity, and demonstrate competency in laparoscopic tasks. These sessions typically occur on a one-time basis or through a handful of sessions scheduled throughout the year. Few studies have examined the impact of a training session immediately prior to performance in the operating room. Recently, studies by Kahol et al. and Do et al. evaluated the effect of a “warm up” session on task performance. (10, 11) The concept of a warm-up has been described in music and sports literature, and often anecdotally among surgeons. In the absence of procedural practice mental practice alone has been advocated for the acquisition of technical skills and emotional preparedness in stressful situations such as the operating room. (12) In those studies by Kahol et al. and Do et al., practice immediately prior to performance of a surgical task resulted in improved performance and skills proficiency. A simulated task was used as the final surgical task in both studies.

In addition to using simulators for teaching and practicing laparoscopic skills, simulators are also being considered as a standardized and objective option for demonstrating competency in performing specific procedures or techniques. The expectation is that trainees will have to demonstrate competency on the simulator before being allowed to perform certain procedures in the operating room or being credentialed for certain procedures at an institution. There are many studies in the literature addressing the validity and reliability of simulators (7, 13-18); however, it is unclear if performances on simulators reflect performances in operative settings. There is one study that found significant correlations between laparoscopic cholecystectomy performances in a virtual reality environment as determined by a computer simulator (LapSim, Surgical Science Ltd., Gothenburg, Sweden) and performances in the operating room using a modified OSATS global rating scale. (19)

Furthermore, while the value of faculty assessments, especially using validated standardized assessment tools, is well established, the importance of self-assessment has not been as well studied. Self-perception is an essential component for directing self-learning. Determining the correlation of self perception and faculty perception is vital, as this feedback to residents can give them further insight into their surgical abilities and targeted areas for improvement.
SPECIFIC AIMS & HYPOTHESES

Objective: To assess the impact of a preoperative laparoscopic training warm-up exercise on the intraoperative laparoscopic performance of surgical residents and fellows.

Specific Aim 1: To compare intraoperative performances after an immediate preoperative warm-up of basic laparoscopic skills with performances without preoperative warm-up using previously validated assessment tools.

Hypothesis 1: There will be an improvement of intraoperative laparoscopic surgical performance between surgical residents/fellows who complete a preoperative laparoscopic training warm-up exercise and those who do not.

Specific Aim 2: To determine if faculty assessment of surgical skills correlate with trainee’s self-assessment of surgical skills.

Hypothesis 2: Trainees may not appreciate their improvement when compared to surgical faculty objective assessment and therefore reinforces the importance of faculty feedback.

METHODS

Study population: All general surgery trainees postgraduate years (PGY) 1 – 5 and minimally invasive surgical fellows comprise the study population. During any one surgical rotation (4 to 8 week period), there is potential for one minimally invasive fellow, three PGY1 interns, one PGY2, two PGY4 interns, and one PGY5 to consent to the study. We anticipate enrolling at least 30 participants in the study, as is described in the section titled “Power Analysis” below.

Data Collection: The study will take place at Johns Hopkins Bayview Medical Center (JHBMC).

Study time period: The intraoperative performances of the study population will be assessed for the years 2014 – 2015. All study participants in each surgical rotation that falls within this time frame will be included in the study.

Recruitment: All surgical residents and fellows will be recruited for the study via a mass email approximately 4 weeks before the start of each new surgical rotation. It will be stressed that participation in this study is strictly voluntary; participation status will not influence the participant’s rotation evaluation or promotion within the program.

Informed Consent: Before a resident or fellow begins their surgery rotation, a designated study consenter will describe the details of this study, including the reason why the study is being performed, the risks, the benefits, and the participant’s expected length of involvement. An IRB-approved informed consent form must be signed and dated by the prospective participant and the designated study consenter before the start of the rotation in order for the resident or fellow to proceed with the study.

Research Model: Randomized Single Blind Crossover Design

There are two arms to this study “warm up” and “no warm up”.

Simulation Training: The residents and fellows rotating at JHBMC are required to complete the Fundamentals of Laparoscopic Surgery (FLS) Curriculum regardless as to whether they are participating in this study. FLS is a comprehensive web-based education module that has been endorsed by the American College of Surgeons (ACS) and is an educational tool designed and validated by the Society of Gastrointestinal and Endoscopic Surgery (SAGES). It includes a hands-on skills training component and assessment tool designed to teach the physiology, fundamental knowledge, and technical skills required in basic laparoscopic surgery. In 2009 the American Board of Surgery mandated that all general surgery residents must be certified in the FLS curriculum in order to graduate. Proficiency is based on time to
completion and manual dexterity. FLS is the first fully developed competency evaluation tool available for surgeons.

The five tasks of FLS include:

1. **Peg Transfer** - Transfer the colored pegs from one side of the board to the other. This exercise focuses on the skill of grasping and releasing objects in a controlled fashion. This develops eye-hand coordination, manual dexterity and depth perception.

2. **Pattern Cutting** - Demonstrate accurate and meticulous precision using Metzenbaum scissors. Use the Metzenbaum scissors and follow the pattern. Cut directly on the lines. This skill develops the ability and dexterity to cut tissue using laparoscopic scissors.

3. **Endoloop** - Demonstrate accurate placement of an endoloop on the marked line and then accurately cut the endoloop using endoshears. This skill develops accuracy and meticulous operating skills.

