

Utilización de simuladores quirúrgicos. Tipos de simuladores. Experiencia y evidencias científicas.

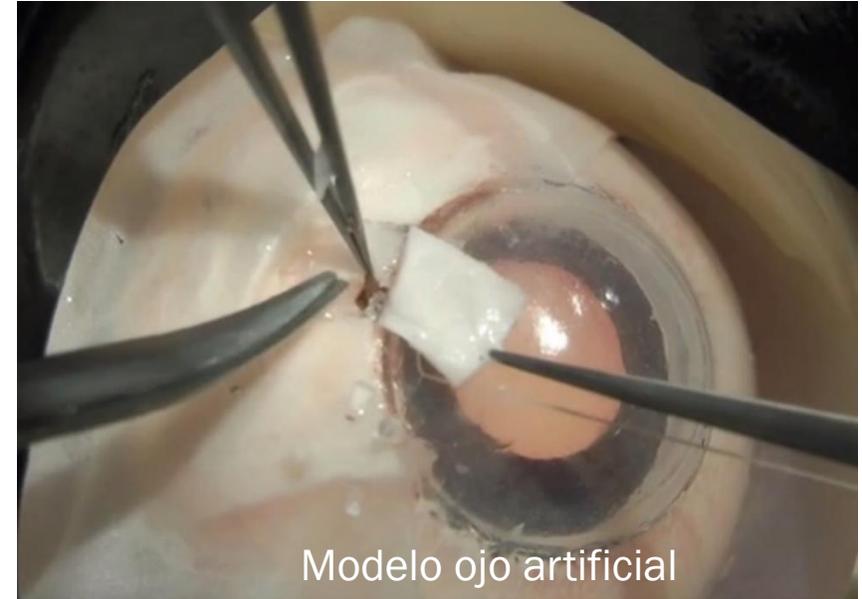
Jesús Barrio Barrio

92 CONGRESO SEO, Málaga 23 de septiembre de 2016



**Clínica
Universidad
de Navarra**

- ▶ Aprendizaje diseñado para el residente
- ▶ Sin riesgo para el paciente
- ▶ Ambiente no estresante
- ▶ Entrenamiento programado personalizado



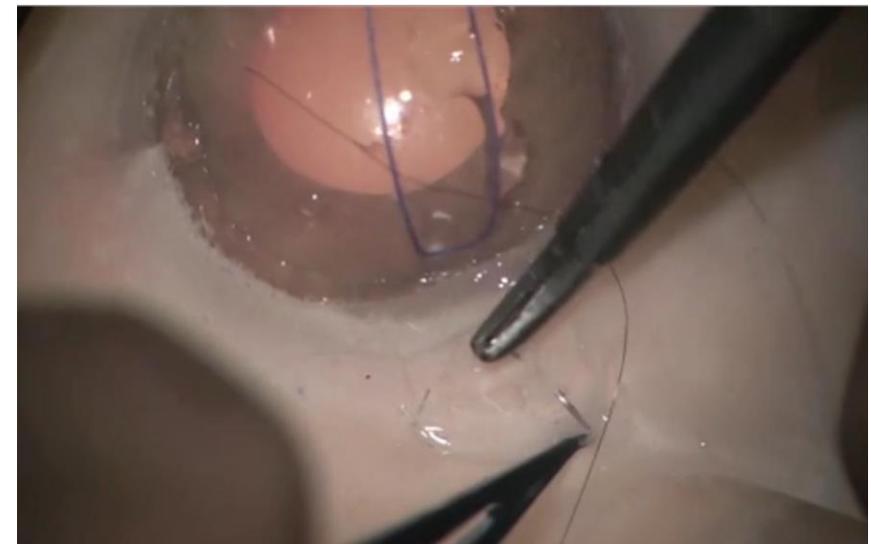
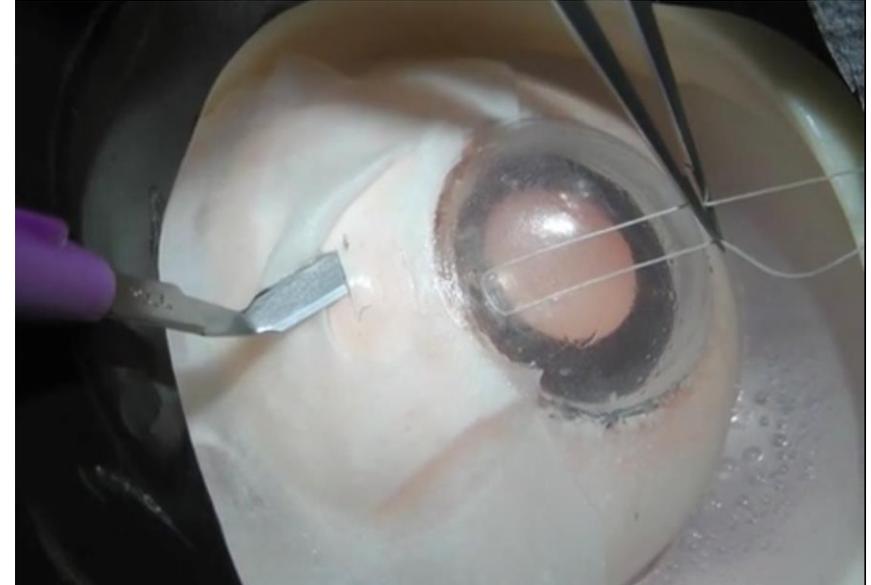
▶ 1. Modelos artificiales:

