Società Oftalmologica Calabrese

SOC

XVII CONGRESSO
SOC

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"CORSO AVANZATO DIAGNOSTICO-CHIRURGICO DI SEMEIOTICA STRUMENTALE"

Responsabile Scientifico: A. Lucente

27 ottobre 2017, Reggio Calabria

STRUMENTI HI-TECH VITREO-RETINICI

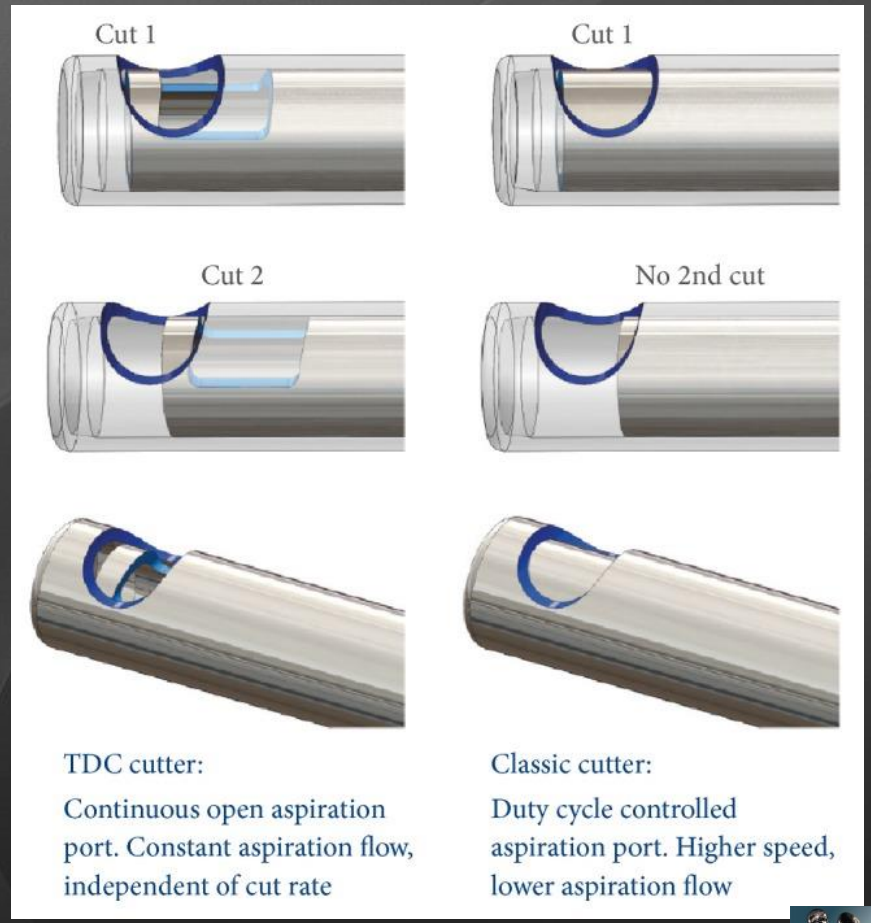
Dott. Simone Donati, Dott. Elias Premi

Sommario

- Introduzione
  - Vitrectomi
  - Sistemi di visualizzazione
  - OCT intraoperatorio
  - Chirurgia 3D
- Discussione

Vitrectomi hi-tech

- Tecnologia (obbiettivi):
  - Ridurre i calibri degli strumenti
  - Ridurre le variazioni del flow-rate
  - Aumentare il numero di tagli al minuto
  - Aumentare Duty Cycle



Vitrectomi hi-tech

Calibro:

- 23G
  - Maggior traumatismo
  - Minor precisione di dissezione
  - Maggior flusso
- 25G
- 27G
  - Minor traumatismo
  - Miglior dissezione membrane
  - Minor flusso

GAUGE	INTERNAL DIAMETER (MM)	PORT DISTANCE FROM TIP (MM)	PORT SIZE (MM^2)
20	0.52	0.43	0.53 x 0.30 = 0.16
23	0.39	0.25	0.40 x 0.18 = 0.07
25	0.29	0.23	0.32 x 0.14 = 0.045
27	0.20	0.23	0.29 x 0.12 = 0.035