4. **Extracorporeal Suturing** - Demonstrate the ability to complete and extracorporeal knot with 3 throws. This skill develops the ability to suture beginning outside the body.

5. **Intracorporeal Suturing** - Demonstrate the ability to complete an intracorporeal knot with 3 throws in both directions. This skill is very important for a laparoscopic surgeon to develop should they want to proceed with complex laparoscopic operations.

We plan to use 4 of these 5 validated tasks as warm-up exercises for our study participants. The FLS extracorporeal suturing technique will not be assessed in this study as it is not included as part of the JHBMC training curriculum.

**Surgical Procedures:** All scheduled, non-emergent, laparoscopic procedures that can be performed by residents under an attending surgeon’s supervision will be included in the study. According to the 2012 hospital censuses at JHBMC, most of these laparoscopic cases will be laparoscopic cholecystectomy, laparoscopic appendectomy, laparoscopic inguinal and ventral hernia repair, laparoscopic colon resection, laparoscopic sleeve gastrectomy and laparoscopic Roux-en Y gastric bypass.

The PGY 1 and 2 residents are considered junior residents at JHBMC. This group will be responsible for covering the following surgical procedures: laparoscopic cholecystectomies, laparoscopic appendectomies, and laparoscopic ventral hernias.

The PGY 4 and 5’s and minimally invasive fellow are considered senior residents at JHBMC. This group will be responsible for covering the following surgical procedures: laparoscopic colon cases, laparoscopic ventral hernias, laparoscopic inguinal hernias, and laparoscopic bariatric cases such as laparoscopic Roux-en Y Gastric Bypass and laparoscopic sleeve gastrectomy.

To standardize the skill set competencies of the study participants, all residents and fellows will be required to practice each exercise at least 10 times to achieve proficiency on the exercises (9) prior to the start of their surgery rotation at JHBMC. Residents who choose to not participate in this study will still be expected to practice each of the exercises at least 10 times. The residents have a standard surgical simulation lab scheduled each Wednesday morning from 6:45am to 7:30am. At these sessions, the residents are proctored and expected to practice the aforementioned 5 FLS skills that are required to be competent in the FLS program.

It is important to note that while the difficulty of the surgical procedure to be performed is different for the junior versus senior residents, the warm-up session will remain the same regardless of the planned surgery performed.

**Randomization:** To randomize the residents to warm-up or no warm-up we will time their initial performance at enrollment: the residents will be asked to complete the FLS peg transfer task without any practice. The participant will then be matched to a participant with a similar time and PGY level for randomization. The study participant’s assignment to warm-up or no warm-up will be paged to each participant after being matched and randomized. The resident will be given sealed envelopes the morning of surgery with evaluations to be filled out by the participant and attending surgeon (surgeon will be blinded to whether warm-up or no warm-up was
done). After completing 5 cases doing warm-up or not, the participants will then be asked to cross-over to the other arm.

**Warm Up Arm:** Study participants who are randomized to perform the warm up exercise will be asked to perform the following FLS tasks: peg transfer, pattern cutting, endoloop, and intracorporeal suturing. These simulation techniques are detailed in the section titled “Simulation Training” above. The residents and fellow will be directed to perform the above tasks on the FLS simulator for a total warm-up practice time of 10 minutes. This will be completed within one hour prior to going to the operating room to perform the resident’s or fellow’s designated laparoscopic procedure. The residents/fellow will complete 5 laparoscopic cases consecutively and then be asked to crossover to the other arm and follow instructions for the no warm up group.

**No Warm Up Arm:** Study participants who are randomized to the no warm up arm will be asked to present to the operating room to perform their designated case. There will be no pre-operative warm up. The residents will complete 5 laparoscopic cases consecutively and then be asked to crossover to the other arm and follow instructions for the warm up group.

---

**Consent, (PGY level documented, baseline Peg Transfer Score established)**

**Randomization (based on PGY level and Baseline Score)**

**Warm up**

**5 laparoscopic cases**

**Warm up**

**No Warm up**

**5 laparoscopic cases**

**No Warm up**

---

**Fig. 1. Study Design**

Preoperative warm-up or no preoperative warm-up for residents will be systematically randomized such that each surgery type and resident year will have an equal chance (i.e. 50%) of requiring a warm-up, while attempting to systematically randomize the residents so an equal number of cases are done using warm-up or no warm-up (i.e. 50% laparoscopic appendectomies require warm-up). Therefore, before each case, the participating resident will be randomized to undergo preoperative warm-up practice using the aforementioned FLS skills or not undergo this warm-up exercise. Based on the resident’s PGY, they will be expected, per the surgical department and the ACGME, to perform procedures consistent with their level of training.

**Study Design (Fig. 1):** If applicable based on randomization, the resident will perform the warm-up exercises for 10 minutes within one hour of starting their surgical case. The resident will proceed with surgery as per routine under the guidance of the supervising attending surgeon. The attending will be blinded as to whether or not the resident has undergone warm-up exercise prior to the procedure. The attending will evaluate the trainee immediately after each laparoscopic procedure using 3 previously validated global rating scales as well as a visual analogue scale of overall performance. (Appendices A, B, and C) (19-21). One further rating scale (Appendix D) will be utilized for laparoscopic cholecystectomy. This rating scale was developed specifically for evaluating residents completing laparoscopic cholecystectomy. These global rating scales were modified from the original Reznick scale specifically for laparoscopic cases and have undergone psychometric validation after actual laparoscopic surgical cases. (19, 21) The trainees will also be asked to rate themselves after their performances using the corresponding appropriate global rating scale(s). Information including whether or not the resident completed the pre-rotation training on the laparoscopic trainer, time spent on trainers besides the warm-up exercises during the surgery rotation, the type of surgery being assessed, the difficulty of the case, resident training level, and number of previous cases performed by the resident will be obtained (Appendix E). This assessment will not impact the residents’ formal assessments during the rotation nor will it be a part of their permanent residency record.

