Simulation Lab:
Practical Applications for Tissue Re-approximation, Knot Tying and Suturing Technologies

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3-Dmed, CONMED Corporation, CooperSurgical, Covidien, Ethicon US, LLC, Olympus America Inc., Karl Storz Endoscopy-America, Inc., Symmetry Surgical
Target Audience
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SUTR-700
Simulation Lab: Practical Applications for Tissue Re-approximation, Knot Tying and Suturing Technologies

Jin Hee (Jeannie) Kim, Chair
Nash S. Moawad, Co-Chair

Faculty: Krisztina I. Bajzak, Mandi L. Beman, Amy Broach, Lydia Garcia, Susan Khalil, Jessica M.B. Ritch, Kimberly A. Swan, Mireille Truong, Bich-Van T. Tran, Johnny Yi

This course will provide an introduction to basic and advanced laparoscopic suturing techniques in a dry lab setting and is designed for participants wanting to expand their laparoscopic suturing skills. This course will present a variety of techniques for needle loading and tissue re-approximation from different port configurations in laparoscopic box trainers. Techniques and clinical applications for extra-corporeal, intra-corporeal knot tying, and running suturing techniques relevant to vaginal cuff closure, myomectomy, and cystotomy repair will be presented. In addition, various applications of different suture materials and alternative suturing devices and technologies utilized in gynecologic laparoscopy will be reviewed. This course will aim to present the material in a systematic fashion with concrete and focused objectives throughout the session. Faculty will provide an interactive environment to meet the needs of the individual, critical to effective learning. This course is designed for the practical gynecologist to help determine which suturing techniques will work best in his or her surgical practice. This course is designed to help improve suturing skills for immediate clinical application.

Learning Objectives: At the conclusion of this course, the clinician will be able to: 1) Explain how to overcome the obstacles to laparoscopic suturing and knot tying in relation to depth perception and port placement; 2) reproduce efficient techniques for laparoscopic tissue re-approximation, suture management, and running closures; 3) Recognize and perform efficient intra-corporeal and extra-corporeal knot tying, the common mistakes encountered, and how to correct them; and 4) compare and distinguish potential benefits of suturing technologies and devices used in laparoscopy.

Course Outline

7:00 Welcome, Introductions and Course Overview
7:05 Pre-Test (3 minutes)
7:20 Handling Suture and Needle, Intra-Corporeal Knot Tying
7:35 LAB I: Drills, Needle Loading, Intra-Corporeal Knot Tying
8:05 Improve Efficiency and Avoid Errors
8:20 LAB II: Continuous Suturing, Advanced Skills
8:50 Questions & Answers
9:00 Break
9:15 Extra-Corporeal Knot Tying
9:25 LAB III: Extra-Corporeal Knot Tying
9:50 Suture Types and Characteristics; Suturing Devices
10:05 Post-Test
10:20 LAB IV: Troubleshooting, Supra-Pubic Approach, Barbed Suture and Suturing Devices
10:50 Questions & Answers
11:00 Adjourn
Simulation Lab: Practical Applications for Tissue Re-approximation, Knot Tying and Suturing Technologies

Nash S. Moawad, Chair
Jin Hee (Jeannie) Kim, Co-Chair
Faculty: Krisztina I. Bajzak, Mandi L. Beman, Amy Broach, Lydia Garcia, Susan Khalil, Jessica M.B. Ritch, Kimberly A. Swan, Mireille Truong, Bich-Van T. Tran, Johnny Yi

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Course Outline

12:30 Welcome, Introductions and Course Overview N.S. Moawad
12:35 Pre-Test (3 minutes) All Faculty
12:50 Handling Suture and Needle, Intra-Corporeal Knot Tying N.S. Moawad
1:05 LAB I: Drills, Needle Loading, Intra-Corporeal Knot Tying All Faculty
1:35 Improve Efficiency and Avoid Errors N.S. Moawad
1:50 LAB II: Continuous Suturing, Advanced Skills All Faculty
2:20 Questions & Answers All Faculty
2:30 Break
2:45 Extra-Corporeal Knot Tying J.H. Kim
2:55 LAB III: Extra-Corporeal Knot Tying All Faculty
3:20 Suture Types and Characteristics; Suturing Devices J.H. Kim
3:35 Post-Test All Faculty
3:50 LAB IV: Troubleshooting, Supra-Pubic Approach, Barbed Suture and Suturing Devices All Faculty
4:20 Questions & Answers All Faculty
4:30 Adjourn
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).
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Frank D. Loffer, Medical Director, AAGL*
Linda Michels, Executive Director, AAGL*
M. Jonathon Solnik*
Johnny Yi*

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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: Stock Ownership: Johnson & Johnson
Mireille Truong*
Bich-Van T. Tran*
Johnny Yi*

Asterisk (*) denotes no financial relationships to disclose.
Laparoscopic suturing

SUTR-701
Handling Suture and Needle, Intra-Corporeal Knot Tying

Nash S. Moawad, MD, MS
University of Florida MIGS

Disclosure

I have no financial relationships to disclose.