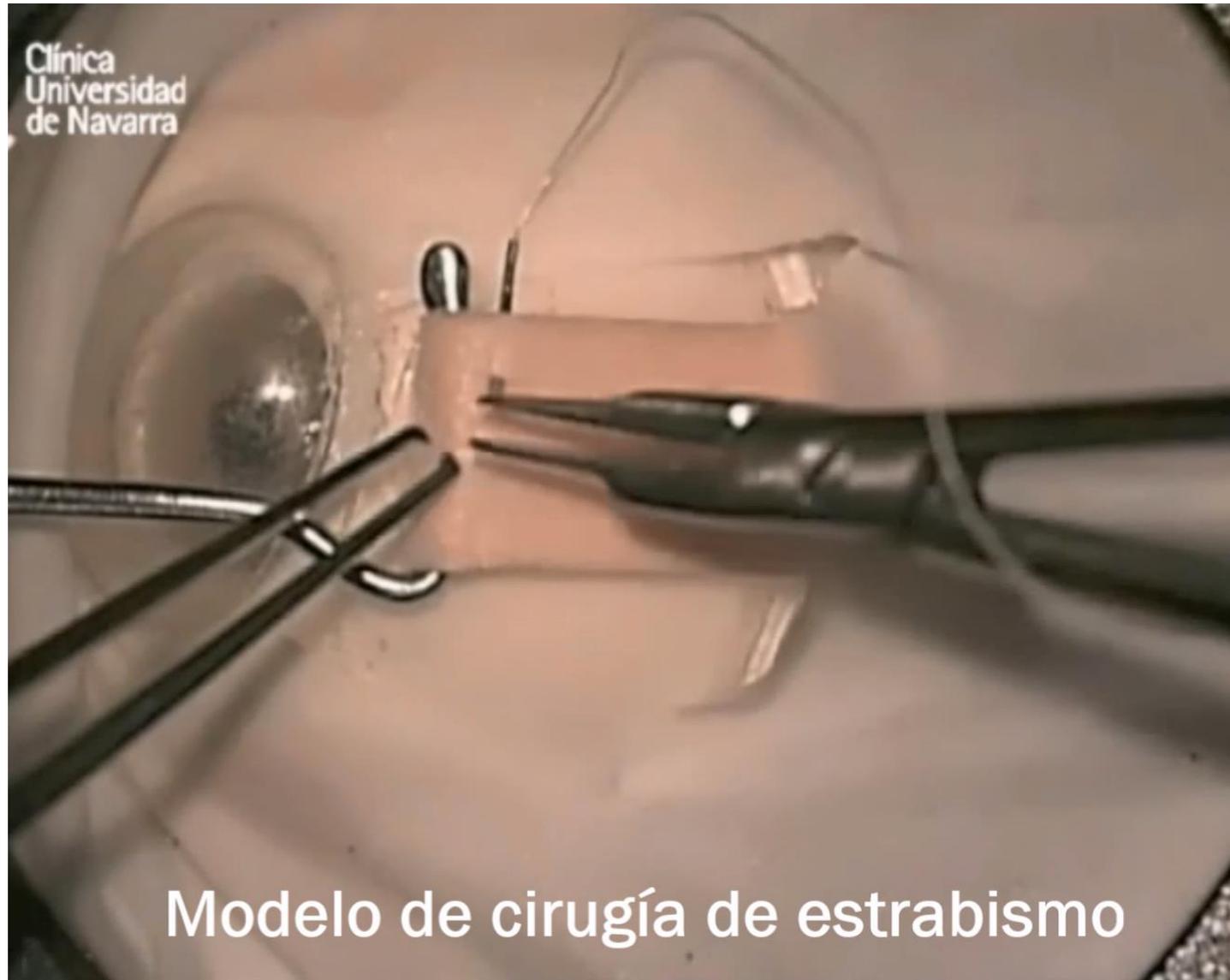
- ▶ Accesibles
- ▶ Aprendizaje de muchas maniobras (incisiones, microsutura)
- ▶ Sensación táctil bastante real
- ▶ Pueden introducirse en los quirófanos reales

Proveedores de modelos artificiales:

<http://www.guldenophthalmics.com/products/index.php/practice-eyes.html>

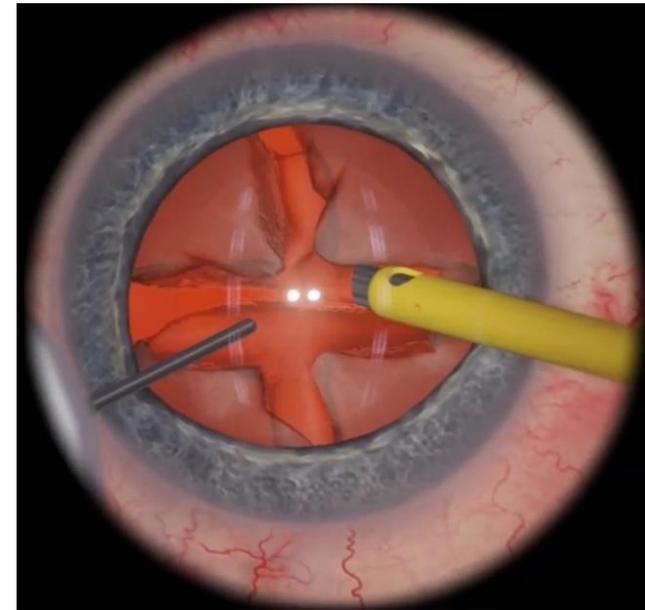
<http://simulatedocularsurgery.com/>





▶ 2. Simuladores virtuales

- ▶ No fácilmente accesibles
- ▶ Entrenamiento estructurado (pe: pasos específicos)
- ▶ Práctica independiente ilimitada.
- ▶ Ahorro tiempo instructor.
- ▶ Entrenamiento de casos difíciles y complicaciones
- ▶ Feedback automático y objetivo



- ▶ Más de 60 publicaciones en Cirugía Oftalmológica
- ▶ Inapelable reducción de la curva de aprendizaje en todas las maniobras

Graefes Arch Clin Exp Ophthalmol (2013) 251:777–781
DOI 10.1007/s00417-012-2160-z

CATARACT

Impact of simulator training on resident cataract surgery

Russell Pokroy
Sarah Khodada
Paul Edwards

Received: 5 June 2012
© Springer-Verlag

Abstract
Background Vir

ident cataract surgery training. The Accreditation Council for Graduate Medical Education now requires that ophthalmic residents have access to wet-lab or virtual simulator training [3]. Structured surgical training programs (including wet-lab training, simulator training, and supervision and feedback of resident cases) have been shown to hasten the resident learning curve [4, 5].