**Power Analysis:** To determine the number of participants required to obtain a power of 0.80 at the 0.05 significance level, an a-priori power analysis was conducted using G*Power (1) for a Mixed Factors ANOVA taking into consideration a difference in performance between the different post-graduate training levels. For a medium effect size (f = 0.25), 6 residents in each post-graduate year will need to conduct 6 surgeries (3 with warm-up and 3 without warm-up). (23) For example, in the Department of Surgery, we will need a total of 30
residents performing 180 laparoscopic cases. In 2012 at our institution, the Department of Surgery performed over 1200 laparoscopic cases, 234 laparoscopic cholecystectomies, 102 laparoscopic appendectomies and over 300 laparoscopic bariatric 126 RYGB and 141 gastric sleeves, 82 laparoscopic inguinal hernias, and 58 laparoscopic colon cases.

**Statistical Analysis:** Mixed factors ANOVA will be used to compare intraoperative surgical performances with and without preoperative warm-up. Given that the validated Global Rating Scales are based on an ordinal scale, we will use Spearman’s Rho to measure the relationship between the resident’s self-assessments and the attending surgeon’s assessment. Student’s t-test will be used to compare self-assessments and the attending surgeon’s assessment with and without preoperative warm-up.

**RATIONALE AND PRELIMINARY FINDINGS**

In the following section we present preliminary data that has motivated the specific aims in this proposal. It will demonstrate the feasibility of this investigation and describe the approach taken for this scientific inquiry.

**BACKGROUND:** The ACGME has required that a simulation and skills lab be incorporated into surgical residency training curricula. The benefit of practicing in the lab has been studied in recent years and is well accepted. While the value of warm-up is generally accepted in other areas requiring complex motor skills, e.g. athletics and musical performance, there is little evidence to support the benefits of warm-up prior to performing surgery. We are conducting this study in an attempt to identify whether a warm-up period, just prior to operating, results in better operative technique.

**METHODS:** All general surgery residents from PGY1 to PGY5, as well as the MIS fellow, were asked if they wished to participate in this IRB approved study. The procedures eligible for the study were laparoscopic appendectomy or cholecystectomy for junior level residents (PGY1 and 2), and laparoscopic ventral or inguinal hernia repair, colon resection, vertical sleeve gastrectomy, or Roux-en-Y gastric bypass for senior levels (PGY 3, 4, 5 and fellow). Participants were randomized to warm-up or no warm-up groups. Participants randomized to the warm-up group completed a 10 minute practice session in the simulation lab within 1 hour of starting the case, using an FLS training box. PGY1 and PGY2 training skills performed were pegboard transfer, pattern cutting, and endoloop; PGY3 to PGY5 and fellow skills were pegboard transfer, pattern cutting, intracorporeal suturing and endostitch. At the conclusion of the operation, the participant was evaluated by the attending surgeon using the validated global rating scales of Reznick and Vassiliou. The attending surgeons were blinded to the use or not of pre-procedure warm-up. The results of the questionnaire were analyzed using student T-Test with p<0.05 for significance.

**RESULTS:** Pilot data was obtained enrolling 15 residents randomized to warm up (10) or no warm-up (12) for 22 laparoscopic procedures. Attending surgeon evaluations on resident performance showed a statistical significance in instrument handling (0.03) and bimanual dexterity (0.01) (Table 1) although the rest of the grading points did not show statistical significance there was a notable improvement in overall scores. Participants’ perception of their performance during the procedure using warm-up was not significantly altered (Table 2).

**CONCLUSIONS:** Preoperative warm-up significantly improves bimanual dexterity and instrument handling. There did appear to be improvement in operative technique among subjects using warm-up as judged by the attending surgeon, though this effect did not reach statistical significance. The lack of self-perceived improvement by the residents may be a reflection of the high standards and intense self-critique that is common among surgical trainees. We believe that our findings, while preliminary, reflect an important finding: namely, that surgical performance, as with other areas of human performance, can be enhanced through structured warm-up activities. The potential importance of this finding justifies further data collection and replication of our findings at other institutions.

Please see Appendix A for Tables 1 & 2.
**Budget Justification:** The Principal Investigator, Dr. Kimberley Steele, and the co-investigator Dr. Erin Moran-Atkin will not receive salary support from this grant funding. The Senior Research Program Coordinator, TBA, is asking to receive 35% salary support from the SAGES grant funding as the recruitment, study coordination, and basic analyses will require 35% of his time and effort in a one year period. The statistician, Dr. Eric Schneider, is asking to receive 1% salary support as the statistical analyses will require 1% of his time and effort in a one year period. Johns Hopkins Bayview Medical Center fringe costs for a one year period for Ransom Wyse, MPH and Dr. Eric Schneider are expected to be $6,123.00 USD. The costs of

Dollar amount requested (Omit cents) **$29,728**

Total for the grant request may not exceed $30,000.