Objectives

1) Explain how to overcome the obstacles to laparoscopic suturing and knot tying in relation to depth perception and port placement
2) Recognize the benefits and applications of laparoscopic suturing
3) Reproduce efficient techniques for laparoscopic tissue re-approximation and suture management
4) Recognize and perform efficient ipsilateral intra-corporeal knot tying

Why suture laparoscopically?

- Enabler - allows you to do more
  - e.g., TLH, Myomectomy, Sacro-collpexy, USLS, etc.
- Decrease complications
  - e.g., bleeding, vaginal cuff dehiscence, granulation tissue, dyspareunia, uterine rupture, avoid thermal damage, etc.
- Repair complications - decrease need for conversion.
  - Bowel, bladder and ureter repair.
- Refine your surgery - e.g., ovarian cystectomy, oophoropexy, bowel suspension, ventrosuspension, etc.

Laparoscopic Suturing Applications

- Video examples:
  - Myomectomy closure
  - Vaginal cuff
  - Ovarian cystectomy closure
  - Ovarian suspension
  - Bowel suspension
  - Ovarian Transposition
  - Bladder repair
  - Bowel over sewing
  - Suturing the uterine vessels
  - SCP
  - Ventrosuspension

Myomectomy
Hysterection

Bladder excision

Ventrosuspension

Ovarian Transposition

Box Trainer – Dry lab

- Importance of practice
- Warm-up
- Retention with continued practice
- Simple - Cardboard box, webcam

Schools

- Ipsilateral approach
- Supra-pubic approach
- Contra-lateral approach

- Intra-corporeal knot-tying
- Extra-corporeal knot-tying
Instruments

- Needle Holder
- Needle Grasper
- +/- Knot Pusher (Slider)
- Scissors

Intra-corporeal

- Ipsilateral approach
  - Where do you stand?
  - Ideal for suturing
  - Limitations?

Fundamentals

- Strategy: Port setup
  - Trocars (12 mm or backload through 5 or 3 mm trocar)

Fundamentals

- Needle introduction (properly load outside)
- Needle handling (Swivel)
- Needle loading
- Throwing a stitch
- Knot-tying

Anatomy of the needle

Needle Introduction
**Needle Handling (Swivel)**

**Key**

**Needle Loading**

**PERFECT IT!!**

**Fundamentals**

- Pierce perpendicular to the tissue
- Utilize your “other” hand
- Stabilize target tissue
- Don’t force it
- Follow the curve of the needle (wrist rotation)
- Use the tip of the needle holder
- 1/3 + 2/3
- Instrument shaft perpendicular to needle plain

**Video on Smiley suturing and knot-tying, intracorporeal - dry lab**
• Loading is everything!
• Perfect it!

References


LAB I

• Continuous loop video of intra-corporeal knot-tying during LAB I.
OBJECTIVES

1) Recognize and perform efficient supra-pubic intra-corporeal knot tying

2) Recognize techniques and applications of advanced laparoscopic suturing

3) Recognize common errors in laparoscopic suturing and how to overcome them

SUPRA-PUBIC SUTURING

- Versatile for all pelvic procedures
- Ergonomics.

SUPRA-PUBIC SUTURING

- Needle loading & suturing:
  - Drape
  - Use the “other” hand
  - Pierce perpendicular
  - Follow the curve of the needle

I have no financial relationships to disclose.
**EXPERT KNOT TYING**
- Required skill for continuous running sutures
- Efficiency: can use same long suture for multiple interrupted sutures.
- Decrease needle-in & -out exchanges
- Cost
- Safety (number of needles to account for)

**CONTINUOUS SUTURING**
- 2-layer closure - Efficient closure of vaginal cuff, hysterotomy, cystotomy & enterotomy repair.
- Suture length is critical
- Assistant role

**CINCH KNOT**
- For large bites on tension e.g. Myomectomy
- Hemostatic e.g. Uterine artery ligation
- Lift! e.g. Burch, USLS, Ventrosuspension
Troubleshooting

- Poor outside load → Point A loading → Too far, too close (use 1 inch)
- 2-D view → zoom in → 3-D
- Air knot → too far away
- Suture break → too far away
- Poor loading angle → Poor control
- Forcing the tissue → Needle swinging → Efficiency
- Pulling on the free end → Elongation
- Premature Wrist rotation → Skimming through the tissues → Cuff dehiscence!!