Editorial



Simulation Surgical Teaching in Ophthalmology

Colin A. McCannel, MD - *Los Angeles, California*

that is to be taught on the simulator.³ Many ophthalmology resident training programs worldwide have these modern simulators for their trainees, and some require completion of simulation-based curricula before performing surgery in the operating room. There is a growing body of literature that demonstrates the utility

► No solo para residentes...

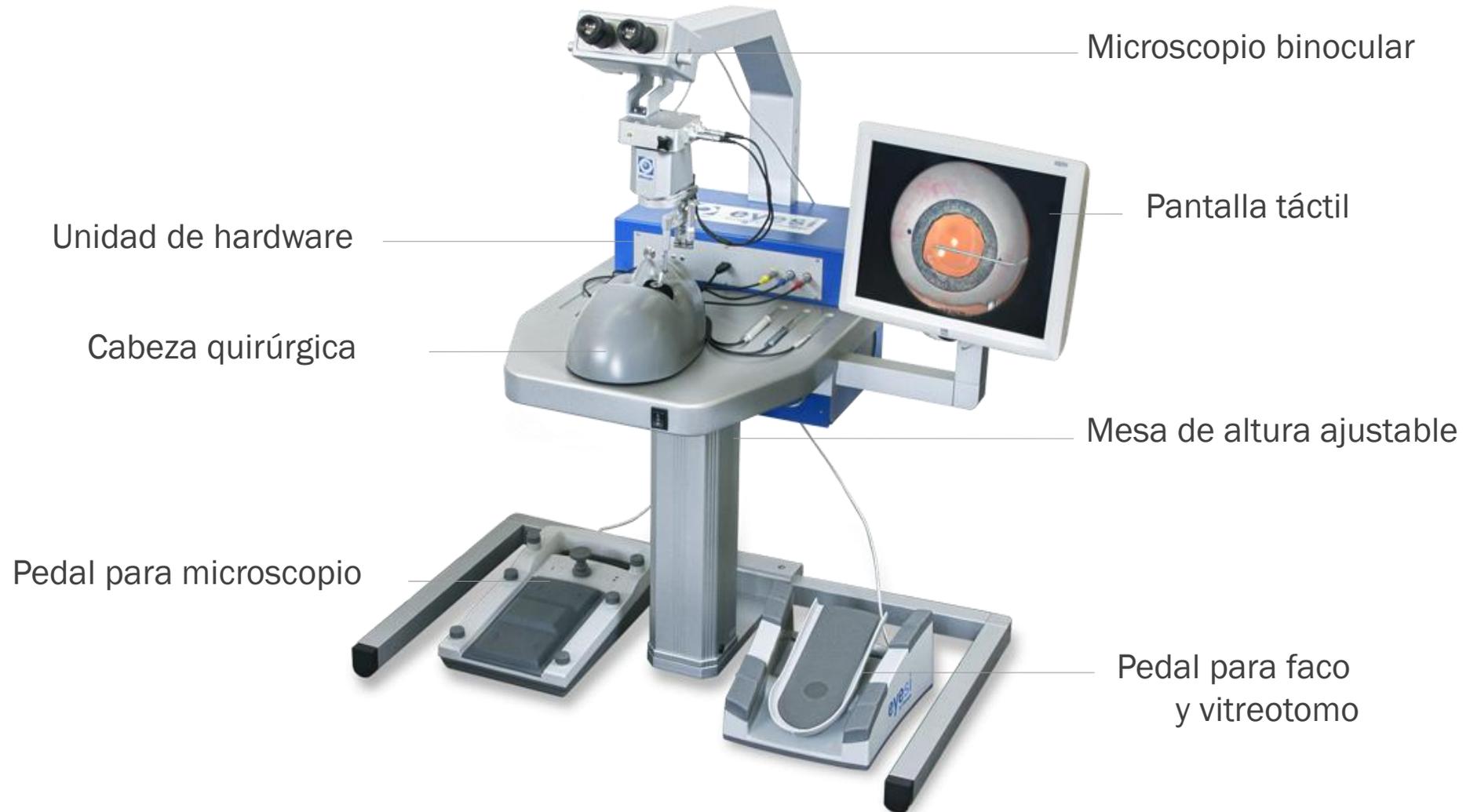


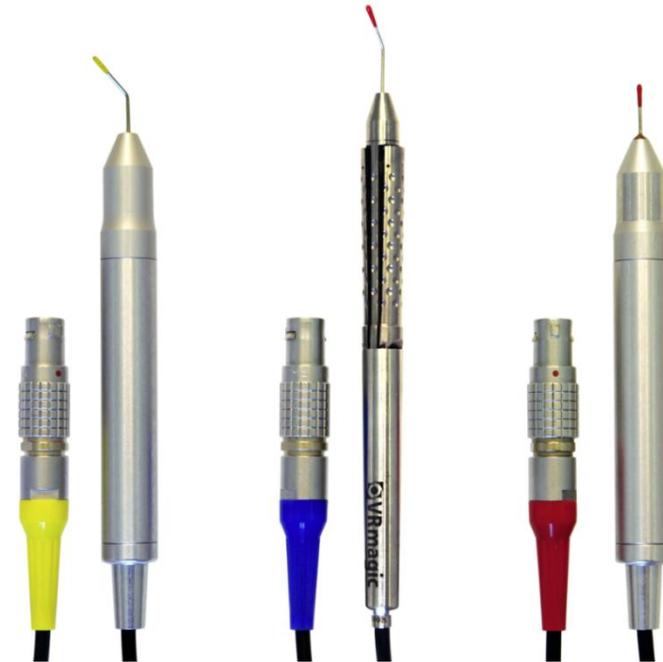
PLOS ONE | DOI:10.1371/journal.pone.0150690 March 10, 2016