*Salary funds should be used for staff required to execute the study, but should not be used for salary support for the primary investigator. If salary support exceeds 50% of the project budget, then specific justification is required.

**Funds requests for travel for the presentation of a SAGES funded study should be limited to $1,000.**

---

<table>
<thead>
<tr>
<th>NAME</th>
<th>POSITION TITLE</th>
<th>TIME/EFFORT</th>
<th>SALARY</th>
<th>FRINGE BENEFITS</th>
<th>SUB-TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Kimberley Steele</td>
<td>Principal Investigator*</td>
<td>5 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Erin Moran-Atkin</td>
<td>Co-Investigator</td>
<td>5 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. TBA</td>
<td>Research Coordinator</td>
<td>35 14</td>
<td>$16,875</td>
<td>$5,822</td>
<td>$22,696</td>
</tr>
<tr>
<td>4. Eric Schneider</td>
<td>Statistician</td>
<td>1 1</td>
<td>$871</td>
<td>$301</td>
<td>$1,172</td>
</tr>
<tr>
<td></td>
<td>CONSULTANT COSTS</td>
<td></td>
<td></td>
<td></td>
<td>$0</td>
</tr>
<tr>
<td></td>
<td>EQUIPMENT (List all Items &amp; Total Cost)</td>
<td></td>
<td></td>
<td></td>
<td>Subtotal $3,360</td>
</tr>
<tr>
<td></td>
<td>SUPPLIES (List all Items &amp; Total Cost)</td>
<td></td>
<td></td>
<td></td>
<td>Subtotal $1,500</td>
</tr>
<tr>
<td></td>
<td>TRAVEL**</td>
<td></td>
<td></td>
<td>$1,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PATIENT CARE COSTS</td>
<td></td>
<td></td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CONSORTIUM/CONTRACTUAL COSTS</td>
<td></td>
<td></td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OTHER EXPENSES (List all Items &amp; Total Cost)</td>
<td></td>
<td></td>
<td>Subtotal $29,728</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL DIRECT COSTS</td>
<td></td>
<td></td>
<td>$29,728</td>
<td></td>
</tr>
</tbody>
</table>

---

**Detailed budget for 12 month period from 03/01/2014 through 02/28/2015.**

---

**BUDGET**

---

---

---

---

---
Supplies include two FLS Trainer Systems which are commercially available at $1,680.00 USD each. Presently, we have one FLS Trainer System that was earned through an externally funded grant from Covidien. We believe that the addition of two FLS Trainer Systems will be essential to cover the scope of this research project as it provides the resources for resident training. Supplies that support these FLS Trainer Systems, such as video cables, power adapters and monitors, are also commercially available and will cost $1,500.00 USD in total. Estimated travel costs for SAGES presentations are conservative at $1,000 USD. In sum, the projected total costs to perform this research study as per the aforementioned justifications equal $29,728.00 USD. The cost breakdown is listed above.

REFERENCES


JOHNS HOPKINS MEDICAL INSTITUTES INSTITUTIONAL REVIEW BOARD

Currently, this research project is approved by our IRB (NA_00032565) and is pending monetary support for study personnel who will be able to oversee the protocol and coordinate the project through completion at the Johns Hopkins Medical Institutes. The IRB approval letter will be supplied when this project is funded.

AVAILABLE RESOURCES

Department of Surgery and the School of Medicine: The Johns Hopkins University School of Medicine has a long-standing tradition of excellence in clinical and educational training research. The mission of The Johns Hopkins University is to educate its students and cultivate their capacity for life-long learning, to foster independent and original research, and to bring the benefits of discovery to the world. They are 100% committed to their faculty who represent them proudly in research endeavors. The Chair of the Department of Surgery, Dr. Julie Ann Freischlag has not only been an outstanding Chair but also an amazing and supportive mentor. She has encouraged our team to pursue this educational research trial with the goal of attaining new and novel methods in the training of our surgical residents. By combining the resources of the JH medical institutions and the practical experience in the pursuit of the outlined aims, the SAGES award will provide our team the opportunity to obtain significant data to use for application towards larger grant funding and further educational studies.

The Center for Surgical Trials and Outcomes (CSTOR): CSTOR is a Department of Surgery research endeavor to advance the collaborative study of processes of surgical trials and surgical outcomes through multidisciplinary approach. The CSTOR initiative is primarily focused on building a research infrastructure that provides investigators with the tools, resources, and the support they need to successfully achieve their research goals and objectives (ex. study design and grant support services, provide a database library to empower surgeons to utilize large datasets, provide expertise in database analysis and provides biostatistical consultation, research nurses and coordinator support for surgical faculty and their research protocols.

Biostatistics, Epidemiology and Data Management (BEAD) Core: The BEAD core is located on the Bayview campus and provides consulting and support services to new and established investigators engaged in human subject research. Specific services include programming for new and ongoing research projects, basic and complex biostatistical analyses, as well as consultation and support for study design, analysis plans, manuscript preparation, and public presentations.

