Laparoscopic Suturing –
The “Vertical Zone” (Simulation Lab)

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AAGL
Advancing Minimally Invasive Gynecology Worldwide
Professional Education Information

Target Audience
Educational activities are developed to meet the needs of surgical gynecologists in practice and in training, as well as, other allied healthcare professionals in the field of gynecology.

Accreditation
AAGL is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The AAGL designates this live activity for a maximum of 3.75 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

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As a provider accredited by the Accreditation Council for Continuing Medical Education, AAGL must ensure balance, independence, and objectivity in all CME activities to promote improvements in health care and not proprietary interests of a commercial interest. The provider controls all decisions related to identification of CME needs, determination of educational objectives, selection and presentation of content, selection of all persons and organizations that will be in a position to control the content, selection of educational methods, and evaluation of the activity. Course chairs, planning committee members, presenters, authors, moderators, panel members, and others in a position to control the content of this activity are required to disclose relevant financial relationships with commercial interests related to the subject matter of this educational activity. Learners are able to assess the potential for commercial bias in information when complete disclosure, resolution of conflicts of interest, and acknowledgment of commercial support are provided prior to the activity. Informed learners are the final safeguards in assuring that a CME activity is independent from commercial support. We believe this mechanism contributes to the transparency and accountability of CME.
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PG 101
Laparoscopic Suturing – The “Vertical Zone” (Simulation Lab)

Charles H. Koh, Chair
Dobie L. Giles, Co-Chair

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Course Description

Advanced operative laparoscopy makes it mandatory to be proficient in suturing. The progressive algorithm for laparoscopic suturing as described in the “Vertical Zone” has been taught and tested over many years in national and international courses. This course includes a pre-test and post-test followed by instruction in a controlled setting. Previous results have shown that over 80% of the participants who attend this course achieve tying an intracorporeal knot in less than 3 minutes. There is good fidelity, concurrent and face validity with the technique described, as the relative hand positions and movements are immediately transferable from the trainer to the operating room. This course prepares attendees with improved suturing skills and insight into their application during surgery. Algorithms from standing on the right and left side of the patient will be taught, with progression from simple interrupted to continuous and cinch knots.

Course Objectives

At the conclusion of this course, the clinician will be able to: 1) Explain the ergonomics, theory, and rationale for reproducible laparoscopic suturing; 2) apply the skills learned relevant to gynecologic surgery; 3) apply skills acquired to management of bowel, bladder, and ureteral complications by appropriate suture repair; and 4) demonstrate measurable improvement in laparoscopic suturing skills.

Course Outline

8:00 Welcome, Introductions and Course Overview C.H. Koh
8:05 Pre Test (3 minutes)
8:30 Managing Needles, Suture, “Smiley” Knotting C.H. Koh
8:45 LAB I: Drills, Intracorporeal Suturing with “Smiley Needle Technique C.H. Koh
9:45 Questions & Answers
9:55 Break
10:10 Expert Knotting, Continuous Suturing and Cinch Knot
Applications in Surgery including Managing Complications by Suturing C.H. Koh
10:30 LAB II: Expert Knotting, Continuous and Cinch All Faculty
11:30 Post Test: Intracorporeal Knot Tying (3 minutes)
11:50  Questions & Answers  All Faculty
12:00  Course Evaluation
PLANNER DISCLOSURE
The following members of AAGL have been involved in the educational planning of this workshop and have no conflict of interest to disclose (in alphabetical order by last name).
Art Arellano, Professional Education Manager, AAGL*
Viviane F. Connor
Consultant: Conceptus Incorporated
Frank D. Loffer, Executive Vice President/Medical Director, AAGL*
Linda Michels, Executive Director, AAGL*
Jonathan Solnik
Other: Lecturer - Olympus, Lecturer - Karl Storz Endoscopy-America

SCIENTIFIC PROGRAM COMMITTEE
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Other: Royalties - CooperSurgical
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Grants/Research Support: Elsevier
Consultant: Bayer Healthcare Corp., Conceptus Incorporated, Ferring Pharmaceuticals
Speaker’s Bureau: Bayer Healthcare Corp., Conceptus Incorporated, Ferring Pharm
Keith Isaacson
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Other: Honorarium - Ethicon Endo-Surgery
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Consultant: Covidien, CareFusion, TransEnterix
Stock Shareholder: TransEnterix
Speaker’s Bureau: Covidien, Abbott Laboratories
Other: Proctor - Intuitve Surgical

FACULTY DISCLOSURE
The following have agreed to provide verbal disclosure of their relationships prior to their presentations. They have also agreed to support their presentations and clinical recommendations with the “best available evidence” from medical literature (in alphabetical order by last name).
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Other: Royalty - CooperSurgical, Royalty - Karl Storz Endoscopy-America
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Consultant: Coloplast, LiNA Medical, Caldera Medical
Other: Proctor - Intuitive Surgical
Sawsan As-Sanie*

Asterisk (*) denotes no financial relationships to disclose.
Managing sutures, needles, Smiley knotting
CHARLES KOH M.D.