RESEARCH ARTICLE

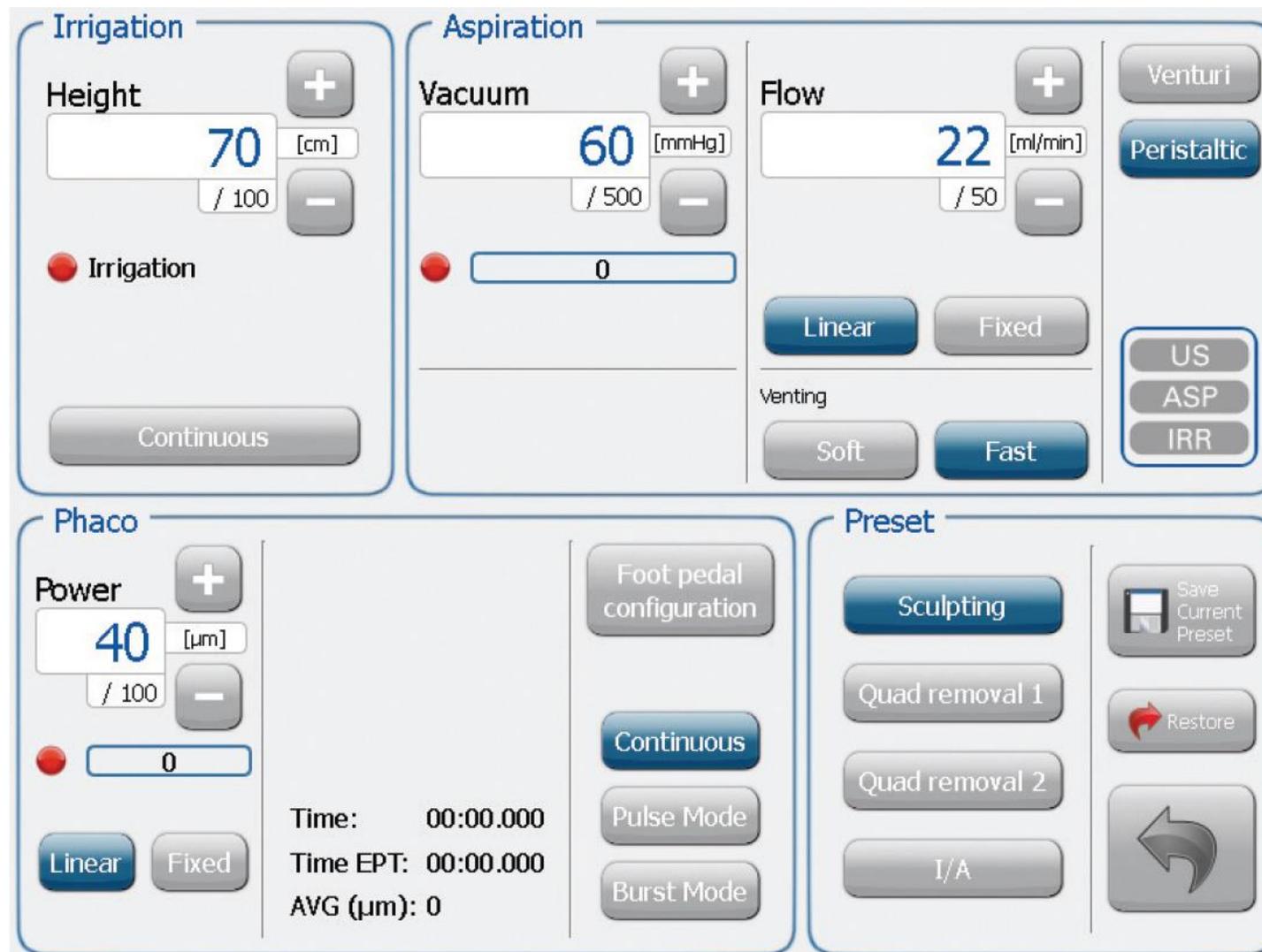
Clinical Efficacy of Simulated Vitreoretinal Surgery to Prepare Surgeons for the Upcoming Intervention in the Operating Room

Svenja Deuchler^{1*}, Clemens Wagner², Pankaj Singh¹, Michael Müller¹, Rami Al-Dwairi^{1,5}, Rachid Benjilali¹, Markus Schill², Hanns Ackermann³, Dimitra Bon³, Thomas Kohnen⁴, Benjamin Schoene², Michael Koss^{1,6}, Frank Koch¹