The Johns Hopkins Bloomberg School of Public Health: Provides education, research and service in numerous fields of public health, including the primary disciplines of Epidemiology, Biostatistics, Genetics, Health Policy and Management, Nutrition, Mental Health Hygiene and Population Dynamics. Among the many areas of specialized academic interests are observational epidemiologic investigations and clinical trials.
The Johns Hopkins Institute for Clinical and Translational Research: The Institute for Clinical and Translational Research (ICTR) offers a wide variety of programs and services to members of the Johns Hopkins research community who are currently preparing or executing a study. The ICTR Clinical Research Units (CRUs) and associated services are designed to support a wide range of research at Johns Hopkins. From pilot studies to multi-center trials, the CRUs are available for investigators who need outpatient, inpatient, adult, pediatric, or neurological services.

Venue: The FLS simulation training instruments are located in a secured room that requires a JHBMC staff card swipe for admission. The simulation room is approximately 20 ft. square which is more than adequate space for the training. Presently, the room is equipped with one FLS Trainer System, a TASKIT Trainer (donated by Ethicon Inc.), a LTS Surgical SIM and a VT Trainer (METI®), locked cabinets where all supplies are housed, and a whiteboard for teaching purposes. This room is approximately 50 feet from the main operating room suites. This close proximity allows the study participants to access the training equipment before or between cases. The laparoscopic surgical procedures will be conducted in the operating room suites under the supervision of the attending surgeon.

Equipment: The Fundamentals of Laparoscopic Surgery simulator, equipment, supplies, and instrument (detailed above) are commercially available products and are supported and endorsed by SAGES.

Faculty: Johns Hopkins Bayview Medical Center Attending Surgeons with FLS credentials will assess the intraoperative performances of the study participants. There are a total of four Attending Surgeons that will help evaluate and participate in this study. The chair of the Department of Surgery at Johns Hopkins Bayview Medical Center, Dr. Thomas Magnuson, fully supports this project and has guaranteed commitment to the resources and completion of this study.
A. Personal Statement
As a young adult, I never really imagined that I would choose surgery as my career. For most of my 20s, I was competing full-time as an international level ice dancer. As an athlete it was imperative to “warm up” prior to any training or performance. In my immediate profession as a surgeon and teacher—these past training experiences in my life have led me to asking the question as to why surgeons do not “warm up”. I took an unorthodox approach to medicine and returned to my academic studies to earn my MD degree as a distinguished scholar and valedictorian from Ross University School of Medicine in 2000. I completed my general surgery residency training at Penn State College of Medicine in Hershey Pennsylvania from 2000 to 2005 and was the first surgical resident to earn the prestigious Kienle Humanitarian Award for outstanding clinical skills and compassionate care of my patients. From 2005 to 2006 I completed a minimally invasive and bariatric surgery fellowship at the Johns Hopkins. After completing my fellowship, I was actively recruited to The Johns Hopkins Center of Bariatric Surgery where I established a busy surgical practice. My concentration was mainly clinical during my first two years on faculty. Following this I had my two children (14 months apart in 2009 and 2010). Despite being clinically busy, I volunteered to precept the medical students who were completing their surgical clerkship. This led to me taking on the role of Associate Director of the Surgical Clerkship in the same year, 2006. Not only did I teach various components within the surgical clerkship including labs, didactic sessions, and in the operating room, I helped with administrative duties, mentored medical students (both from Hopkins and abroad) that went on to become surgical residents, took on sub-interns, developed and taught a laparoscopic curriculum that continues to be utilized today and helped develop and teach the PRECEDE medical student surgical curriculum and the surgical resident minimally invasive curriculum having authored 8 modules that have been used in Duke University’s surgical curriculum. In 2011, I received the Outstanding Teachers Award for the Surgical Clerkship. In addition to making a large contribution to teaching within the institution, I have accumulated an impressive amount of educational scholarship outside the institution. I am committed to the education of surgical trainees and serve on the Association of Surgical Education’s medical student education committee. I have authored numerous book chapters, been invited faculty to numerous SAGES national courses, and most recently was faculty at a laparoscopic suturing course at the annual ASMBS meeting, where I had the privilege of teaching surgeons from around the world. The SAGES grant would be ideal at this juncture to assist me in carrying out this project to indeed determine as to whether “warm up” improves the performance of an operating surgeon.

B. Positions and Honors
Professional Positions
2006-2007  Instructor, Johns Hopkins University School of Medicine, Department of Surgery
2006-2011  Co-Director of the Surgical Clerkship, Johns Hopkins University School of Medicine-JHBMC
2007-present Assistant Professor, Johns Hopkins University School of Medicine, Department of Surgery
2009-present Director of Adolescent Bariatric Surgery, Johns Hopkins Center for Bariatric Surgery
2009-present Director of Surgical Simulation and Education - Johns Hopkins Bayview Medical Center
2012-present Associate Director of The Center for Trials and Outcomes Research, Department of Surgery

Other Experience and Professional Memberships:
2001  Pennsylvania Medical Society, Dauphin County
2003-present  American College of Surgeons (ACS)
2004-present  Association of Women Surgeons (AWS)
2004-present  Society of American Gastrointestinal Endoscopic Surgeons (SAGES)
2006-present  Association of Surgical Education (ASE)
2006-present  American Society of Metabolic and Bariatric Surgeons (ASMBS)
2007-present  Fellow of the American College of Surgeons (FACS)
2009-present  Association of Academic Surgeons (AAS)
2006-present  Bariatric Center of Excellence Committee at Johns Hopkins Bayview Medical Center
C. Peer-Reviewed Publications

Most relevant to proposed research


Other publications

2. Schweitzer MA, Steele KE. Lidor AO. Failure of the Adjustable Gastric Band System Due To a Leak of Saline. Surgery for Obesity and Related Disease, 2006; 2:413.