- Short loop
- Suture too long → Use Expert
- Moving 2 hands together → moving target.
- Free end → Too long or too short
- Bow tie
- Unnecessary hand motion → Stay close to your target (the free end).
- Redeem yourself → When things get out of control → back to the basics; A, B, C

- Anticipate potential problems
- Avoid errors
- Maximize efficiency
- Maximize safety
- Teach effectively

References

- Parker et al. Risk Factors for Uterine Rupture after Laparoscopic Myomectomy. JMIG, Vol 17, No 5, September/October 2010
WHAT’S NEXT?

- Lab: Practice Expert, continuous and Cinch.
- Defer suprapubic practice to the last lab.
Extra-corporeal Suturing

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Division of Gynecologic Specialized Surgery
Department of Obstetrics and Gynecology
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Disclosures
I have no financial relationships to
disclose.

Objectives
- Recognize the benefits and applications of extra-corporeal suturing
- Reproduce efficient techniques of extra-corporeal suturing using the closed and open knot pusher
- Learn to maximize efficiency with the multi-knot technique
- Discuss extracorporeal suture assist devices including endoloop and endoknot

Benefits of Extracorporeal Suturing
- An alternative to intracorporeal suturing
- May be easier to perform and teach
- More feasible and reproducible
- Less need for needle management
- Actual knot is made outside the body
- Depending on operator, may be a faster method

Downside of extracorporeal suturing
- Requires long sutures
- There is still a learning curve

Knot pushers
- Closed
- Open

Steps for CLOSED knot pusher
- Bring out needle through SAME trocar
- Perform surgical knot; surgeon’s knot
- Feed exit strand through knot pusher and place a hemostat at tip
- Use knot pusher to drive knot ‘past point’
- Perform one handed knot in opposite direction and drive knot down

Steps for OPEN knot pusher
- Bring out needle through SAME trocar
- Place hemostat on one end
- Perform surgical knot
- Place open knot pusher next to the knot on the exit strand and place a hemostat at tip
- Use knot pusher to drive knot ‘past point’
- Perform one handed knot in opposite direction and drive knot down

Tips and tricks for the ACTIVE hand
- Untwist suture by twirling knot pusher around suture
- The tip of the knot pusher should be 1cm away from the knot on the exit strand
- NOT on the knot
- Knot pusher at an angle to the suture
- NEVER parallel
- Push knot down ‘past point’
- Into the posterior cul-de-sac

Tips and tricks for the PASSIVE hand
- Hold two ends of suture separately in the same hand
- Alternating equal tension on each end of suture as you push down
  - Index and middle finger
- Knot pusher at an angle to the suture
  - NEVER parallel
- Push knot down ‘past point’
  - Into the posterior cul-de-sac

The Actual Knot
- Can start with surgeon’s knot
  - Slightly harder to push down knot but can be faster
- Then one-handed tie with non-dominant hand
- And alternate
- Remember to maintain tension on suture but don’t strangulate
Multi Knot Technique Video

Endoloop
- Ethicon
- Single use
- 0 18” Vicryl and PDS

Steps for Endoloop
- Introduce into trocar
- Break end at assigned area
- Introduce loop around tissue to be removed; assistant pulls tissue thru loop
- Cinch loop tight by pulling end of suture and pushing introducer down
- If needed, place second endoloop distal to the first knot

Endoknot
- Ethicon
- 42” Vicryl, PDS, Ethibond

- Introduce endoknot, suture, bring out through same trocar
- Snap off top of plastic endoknot
- Perform extracorporeal knot tying
- Use built-in knot pusher to drive knot home

Thank You
Questions?
Suture Types and Characteristics; Suturing Devices

Jin Hee (Jeannie) Kim, MD
Assistant Clinical Professor
Division of Gynecologic Specialized Surgery
Department of Obstetrics and Gynecology
Columbia University Medical Center / New York – Presbyterian Hospital

Disclosures
I have no financial relationships to disclose.