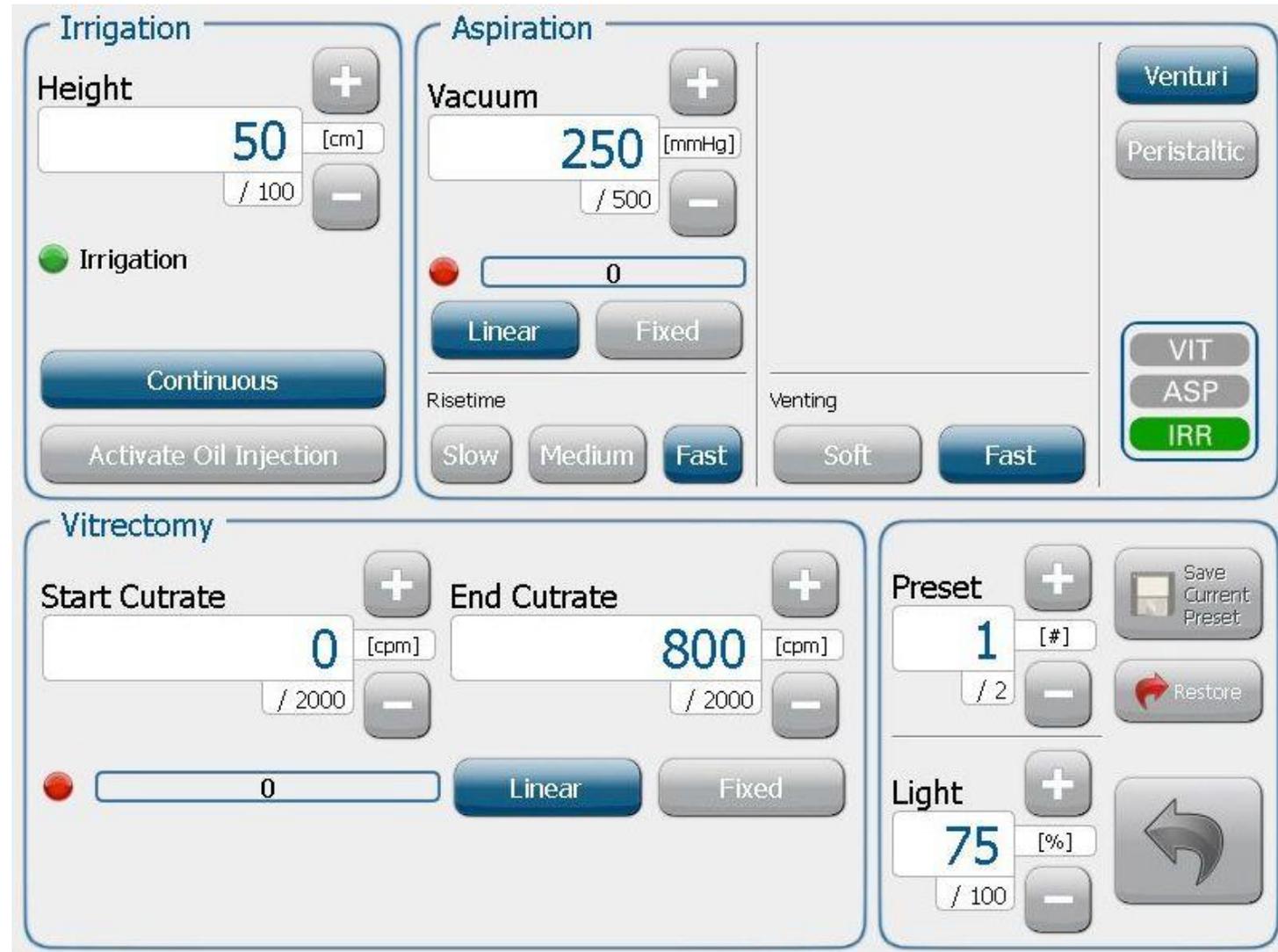


Instrumentos simulados: cistitomo,
mango facoemulsificación, mango I/A,
Vitrectomo, forceps, pincel de tano,
endolaser...



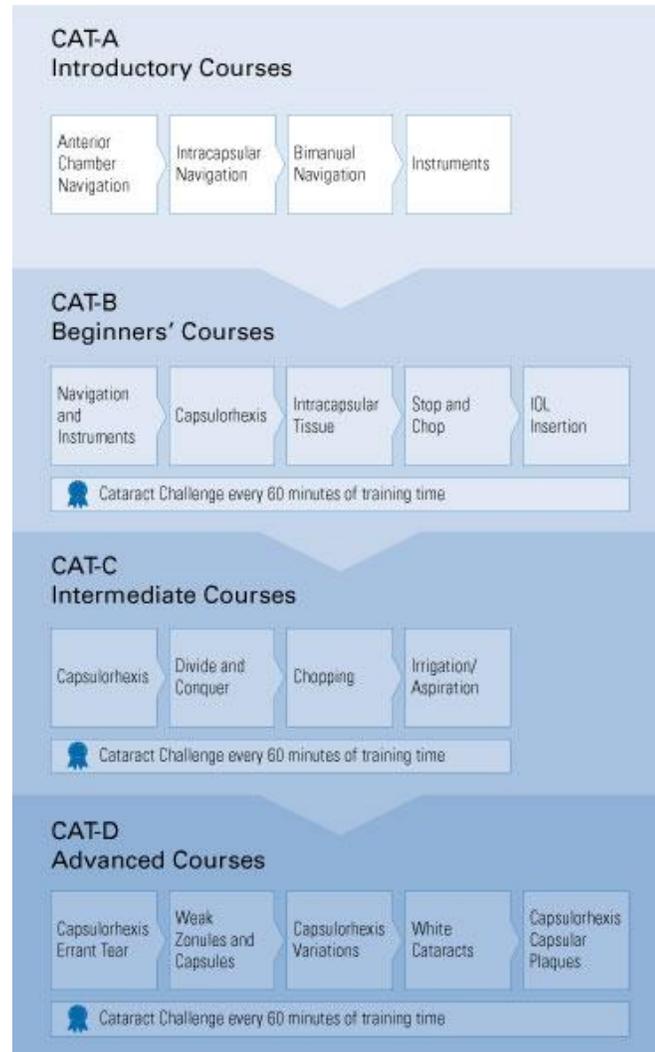
The console interface is divided into four main sections: Irrigation, Aspiration, Phaco, and Preset.