6. Steele KE, Prokopowicz GP, Lidor AO, Magnuson TH, Schweitzer MA. Laparoscopic antecolic Roux-en-Y gastric bypass with closure of internal defects leads to fewer internal hernias than retrocolic approach. Surgical Endoscopy, 2008 Sep; 22; (9):2056-61


---

**Invited Critique & Editorials**


---

**Monographs**


---

**Book Chapters**


D. Research Support
Ongoing Research Support
Year 2: Presently, at the Johns Hopkins Bloomberg School of Public Health completing my PhD in Graduate Training and Clinical Investigations. Scheduled to graduate June 2014. 75% research, 25% clinical for 3 years.


A RCT (pilot study) to determine the feasibility of conducting a RCT comparing fondaparinux sodium once daily with enoxaparin twice daily with respect to preventing venousthromboembolism (VTE) after bariatric surgery. MRV will be used to examine the 2 week postoperative patient for VTE.

INTRADEPARTMENTAL DEPARTMENT OF SURGERY GRANT FOR YOUNG INVESTIGATORS: Role: PI Jan. 2008 to present. Association of Taq 1 A1 Allele with Suboptimal Weight Loss in Obese Patients Undergoing Roux-en-Y Gastric Bypass. Patients will be tested for the presence of the A1 allele, and also assessed for the amount of weight lost between preoperative and 2-year postoperative visits.

INVESTIGATOR INITIATED GRANT (Yasoo Vitamins): Role: PI July 2011 to present. RCT comparing the absorption and outcomes of standard oral tablet form vitamins versus chewable vitamins in Roux-en Y gastric bypass patients.

Completed Research
ASSOCIATION OF WOMEN SURGEONS ETHICON-ENDOSURGERY FELLOWSHIP GRANT 2006. Steele (PI)
Central brain dopamine receptor activity in obese subjects before and after gastric bypass surgery.
NAME  
Erin Moran-Atkin, M.D.

POSITION TITLE  
Assistant of Surgery

eRA COMMONS USER NAME

EDUCATION/TRAINING

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE (if applicable)</th>
<th>YEAR(s)</th>
<th>FIELD OF STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universidad Anahuac, Edo. Mexico, Mexico</td>
<td>MD</td>
<td>1997-2003</td>
<td>Medicine</td>
</tr>
<tr>
<td>Mount Sinai Medical Center, New York, NY</td>
<td>GS intern</td>
<td>2007-2008</td>
<td>General Surgery</td>
</tr>
<tr>
<td>George Washington University Medical Center, Washington DC</td>
<td>GS Resident</td>
<td>2008-2013</td>
<td>General Surgery</td>
</tr>
<tr>
<td>George Washington University Medical Center, Washington DC</td>
<td>Research Fellow</td>
<td>2010-2011</td>
<td>General Surgery</td>
</tr>
<tr>
<td>The Johns Hopkins University School of Medicine, MD</td>
<td>Bariatric Fellow</td>
<td>2005-2006</td>
<td>Bariatric Surgery</td>
</tr>
</tbody>
</table>

A. Personal Statement
Surgery demands more than any field in medicine as patients commit their bodies wholeheartedly with unwavering trust to their respective surgeon. This trust is based on honesty, and trust. More importantly, an outstanding surgeon must possess the skills needed to provide the best surgical care available.

The choice to become a surgeon was simple. I found nothing but excitement and extreme happiness when I was called as a medical student to assist in a surgical procedure. Fortunately this satisfaction for surgery has continued throughout residency and fellowship. During my training, I am honored to say that my peers and Attending surgeons have been pleased with my dedication, work ethic, interpersonal skills, and surgical technique.

During residency and fellowship, I have been involved in research including basic science, outcomes and education. During training I discovered that there is a great deal of satisfaction in working on education, and in recent months I have seen that research on education and training is fascinating. This experience has only bolstered my work ethic and complemented my clinical experience. Research in education has made me realize that I would like to continue a career in academic surgery. I am looking to further develop my role as an educator and become a mentor for the next generation as well as be involved in the formation of future outstanding minimally invasive surgeons.

B. Positions and Honors
Professional Positions
2013-present  Assistant of Surgery, Johns Hopkins University School of Medicine, Department of Surgery

Other Experience and Professional Memberships:
2009-present  American College of Surgeons (ACS)
2013-present  Society of American Gastrointestinal Endoscopic Surgeons (SAGES)
2013-present  American Society of Metabolic and Bariatric Surgeons (ASMBS)
2013-present  Associate Fellow of the American College of Surgeons (ACS)

Awards and Honors:
2012  Outstanding Resident Teacher Award, George Washington University Medical Center
2013  Outstanding Surgical Resident Award, George Washington University Medical Center

C. Peer-Reviewed Publications
Most relevant to proposed research

Other publications
PARTICIPATION IN SAGES

As a member of SAGES since 2005, Dr. Steele has been active in promoting and recruiting new members to the society, including Johns Hopkins surgical residents, Ob/Gyn residents, and medical students. She has also been an active member on the Membership Committee since 2007. She has authored and presented multiple abstracts and video presentations at the SAGES conferences. She is also published in the SAGES official journal *Surgical Endoscopy*.