Disclosure
• Speaker's Bureau: CooperSurgical, Karl Storz Endoscopy-America
• Other: Royalty: CooperSurgical, Karl Storz Endoscopy-America

Needles
• Curved, ski, straight
• Size
• Strength

Straight needle suturing
- Two dimensional
- Use to effect needle fulcrum driving
- Side to side suturing movement only, "horizontal zone"
- Central ports

Curved needle suturing
- Two dimensional in sagittal plane
- Rotational movement of needleholder like laparotomy
Preferred Needles and sutures

- CT-1 0, 2/0 suture
  - Hysterectomy cuff closure
  - Myomectomy
  - Sacrocolpopexy
  - Burch
- SH – 3/0 suture
  - Myomectomy
  - Cystotomy repair
  - Cystectomy repair
- RB-1 4/0; 5/0; 6/0 suture
  - Serosal Repair
- BV-175-6 – 7/0; 8/0 suture
  - Tubal reanastomosis
  - Vascular repair
  - Ureteroureterostomy

Preferred Suture

- Ethibond 0, 2/0 on CT1
  - Burch
  - Sacrocolpopexy
- Monocryl 3/0, 4/0, 5/0
  - Cystotomy repair, Ureteral repair/anastomosis
- Prolene
  - Tubal reanastomosis 8/0
  - Vascular repair 7/0
- PDS
  - All other indications
  - “The Work Horse”
- Colored Vicryl 2/0, 3/0
  - As alternative to monocryl, PDS

Suture

- Properties related to clinical goal
- Ease of tying
- Memory – least in braided, most (worst) in monofilament
- For continuous suturing, better to use monofilament like PDS
- For cinching – all coated or monofilament suture usable

Ports

- Size
  - 3mm
  - 5mm
  - 10-12mm
- Caps
  - Trivalve - allows use of 3 & 5mm instruments
  - Rubber universal adaptor – 5 & 10mm instruments
  - Flip top & rotating adaptors not suitable for suturing
- Clear
  - Easier to find needle
**Port Placement**

<table>
<thead>
<tr>
<th>Pro</th>
<th>Con</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suprapubic</td>
<td>Poor ergonomics</td>
</tr>
<tr>
<td>Good access</td>
<td>Poor access posterior pelvis</td>
</tr>
<tr>
<td>Space of Retzius</td>
<td>Operating toward scope</td>
</tr>
<tr>
<td>Contralateral</td>
<td>Good angle to pelvis</td>
</tr>
<tr>
<td>Good distance between</td>
<td>Poor ergonomics</td>
</tr>
<tr>
<td>instruments for tying</td>
<td></td>
</tr>
<tr>
<td>Ipsilateral</td>
<td>Ergonomic</td>
</tr>
<tr>
<td>Decreased tremor</td>
<td>Less distance between instruments for tying</td>
</tr>
</tbody>
</table>

**PARAMETERS FOR EFFORTLESS AND EFFECTIVE SUTURING**

- HORIZONTAL NEEDLEHOLDER
- VERTICAL SUTURING IN THE SAGITTAL PLANE

**Horizontal needleholder**

**Knot formation**

<table>
<thead>
<tr>
<th>Pro</th>
<th>Con</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extracorporeal</td>
<td>Easier</td>
</tr>
<tr>
<td>Able to maintain</td>
<td>Excess tissue tension</td>
</tr>
<tr>
<td>knots under tension</td>
<td>Limited beyond interrupted suturing</td>
</tr>
<tr>
<td>Intracorporeal</td>
<td>Versatile</td>
</tr>
<tr>
<td>-continuous,</td>
<td>Technically challenging</td>
</tr>
<tr>
<td>interrupted, cinch</td>
<td>Requires a choreographed approach</td>
</tr>
<tr>
<td>Reduced tissue</td>
<td></td>
</tr>
<tr>
<td>tension</td>
<td></td>
</tr>
<tr>
<td>-Vascular, bowel,</td>
<td></td>
</tr>
<tr>
<td>tube</td>
<td></td>
</tr>
<tr>
<td>Similar to open</td>
<td></td>
</tr>
<tr>
<td>surgery</td>
<td></td>
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</table>

**NEEDLE DRIVING**

Port placement
SUTURING IN THE VERTICAL ZONE

2.1.3 Suturing
Bringing in the Needle

1. The needle holder grasps the suture 2 cm from the needle and introduces the needle via the right lower quadrant 10/15 mm port.
2. The needle should be oriented such that the sharp end is pointing to the left of the patient. This is achieved by gently clamping the needle on the suture to the right side of the patient.