- Irrigation:** Height is set to 70 [cm] (range 0-100). A red indicator light is on. A "Continuous" button is at the bottom.
- Aspiration:** Vacuum is set to 60 [mmHg] (range 0-500). A red indicator light is on. A progress bar shows 0. Flow is set to 22 [ml/min] (range 0-50). Modes include "Linear" (selected), "Fixed", "Venturi", and "Peristaltic".
- Phaco:** Power is set to 40 [µm] (range 0-100). A red indicator light is on. A progress bar shows 0. Modes include "Linear" (selected), "Fixed", "Continuous" (selected), "Pulse Mode", and "Burst Mode". Time: 00:00.000, Time EPT: 00:00.000, AVG (µm): 0. A "Foot pedal configuration" button is present.
- Preset:** Includes "Sculpting" (selected), "Quad removal 1", "Quad removal 2", and "I/A" buttons. A "Save Current Preset" button is at the top right, and a "Restore" button is below it.



The console interface is divided into three main sections: Irrigation, Aspiration, and Vitrectomy.

- Irrigation:** Height is set to 50 [cm] (range / 100). A green indicator shows Irrigation is active. A 'Continuous' button is present, along with an 'Activate Oil Injection' button.
- Aspiration:** Vacuum is set to 250 [mmHg] (range / 500). A red indicator shows aspiration is active. A slider is set to 0. Modes include 'Linear' (selected) and 'Fixed'. Risetime options are 'Slow', 'Medium', and 'Fast' (selected). Venting options are 'Soft' and 'Fast' (selected). A 'Venturi' button is also present.
- Vitrectomy:** Start Cutrate is 0 [cpm] (range / 2000) and End Cutrate is 800 [cpm] (range / 2000). A red indicator shows vitrectomy is active. Modes include 'Linear' (selected) and 'Fixed'. A 'Preset' is set to 1 [#] (range / 2). A 'Light' is set to 75 [%] (range / 100). Buttons for 'Save Current Preset', 'Restore', and a return arrow are also visible.





CAT-A Introduction

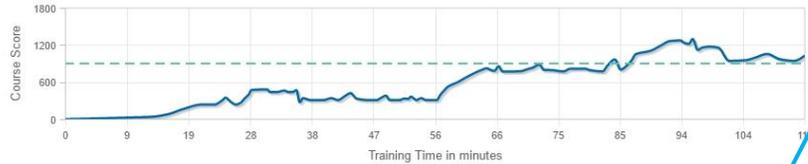
Started courses: 2/4 Training time: 2:00 h
 Completed courses: 1/4 Score: 1287/7800

Completed tasks: 21/78 (27%)

CAT-A Anterior Chamber Navigation

Course score: 1025/1800 Training time: 1:52:58 h

Completed tasks: 18/18 (100%)



Course score req. 900, max. 1800 **1025**

Task	2016-06-13 17:32	2016-06-13 17:37	2016-06-13 17:46	2016-06-13 17:50	2016-06-13 17:54	2016-06-13 17:10	2016-06-15 16:37
Navigation Training, Level 1 (req. 3x50)	28	39	80	83	73	89	92
Anti-Tremor Training, Level 1 (req. 3x50)	64	78	51	0	64	23	10
Anti-Tremor Training, Level 2 (req. 3x50)	0	0	0	84	68	61	38
Navigation Training, Level 2 (req. 3x50)				78	86	86	93
Anti-Tremor Training, Level 5 (req. 3x50)	0	100	94	30	92	86	100
Anti-Tremor Training, Level 6 (req. 3x50)	82	0	11	52	59	26	0

CAT-A Intracapsular Navigation

Course score: 262/1800 Training time: 0:07:44 h

Completed tasks: 3/18 (17%)



Navigation Training - Level 2

User: Bilbao-Valentina Date: 2016-06-15 19:52
 Real Name: Valentina Bilbao Course: CAT-A Anterior Chamber Navigation

Category	Value	Score
Efficiency		good
Time	0:01:37	-2.7
Time (with instruments inserted)	0:01:06	0
Instrument handling		good
Instrument closing meter	0	0
Instrument slipped out of sphere	3	-6
Lateral instrument movements	48	0
Number of instrument closings	0	0
Odometer	54.2468 mm	0
Operating without red reflex	1	0
Rotometer	218.083	0
Microscope handling		excellent
Instrument tip out of focus	0	0
Operating out of focus	0 mm	0
Target achievement		excellent
Completed objects	12	100
Tissue treatment		good
Injured cornea area	1	-5.4
Injured lens area	0	0
Iris contact	0	0
Total Score		
Task score		86/100