Dr. Moran-Atkin is a member of SAGES as of 2013, Dr. Moran-Atkin has authored and presented abstracts at the SAGES conferences. He is also published in the SAGES official journal Surgical Endoscopy.
Appendix A

**TABLE 1.** Attending Global Rating Scale

<table>
<thead>
<tr>
<th>GRS</th>
<th>NO WARM UP</th>
<th>WARM UP</th>
<th>T-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Reznick</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3.87</td>
<td>0.67</td>
<td>4.14</td>
</tr>
<tr>
<td>2</td>
<td>3.45</td>
<td>0.78</td>
<td>3.62</td>
</tr>
<tr>
<td>3</td>
<td>3.29</td>
<td>0.62</td>
<td>3.75</td>
</tr>
<tr>
<td>4</td>
<td>3.5</td>
<td>0.67</td>
<td>3.75</td>
</tr>
<tr>
<td>5</td>
<td>3.62</td>
<td>0.82</td>
<td>3.57</td>
</tr>
<tr>
<td>6</td>
<td>3.66</td>
<td>0.88</td>
<td>3.75</td>
</tr>
<tr>
<td>Vassiliou</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3.25</td>
<td>1.05</td>
<td>3.75</td>
</tr>
<tr>
<td>2</td>
<td>2.95</td>
<td>0.91</td>
<td>3.71</td>
</tr>
<tr>
<td>3</td>
<td>3.12</td>
<td>0.80</td>
<td>3.5</td>
</tr>
<tr>
<td>4</td>
<td>3.54</td>
<td>0.78</td>
<td>3.75</td>
</tr>
<tr>
<td>5</td>
<td>3.24</td>
<td>0.86</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Table 1: Reznick global rating score (GSR) evaluates: 1.- Respect for Tissue, 2.- Time and Motion, 3.- Instrument Handling, 4.- Knowledge of Instruments, 5.- Use of Assistants, 6.- Knowledge of Specific Procedure. Vassiliou GSR evaluates: 1.- Depth Perception 2.- Bimanual Dexterity, 3.- Efficiency of Movements, 4.- Tissue Handling, 5.- Autonomy.

There is an evident improvement in the warm-up group and a statistical significant improvement on instrument handling (p=0.03) and bimanual dexterity (p=0.01).

**TABLE 2.** Resident Global Rating Scale

<table>
<thead>
<tr>
<th>GRS</th>
<th>NO WARM UP</th>
<th>WARM UP</th>
<th>T-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Reznick</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3.50</td>
<td>0.90</td>
<td>3.80</td>
</tr>
<tr>
<td>2</td>
<td>3.25</td>
<td>0.75</td>
<td>3.20</td>
</tr>
<tr>
<td>3</td>
<td>3.66</td>
<td>0.88</td>
<td>3.30</td>
</tr>
<tr>
<td>4</td>
<td>3.66</td>
<td>0.88</td>
<td>3.80</td>
</tr>
<tr>
<td>5</td>
<td>3.33</td>
<td>0.88</td>
<td>3.60</td>
</tr>
<tr>
<td>6</td>
<td>3.50</td>
<td>1.00</td>
<td>3.60</td>
</tr>
<tr>
<td>Vassiliou</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3.50</td>
<td>0.90</td>
<td>3.40</td>
</tr>
<tr>
<td>2</td>
<td>3.16</td>
<td>0.71</td>
<td>3.30</td>
</tr>
<tr>
<td>3</td>
<td>3.33</td>
<td>0.77</td>
<td>3.30</td>
</tr>
<tr>
<td>4</td>
<td>3.41</td>
<td>0.90</td>
<td>3.60</td>
</tr>
<tr>
<td>5</td>
<td>3.33</td>
<td>0.88</td>
<td>3.30</td>
</tr>
</tbody>
</table>

Table 2: Reznick global rating score (GSR) evaluates: 1.- Respect for Tissue, 2.- Time and Motion, 3.- Instrument and Handling, 4.- Knowledge of Instruments, 5.- Use of Assistants, 6.- Knowledge of Specific Procedure. Vassiliou GSR evaluates: 1.- Depth Perception 2.- Bimanual Dexterity, 3.- Efficiency of Movements, 4.- Tissue Handling, 5.- Autonomy.

No Statistical differences were perceived by residents in their self-assessment of their performance.
GLOBAL RATING SCALE OF OPERATIVE PERFORMANCE (To be completed by Trainee and Attending)
Please circle the number corresponding to the candidate’s performance in each category, irrespective of training level.

<table>
<thead>
<tr>
<th>Respect for Tissue:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequently used unnecessary force on tissue or caused damage by inappropriate use of instruments</td>
<td>Careful handling of tissue but occasionally caused inadvertent damage</td>
<td>Consistently handled tissues appropriately with minimal damage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time and Motion:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Many unnecessary moves</td>
<td>Efficient time/motion</td>
<td>Clear economy of movement but some unnecessary moves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>movement</td>
<td></td>
<td>and maximum efficiency</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instrument Handling:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeatedly makes tentative or awkward moves with instruments by inappropriate use of instruments</td>
<td>Competent use of instruments but occasionally appeared stiff or awkward</td>
<td>Fluid moves with and no awkwardness</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge of Instruments:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequently stopped operating course of and seemed unsure of the next move</td>
<td>Demonstrated some forward planning with reasonable progression of procedure</td>
<td>Obviously planned operation with from one move to the next</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>effortless flow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use of Assistants:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistently placed assistants assistants poorly or failed to use assistants at all times</td>
<td>Appropriate use of assistants most of the time</td>
<td>Strategically used to the best advantage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge of Specific Procedure:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

Page 18 of 24
<table>
<thead>
<tr>
<th>Deficient knowledge. Needed</th>
<th>Know all important steps of operation</th>
<th>Demonstrated familiarity with all aspects of operation</th>
</tr>
</thead>
</table>

**OVERALL ON THIS TASK, SHOULD THE CANDIDATE:**

**FAIL**

**PASS**

Reznick et al.
# MODIFIED GLOBAL RATING SCALE OF LSC OPERATIVE PERFORMANCE

To be completed by Trainee and Attending.