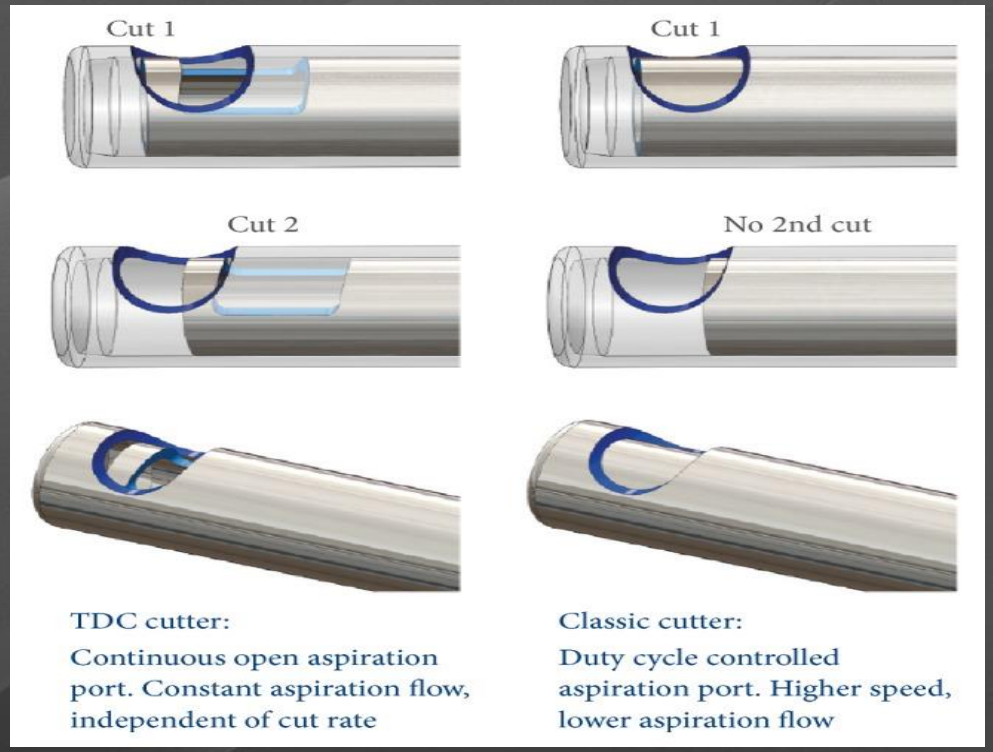
“The sphere of influence”

FREE

ARVO Annual Meeting Abstract | June 2015

NEW PROTOTYPE OF ULTRASOUND HARMONICS VITRECTOR (UHV) HISTOPHATOLOGICAL FINDINGS: First Report

Salvador Pastor; Richard Bonshek; Irion Luciane; Isaac Zambrano; Paul Carlin; Paulo E Stanga



Sistemi di Illuminazione

- Il chirurgo vitreo-retinico ha oggi a disposizione diversi sistemi di illuminazione:
  - Illuminazione a fibra ottica
  - Chandelier
  - Strumenti con sorgente luminosa
  - Lampada a fessura

Variation of chandelier fibers

PHOTON I™, PHOTON II™
Stellaris PC (Xenon & Mercury Vapor)

- 25- & 27-ga chandelier probe

- 23- & 25-ga microcannula-compatible chandelier probe

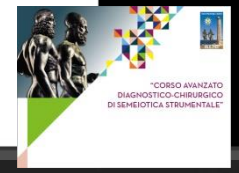
- 29/30-ga dual chandelier fiber

Accurus™ & Constellation
HBI (Xenon)

- 25- & 23-ga compatible chandelier probe

- 25- & 27-ga Twin-light chandelier probe

BrightStar™ (Xenon)



Luce e Filtri

- I moderni calibri della vitrectomia hanno obbligato ad utilizzare sistemi di illuminazione più piccoli
- Per ovviare al problema del conseguente impoverimento della sorgente luminosa data dal calibro dell'ottica sono state sviluppate nuove fonti:
    - Xenon
    - Vapori di Mercurio
    - LED

