RESULTS OF ROBOTIC HOT COURSES

A. Erdem Canda, MD
Yildirim Beyazit University
School of Medicine
Ankara Ataturk Training &
Research Hospital
Department of Urology
Ankara, Turkey

Nicolomaria Buffi, MD
Nicola Fossati, MD
Alessandro Larcher, MD
San Raffaele Turro Hospital
Department of Urology
Milan, Italy
Courses: Aims & Objectives

ESU and the EAU Robotic Urology Section (ERUS) offer a hands-on training (HOT) course:

- Training using simulators
- The main aims of this 90 minutes course are:
  - Improving the participants’ control-skills and hand-eye-coordination
  - Objective benchmarking of console performance and an introduction into standardized surgical steps in robot-assisted procedures
- Each course is limited to the small number of 6 participants, to facilitate an optimal training setting with only 2 participants per faculty
EAU 2014, Stockholm
HOT Robotic Surgery Course
EAU 2014, Stockholm
HOT Robotic Surgery Course
EAU 2014, Stockholm
HOT Robotic Surgery Course
Training modules

dV-Trainer content is developed in collaboration with leading surgeons and educators. More than 60 exercises—relevant to surgeons from any specialty—cover console overview and troubleshooting, basic da Vinci® skills, and more advanced surgical skills such as suturing and knot tying. Tube closure and tube anastomosis exercises provide users the opportunity to develop more challenging, procedure-relevant suturing skills.

Training scenarios help achieve proficiency in these critical areas:

- EndoWrist® manipulation
- Knot tying
- Camera control
- Needle control
- Clutching
- Needle driving
- Vessel dissection
- Suturing
- Energy control
- Fourth arm control
- System settings and controls
Procedure-specific, augmented reality with Maestro AR

Advance clinical decision-making and procedural knowledge

Exclusively available on the dV-Train, Maestro AR answers demand from the robotic community for procedure-specific* simulation. Working at the dV-Train, trainees can now manipulate virtual 3D robotic instruments to interact with anatomical regions within augmented 3D surgical video. The Maestro AR Multi-Specialty package includes Partial Nephrectomy, Hysterectomy, Prostatectomy, and General Surgery. Available now, Partial Nephrectomy uses footage from an actual case performed by Inderbir S. Gill, MD (Keck School of Medicine of USC).

Learning objectives and tasks:
- Identify anatomy
- Anticipate tissue retraction
- Predict regions for dissection
- Refine surgical skills

Watch a preview video and get more information: www.MimicSimulation.com/MaestroAR

Maestro·AR™
Surgeon console overview
- Review basic da Vinci® functionality.
- Cover basic topics such as icons, ergonomics, and settings.

EndoWrist® manipulation
- Develop EndoWrist® dexterity when working with one, two, or three da Vinci® Surgical System instruments.

Camera and clutching
- Improve camera control and learn to use the clutch effectively.
- Train while using different motion-scaling settings.

Energy and dissection
- Learn to properly apply monopolar and bipolar energy.
- Practice dissection and manage bleeding.

Needle control and needle driving
- Develop skill when manipulating needles.
- Learn to effectively hand off and position needles for correct needle driving.

Suturing and knot tying
- Improve suturing and knot tying skills with a variety of scenarios.
- Practice with a range of geometries common to surgery.

Maestro™ AR procedure-specific content
- Advance clinical decision-making and procedural knowledge.
- Refine skills specific to the procedure (Partial Nephrectomy module shown above).

Xperience™ Team Trainer
- Enable the robotic surgeon and first assistant to train together with this optional component for the dV-Trainer.
Featuring data collected from more than 100 experienced surgeons that have each completed 75 or more robotic cases, MScore assessment is based on expert mean and standard deviation data (similar to the FLS™ protocol™) to facilitate credentialing and privileging.

With MScore, you can build your own training protocols from more than 50 exercises and assign different curricula to each user.