Please circle the number corresponding to the candidate’s performance in each category, irrespective of training level.

## Depth Perception:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Constantly overshoots target, instruments wide swings, slow to correct
- Some overshooting or missing of target, but quick to correct in the correct plane
- Accurately directs

## Bimanual Dexterity:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Uses only one hand, ignores hands in a nondominant hand, poor manner to coordination between hands
- Uses both hands, but does not optimize interaction between hands
- Expertly uses both hands in a complimentary manner to provide optimal exposure

## Efficiency:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Uncertain, inefficient efforts; and safe many tentative movements; focus on task constantly changing focus or way persisting without progress
- Slow, but planned movements are reasonably organized until it is better performed by
- Confident, efficient conduct, maintains

## Tissue Handling:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Rough movements, tears tissue, applies
- Handles tissues reasonably well, minor trauma to adjacent tissue
- Handles tissue well, appropriate traction, (ie, occasional unnecessary bleeding injury to
- Applies
- Negligible
- Grasper control, grasper frequently
- Grasper control, grasper frequently
- Adjacent structures
- Injury to
- Slips or slipping of the grasper)
Autonomy:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to complete entire task, even with verbal guidance prompting</td>
<td>Able to complete task safely with moderate guidance</td>
<td>Able to complete task independently without prompting</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please draw an “X” on the line below to indicate the trainee’s overall level of performance on this operation:

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Worst Performance</td>
<td></td>
<td></td>
<td></td>
<td>Best Performance</td>
</tr>
</tbody>
</table>

Appendix C

Trainee Number: Date of Surgery: Evaluator’s Name: Surgery Type ID:

MODIFIED GLOBAL RATING SCALE OF LSC OPERATIVE PERFORMANCE 2
To be completed by Trainee and Attending.
Please circle the number corresponding to the candidate’s performance in each category, irrespective of training level.

Respect for tissue:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tissue consistently handled unnecessarily force</td>
<td>Careful handling of tissue but occasionally inadvertent damage</td>
<td>Frequently used on tissue or damage caused inappropriate use of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>appropriately with minimal damage</td>
<td>by instruments</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Precision of operative technique:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluent, secure, and correct technique in all stages of the operative procedure</td>
<td>Careful technique with occasional errors</td>
<td>Imprecise, wrong approaching</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Economy of movement:

| 1 | 2 | 3 | 4 | 5 |
Tissue consistently handled
unnecessary force
appropriately with minimal
damage
instruments

Careful handling of tissue
but occasional inadvertent
damage

Frequently used
on tissue or damage caused by
inappropriate use of

<table>
<thead>
<tr>
<th>Confidence of movements:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

Tissue consistently handled
unnecessary force
appropriately with minimal
damage

Careful handling of tissue
but occasional inadvertent
damage

Frequently used
on tissue or damage caused by
inappropriate use of instruments

Compared to the average level of difficulty for your operations, would you say this operation was?

☐ 0  Much more difficult than my average operation
☐ 1  Somewhat more difficult than my average operation
☐ 2  About the same as my average operation
☐ 3  Somewhat easier than my average operation
☐ 4  Much easier than my average operation
☐  Not observed

Name of Procedure:

Kundhal and Grantcharov.
### Task-Specific Checklist/Laparoscopic Cholecystectomy

To be completed by evaluator only

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Done (1 point)</th>
<th>Not Done (0 points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Uses cautery only when all conducting areas are in the field of view</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Has good control of the instrument, minimizes recoil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Grasps gallbladder near clips to begin dissection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Readjusts tension on gallbladder to optimize exposure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Avoids dissecting into liver causing undue bleeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Avoids perforation of the gallbladder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Avoids spillage of gallstones</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Maximizes useful dissection in 1 area before changing approach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Performs dissection in the appropriate plane the majority of the time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Obviates the need for surgeon takeover</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total**  
/10
Appendix F

Trainee Number: Date of Surgery: 
To be completed by Trainee Only Surgery Type ID:

Did you complete your required laparoscopic trainer practice (10 repetitions for each exercise) before the surgical rotation?

YES NO

What is your total practice time on these laparoscopic trainers?

__________________ Min

If you applicable, did you complete the preoperative warm-up exercise?

N/A YES NO

During this rotation, have you used other laparoscopic simulators, besides the one listed above?

YES NO

If so, which laparoscopic simulators did you use and how long did you practice?

FLS: _________Min Virtual Reality: _________Min
LTS: _________Min Suturing Sponge: _________Min
Other (Name):__________, _________Min

How many hours have you practiced in the last 24 hours?

__________________ Min

How many laparoscopic procedures have you performed up to this case:

________________________ Procedures

How many of this specific procedure have you performed up to this case:

________________________ Procedures