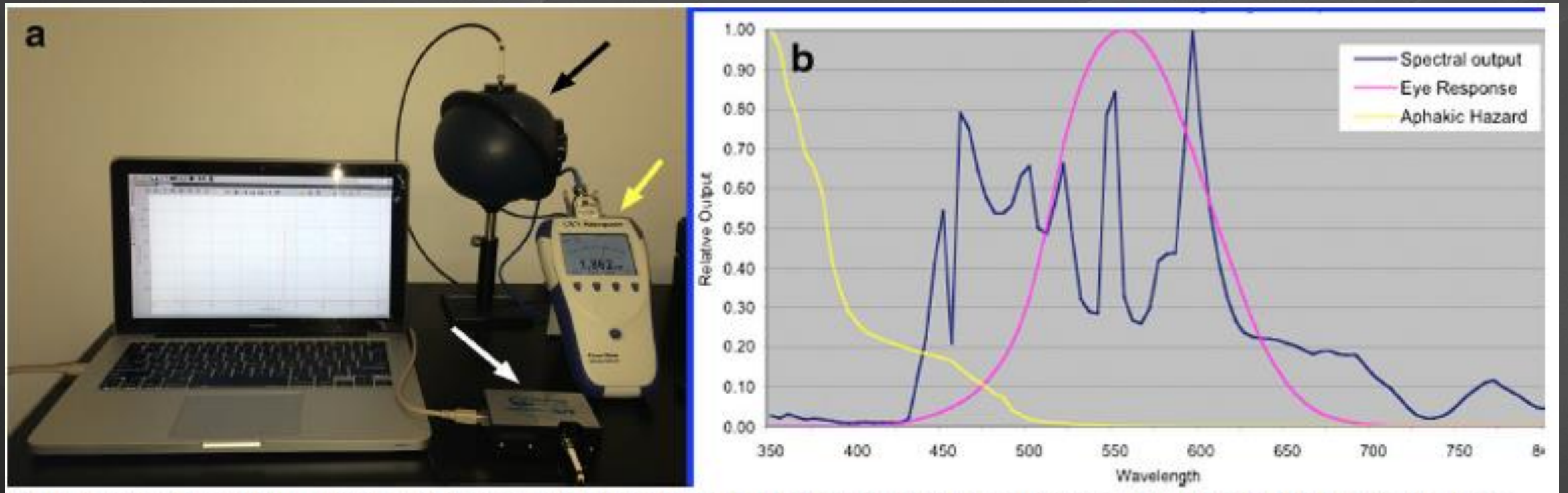
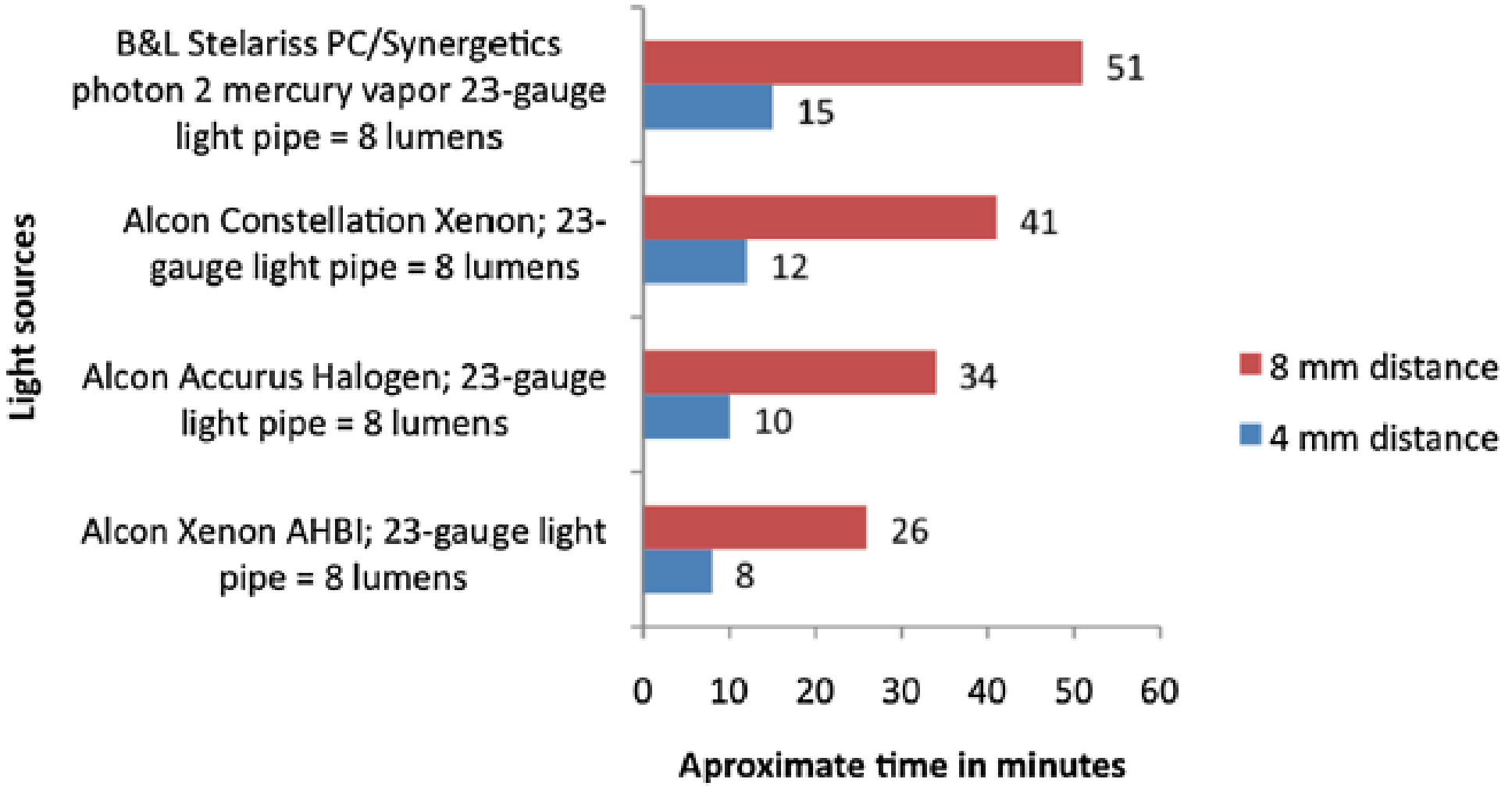