Fig. 1

After ensuring that the point is facing the patient's left, the needle is grasped one third of the way from the tip by the left hand grasper.

Fig. 2

Needle gripping: The needle holder is grasping the suture on the suture with the needle holder positioned on the grasping wheel.

Fig. 3

After the needle is grasped on the grasping wheel, the needle holder releases the needle as it is used for the middle part of the knot. The needle is inserted into the needle holder, which has a reinforced needle holder, and the suture is gripped by the suture holder.

Fig. 4

Fig. 5

The left hand grasper releases the needle when correctly positioned, the needle tip should be between 90° and 120° from the suture shaft.

Fig. 6

The needle is advanced through the tissue. The suture of the needle is in the suture plane or vertical zone.

Fig. 7

The left hand grasper releases the needle holder and the needle is advanced into the wound.

Fig. 8

SMILEY KNOT
This is the address position prior to breaking off. A figure "8" is inserted.

The first deactivation throw is commenced. The tape distortion and non-deactivation effect on the left hand of the needle holder facing the inactive end of the needle. The next step may be taken if this is suitable in position move.
Lecture: Expert Knotting, Continuous Suturing and Cinch Knot. Applications in Surgery including Managing Complications by Suturing

CHARLES KOH M.D.

Disclosure

• Speaker’s Bureau: CooperSurgical, Karl Storz Endoscopy-America
• Other: Royalty: CooperSurgical, Karl Storz Endoscopy-America

ALGORITHM:

the Vertical Zone

EXPERT KNOT

[Images of suturing process]
CONTINUOUS

- start with expert knot
- perform continuous loops and tighten after each
- double back in second layer imbricating the first layer. Smiley tie to tail of expert knot

continuous suturing
CINCH KNOT

cinch - uses

- apposing tissue under tension
  - myomectomy repair, uterosacral suspension,
- ensure adequate tightness
  - uterine artery ligation;
- judging adequate elevation
  - Burch,
- tension relieving stitch
  - ureteral anastomosis,
suturing applications in surgery

- examples of how the suturing techniques learnt in this course is applied in real surgery will be demonstrated with video
CULTURAL AND LINGUISTIC COMPETENCY

Governor Arnold Schwarzenegger signed into law **AB 1195** (eff. 7/1/06) requiring local CME providers, such as the AAGL, to assist in enhancing the cultural and linguistic competency of California’s physicians (researchers and doctors without patient contact are exempt). This mandate follows the federal Civil Rights Act of 1964, Executive Order 13166 (2000) and the Dymally-Alatorre Bilingual Services Act (1973), all of which recognize, as confirmed by the US Census Bureau, that substantial numbers of patients possess limited English proficiency (LEP).

**California Business & Professions Code §2190.1(c)(3)** requires a review and explanation of the laws identified above so as to fulfill AAGL’s obligations pursuant to California law. Additional guidance is provided by the Institute for Medical Quality at [http://www.imq.org](http://www.imq.org).

**Title VI of the Civil Rights Act of 1964** prohibits recipients of federal financial assistance from discriminating against or otherwise excluding individuals on the basis of race, color, or national origin in any of their activities. In 1974, the US Supreme Court recognized LEP individuals as potential victims of national origin discrimination. In all situations, federal agencies are required to assess the number or proportion of LEP individuals in the eligible service population, the frequency with which they come into contact with the program, the importance of the services, and the resources available to the recipient, including the mix of oral and written language services. Additional details may be found in the Department of Justice Policy Guidance Document: Enforcement of Title VI of the Civil Rights Act of 1964 [http://www.usdoj.gov/crt/cor/pubs.htm](http://www.usdoj.gov/crt/cor/pubs.htm).

**Executive Order 13166,”Improving Access to Services for Persons with Limited English Proficiency”,** signed by the President on August 11, 2000 [http://www.usdoj.gov/crt/cor/13166.htm](http://www.usdoj.gov/crt/cor/13166.htm) was the genesis of the Guidance Document mentioned above. The Executive Order requires all federal agencies, including those which provide federal financial assistance, to examine the services they provide, identify any need for services to LEP individuals, and develop and implement a system to provide those services so LEP persons can have meaningful access.

**Dymally-Alatorre Bilingual Services Act** (California Government Code §7290 et seq.) requires every California state agency which either provides information to, or has contact with, the public to provide bilingual interpreters as well as translated materials explaining those services whenever the local agency serves LEP members of a group whose numbers exceed 5% of the general population.

If you add staff to assist with LEP patients, confirm their translation skills, not just their language skills. A 2007 Northern California study from Sutter Health confirmed that being bilingual does not guarantee competence as a medical interpreter. [http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2078538](http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2078538).