Efficient administration and workflow
- Easy to use tools for course creation and management
- Track the learning history for each exercise and metric
- Export data to Excel for further analysis and archiving

Detailed surgical skills assessment
MScore provides comprehensive metrics on the following criteria for exercises performed on the dV-Trainer:
- Time to completion
- Economy of motion
- Instrument collisions
- Number of drops
- Missed targets
- Instruments out of view
- Master workspace range
- Blood loss
- Broken vessels
- Excessive instrument force
- Misapplied energy
- Overall score

Assess surgeons, analyze performance
- Customize scoring to emphasize important curriculum metrics for new users, surgical warm-up, and skills retention
- Establish your own credentialing and privileging program for improved patient care
3 datasets from 3 meetings:

- EAU 2014, ESOU 2014, EMUC 2013
- 102 participants
- 786 exercises
<table>
<thead>
<tr>
<th>Variables</th>
<th>Overall Participants (n=102)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>34 (30, 40)</td>
</tr>
<tr>
<td>Sex</td>
<td>Male 85 (83%)</td>
</tr>
<tr>
<td></td>
<td>Female 17 (17%)</td>
</tr>
<tr>
<td>Degree</td>
<td>Resident 50 (49%)</td>
</tr>
<tr>
<td></td>
<td>Urologist 52 (51%)</td>
</tr>
<tr>
<td>Bedside Assistance Experience</td>
<td>No 49 (48%)</td>
</tr>
<tr>
<td></td>
<td>Yes 53 (52%)</td>
</tr>
<tr>
<td>Bedside Assistance Procedures</td>
<td>20 (10, 50)</td>
</tr>
<tr>
<td>Robotic Surgical Experience</td>
<td>No 84 (82%)</td>
</tr>
<tr>
<td></td>
<td>Yes 18 (18%)</td>
</tr>
<tr>
<td>Robotic Surgical Procedures</td>
<td>3 (2, 12)</td>
</tr>
<tr>
<td>Laparoscopic Procedures</td>
<td>0 29 (28%)</td>
</tr>
<tr>
<td></td>
<td>1 73 (72%)</td>
</tr>
<tr>
<td>Lap. Surgical Procedures</td>
<td>30 (10, 50)</td>
</tr>
<tr>
<td>Meeting</td>
<td>eau 2014 40 (39%)</td>
</tr>
<tr>
<td></td>
<td>esou 2014 32 (31%)</td>
</tr>
<tr>
<td></td>
<td>emuc 2013 30 (29%)</td>
</tr>
</tbody>
</table>

Table 1. Descriptive characteristics of 102 participants.
Table 2. Linear regression analysis predicting Overall Score in 102 participants.

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Coeff.</th>
<th>95% CI</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robot assistant</td>
<td>0.12</td>
<td>-0.33, 0.57</td>
<td>0.6</td>
</tr>
<tr>
<td>Robotic procedures</td>
<td>11.06</td>
<td>6.33, 15.78</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Laparoscopic procedures</td>
<td>-0.11</td>
<td>-0.28, 0.06</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Multivariable analysis was adjusted for participant age, sex, degree (resident vs. urologist), and previous robotic training (no vs. yes).
Overall Score estimation according to age of participants
Overall Population

Graph showing the overall population trend over age (years), with a downward curve indicating a decrease in overall score as age increases.
Overall Score estimation according to bedside assistance experience
Overall Population
Overall Score estimation according to robotic surgical experience
Overall Population
Overall Score estimation according to laparoscopic surgical experience
Overall Population
Conclusions

- Age and robotic surgical experience were the two strongest predictors of Overall Score.
- The younger the age (and/or the higher the robotic surgical experience), the higher the Overall Score.
- Laparoscopic experience and degree (resident vs. urologist), were not significantly associated with the Overall score.
Acknowledgment

- Members of the working group
  Education of ERUS
- MIMIC: Todd Larson, Jan Ostman
- Intuitive Surgical: Christopher Schlosser, Julien Lacaux
Thank You!