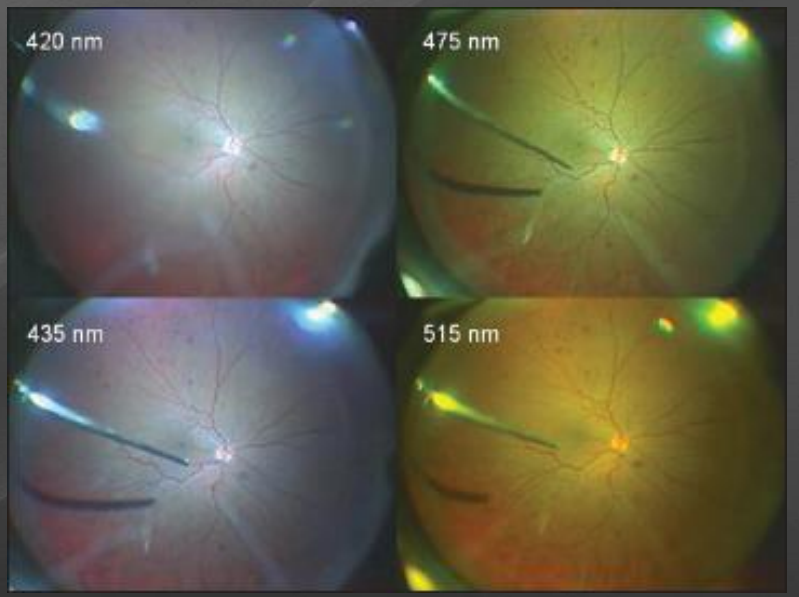