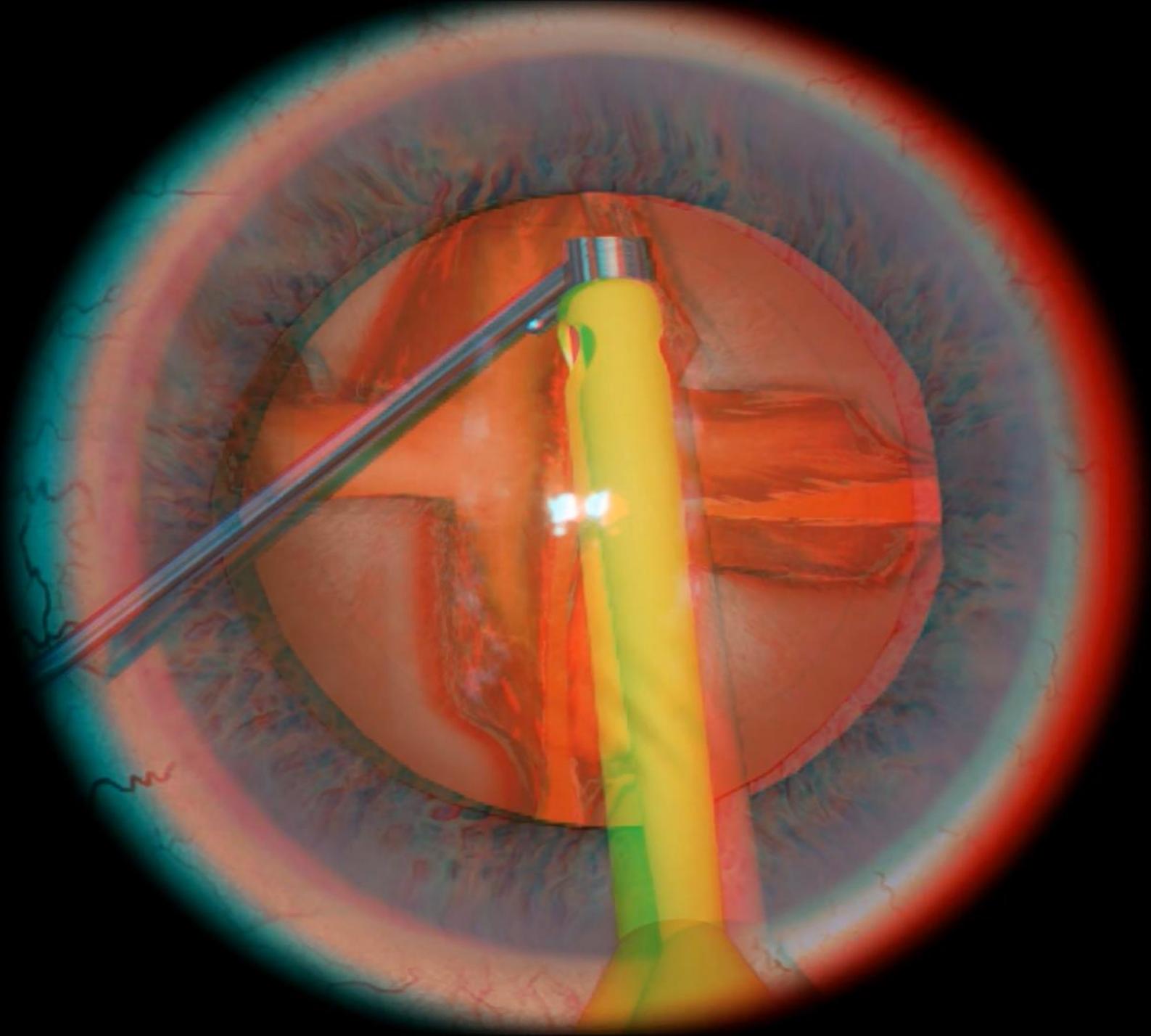
www.granada3d.com

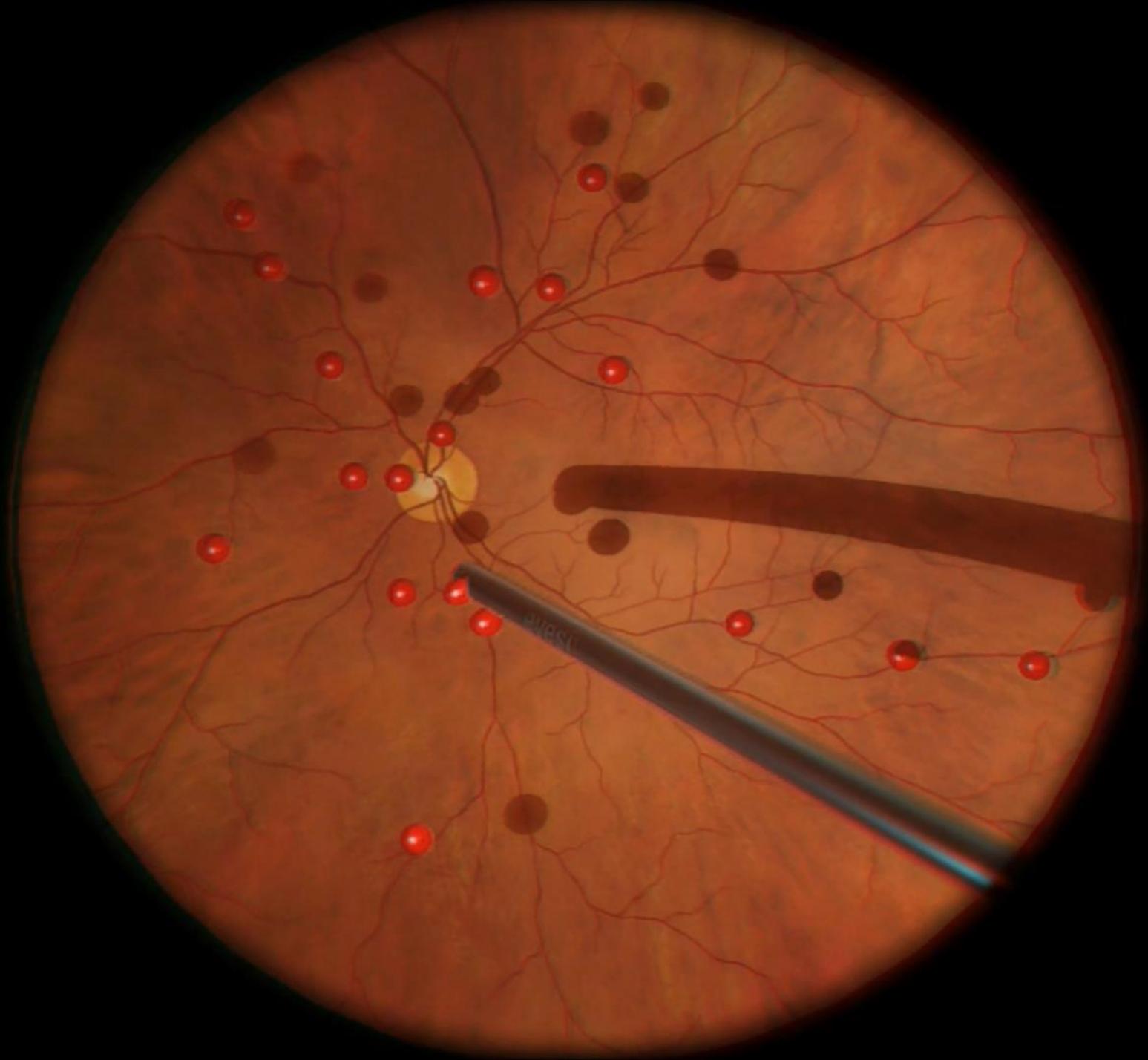
AGV Jardines de Málaga 3D

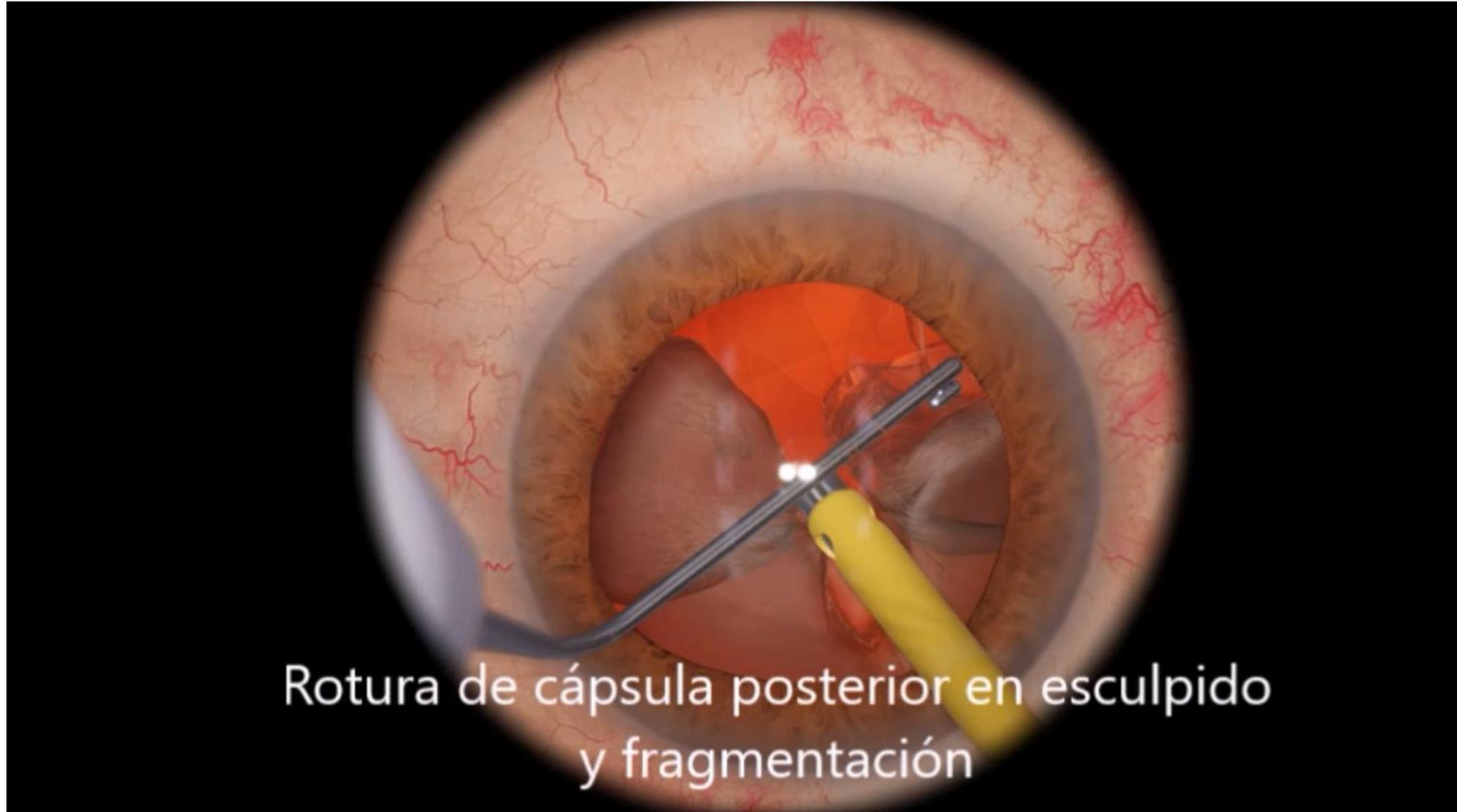














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- Centre for Teaching Excellence: ePortfolios
- Journal of Clinical & Academic Ophthalmology
- Chiefs' Rounds from Wills Eye Hospital

Editor's Choice

Chiefs' Rounds from Wills Eye Hospital

Competency Domain: Medical Education
Resource Type: Learning Object
Date: 2016/03/31

The "Chiefs' Rounds" from Wills Eye Hospital in Philadelphia are streamed online live weekly on Friday mornings (US Eastern Time) at no cost. They are accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

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Jesoes Barrio-Barrio
jbarrio@unav.es
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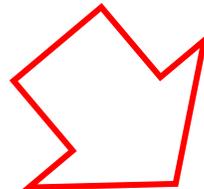
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