Objectives
- Introduce alternative suture material and devices utilized in gynecologic laparoscopic surgery
- Demonstrate utility of these alternatives to facilitate laparoscopic suturing

Laparoscopic suturing
- Technically challenging
- Diminished tactile feedback
- Lack of depth perception
- Tremor amplification
- Limited instrument mobility

Is there a solution?
- Barbed suture
- Automated suturing devices
  - Lapro-Ty
  - Endoloop
  - 3-D vision
  - Robot

Barbed Suture
- Quill™
  - FDA approved 2004
  - Initially used by Plastics
- V Loc™
  - FDA approved 2009
- Stratafix™
  - FDA approved 2012

Greenberg et al. 2008. JMIG
**Quill™**

- Angiotech
- Traditionally bidirectional; unidirectional
- Helical pattern
- Anchors every 1mm

**Quill™**

- Bidirectional
  - Monoderm
  - PDO
  - Nylon
  - Polypropylene
  - 3.5, 7, 10, 14, 24, 30, 40, 45cm
  - Suture size is determined by its OUTER diameter
  - When using barbed suture, upsize by one size
  - 3-0 traditional suture = 2-0 barbed suture

**Quill™ Suturing Video: Myomectomy Closure**

**V Loc™ 90 and 180**

- Covidien
- Unidirectional barbed suture
- 20 barbs/cm
- Spiral configuration of barbs

- V-Loc™ 90 4-0, 18"
- Single angle cut
- 360 anchoring barbs

- Quill™ 3-0, 18"
- Dual angle cut
- 900 anchoring barbs

Advantages of Barbed Suture

- No knot tying required
- Equally distributed tension throughout suture
- Enables continuous suturing without backsliding
- Provides hemostatic closure of myometrium during myomectomy

Barbed suture associated with significantly shorter suturing times for laparoscopic myomectomy compared to traditional sutures.

Alessandri et al. 2010. JMIG
Einarsson et al. 2011. JMIG

V-Loc™ vs continuous suture in lsc myomectomy

- N = 19
- Solitary intramural fibroids 3-5 cm

<table>
<thead>
<tr>
<th></th>
<th>V-loc 90</th>
<th>Conventional</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBL</td>
<td>113.7 ± 74.1 ml</td>
<td>168.6 ± 75.1 ml</td>
<td>0.0076</td>
</tr>
<tr>
<td>Operative time (total)</td>
<td>51 ± 18.1 min</td>
<td>58 ± 18.7 min</td>
<td>0.0616</td>
</tr>
<tr>
<td>Suturing time</td>
<td>9.9 ± 4.3 min</td>
<td>15.8 ± 4.7 min</td>
<td>0.0004</td>
</tr>
</tbody>
</table>

Angioli et al. 2012. JGO

V-loc 90 Conventional P
EBL 113.7 ± 74.1 ml 168.6 ± 75.1 ml 0.0076
Operative time (total) 51 ± 18.1 min 58 ± 18.7 min 0.0616
Suturing time 9.9 ± 4.3 min 15.8 ± 4.7 min 0.0004

Advantages of Barbed Suture

Does barbed suture reduce the risk of vaginal cuff dehiscence?

- Retrospective study N = 387, Jan 2007- Jan 2010
- 149 Barbed suture vs. 229 with Vicryl or Endostitch
- Mean time dehiscence 45 days
- Two layer closure 0-PDO Quill 14 x 14 cm

Siedoff et al. 2011. JMIG

<table>
<thead>
<tr>
<th>No. Dehiscence</th>
<th>Length of follow-up (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quill (149)</td>
<td>0</td>
</tr>
<tr>
<td>Vicryl or Endostitch or Monofilament suture</td>
<td>10 (4.2%)</td>
</tr>
</tbody>
</table>

Einarsson et al. 2010. JSLS

Downside of Barbed Suture

Does barbed suture increase the risk of adhesion formation?

- Unidirectional barbed suture
  - 13 canine enterotomy model
  - No significant difference in adhesion scores at 21 days
- Bidirectional barbed suture
  - 23 non-pregnant ewes
  - Necropsy at 3 months
  - 12 horns (52.2%) with barbed suture-adhesions
  - 10 horns (43.5%) with Vicryl closure-adhesions


Downside of Barbed Suture

“His” pareunia

- Limited data
- 117 TLH, 82 completed questionnaires
- 5 reported persistent dyspareunia (6.8%) at 6 months post-op
- 6 reported “his”pareunia (8.2%)

Enarsson et al. 2010. JLSL
Downside of Barbed Suture

Case report
- Bowel obstruction after TLH
- 0-PDO 14 x 14 cm Quill with Lapra Ty
- Presented POD #30
- On laparoscopy-tail of left end of barbed suture (4cm) found as cause of point of volvulus

Automated Suture Devices

- RD 180™ and TK®
  - LSI Solutions
  - Single use
  - First used for heart valve surgery
- Endostitch™
  - Covidien
  - Single use
- SILSTM stitch
- Endo360°
  - Endo Evolution
  - Reusable

RD 180™ and TK® Video

- SILSTM stitch Articulating Suturing Device
- Intracorporeal knot tying 18 cm
- Extracorporeal knot tying 120 cm

Endo Evolution

“Titanium Knot”
- Trims suture
- Secures suture
- Permanent clips

“Running Device”
- 5 or 10 mm
- Straight or angled shaft

V-Loc™ Suturing Video: Vaginal Cuff Closure

RD 180™ and TK®

- 10 mm
- Shuttle needle
- Option articulating tip
  - SILSTM stitch Articulating Suturing Device
- Intracorporeal knot tying 18 cm
- Extracorporeal knot tying 120 cm

V-Loc™ Suturing Video: Vaginal Cuff Closure

- Donnellan et al. 2011, JMIG

V-Loc™ Suturing Video: Vaginal Cuff Closure

- V-Loc™ Suturing Video: Vaginal Cuff Closure
Benefits of the Endostitch™

- Needle is preloaded
- Needle is protected from surrounding tissue
- No needle management issues with loading or unloading
- Simplifies suturing and knot tying

Endostitch™

Comparative study of pyeloplasties and bladder neck suspension

- Automated intracorporeal suturing versus conventional suturing

<table>
<thead>
<tr>
<th></th>
<th>Endostitch</th>
<th>Conventional</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stitch placement</td>
<td>43 ± 27 sec</td>
<td>151 ± 24 sec</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Knot tying</td>
<td>74 ± 60 sec</td>
<td>197 ± 70 sec</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Adams et al. 1995. Urology

Endostitch™ with Barbed Suture

- 0, 2-0, 3-0 V-Loc
- 10, 15, 20 cm lengths

Endostitch™ Video

Endo360°

- Reusable
- Curved needle
- Articulating
- Roticulating
- 3 lengths
  - Bariatric/single incision
  - Standard
  - Urogyn/natural orifice
- Suturing into a flat plane

Endo 360 Video
## Suture Comparison

<table>
<thead>
<tr>
<th>Suture</th>
<th>Name, Size</th>
<th>Type</th>
<th>Absorption Rate</th>
<th>Tensile Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quill</td>
<td>Polydioxanone</td>
<td>Monofilament</td>
<td>Complete by 180 days</td>
<td>80% at 14 days, 60% at 28 days</td>
</tr>
<tr>
<td>V-Loc</td>
<td>V-Loc™ 90</td>
<td>Monofilament</td>
<td>Complete by 180 days</td>
<td>95% at 14 days, 65% at 21 days</td>
</tr>
<tr>
<td>V-Loc</td>
<td>V-Loc™ 180</td>
<td>Multifilament</td>
<td>Complete by 180 days</td>
<td>80% at 21 days, 75% at 28 days</td>
</tr>
<tr>
<td>RD 180</td>
<td>Monofilament</td>
<td>Multifilament</td>
<td>Complete by 110 days</td>
<td>45% at 21 days, 77% at 21 days</td>
</tr>
<tr>
<td>Endostitch</td>
<td>Polydioxanone</td>
<td>Multifilament</td>
<td>Complete by 110 days</td>
<td>30% at 21 days, 21% at 21 days</td>
</tr>
<tr>
<td>Endo360</td>
<td>Polydioxanone</td>
<td>Multifilament</td>
<td>Complete by 110 days</td>
<td>80% at 28 days, 75% at 21 days</td>
</tr>
</tbody>
</table>

## Cost $$$

<table>
<thead>
<tr>
<th>Suture</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quill</td>
<td>$20-60</td>
</tr>
<tr>
<td>V-Loc</td>
<td>V-Loc 90 $20, V-Loc 180 $23</td>
</tr>
<tr>
<td>RD 180 + TK</td>
<td>RD 180 $175 each, TK Device $150 each, 50 suture $32 each, TK Knot clips $35 per pack of 12</td>
</tr>
<tr>
<td>Endostitch</td>
<td>Device $140-150, Suture $20-28, V-Loc Suture $57</td>
</tr>
</tbody>
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Thank You
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).