FIg. 12 **a** Set up for obtaining the spectral curve and power output of a light source. The spectrophotometer (*white arrow*) and power meter (*yellow arrow*) are linked to the integration sphere (*black arrow*). The light shining into the integration sphere generates a spectral curve captured by the spectrophotometer also linked to the computer software. The power obtained is directly shown by the power meter. **b** Spectral curve of a light source (*blue curve*), as a function of wavelength and intensity output, against an aphakic hazard curve (*yellow*) and a photopic eye response curve (*purple*)



14 Retina threshold time of commercially available light sources according to their working distance from the retina (personal data)

- I limiti dell’utilizzo dei filtri sono stati descritti in letteratura attraverso sondaggi sottoposti a chirurghi esperti dopo il loro utilizzo:
    - Diminuzione dell’illuminazione
    - Perdita di contrasto
    - Alterata percezione dei colori



- Il filtro ambra per sorgenti xenon è risultato essere il più confortevole nell’esecuzione della chirurgia vitreoretinica

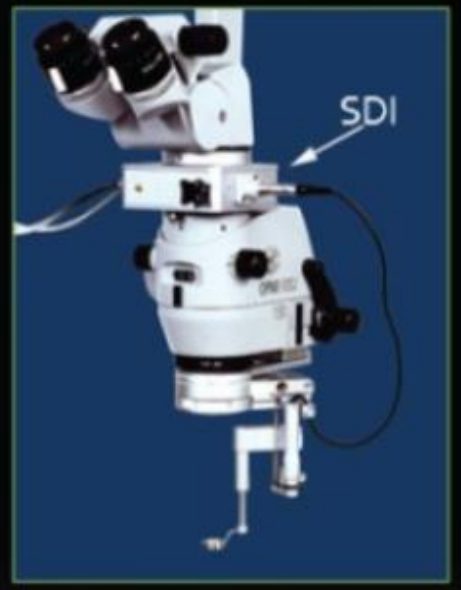
Ottiche Wide Angle

- Le ottiche Wide Angle permettono di avere una panoramica della retina e di individuare più facilmente malattie retiniche

- Si dividono in:
  - A contatto
  - Non a contatto

Variation of wide angle field system for MIVS

BIOM (Oculus)



MERLIN (Volk)

OFFISS (Topcon)

Resight (Carl Zeiss)

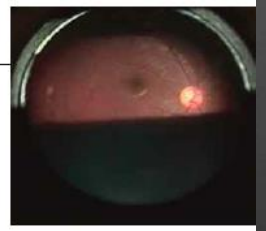
Peyman-Wessels-Landers 132D
Upright Vitrectomy Lens (Ocular)

Optical Fiber Free Intravitreal Surgery System

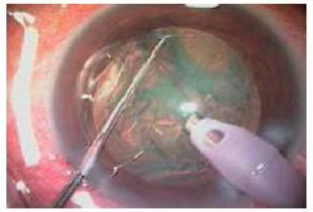
OMS·800 OFFISS

OFFISS opens up the new possibilities in intravitreal surgery

Vitrectomy operations are now easier, safer and faster.



- **Astonishingly wide visual field**
  Unlike conventional methods, OFFISS provides illumination over the whole operative field, even illuminating the peripheral area. This results in a more efficient and safer intraocular operations.
- **Clear, natural stereoscopic view**
  A good stereoscopic view is observed even through patients with small pupil diameters because of the world's first, built-in stereo-variator in an operation microscope.
- **Reduced flare**
  Fundus observation with high contrast and less flare can be achieved with the built-in slit illumination.
- **Increased working distance**
  OFFISS provides exceptional working distance between the 40D non-contact lens and the patient's eye.
- **Unparalleled image quality during simultaneous cataract and vitreous surgery**
  With the advancement of cataract surgery, including techniques such as phacoemulsification, increasing numbers of vitrectomy surgeons are performing simultaneous cataract and vitreous surgery. By adopting a 3-direction illumination system, the OMS-800 provides an improved red-reflex and better shadow-contrast even in situations with low luminance.



OCT Intraoperatorio Real-Time

- Tecnologia in ampia fase di sviluppo e costante aggiornamento
- L'OCT intraoperatorio Real-Time è oggi disponibile già incorporato in alcuni microscopi operatori
- Lo sviluppo di nuovi materiali ha permesso di ridurre le interferenze di segnale indotte dalla struttura stessa dei microscopi e dei loro supporti
- Tecnologia che troverà grande impiego nella futura chirurgia vitreoretinica

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The Prospective Intraoperative and Perioperative Ophthalmic ImagiNg with Optical CoherEncE TomogRaphy (PIONEER) Study: 2-year Results

Justis P. Ehlers[1,2], William J. Dupps[1,2], Peter K. Kaiser[1,2], Jeff Goshe[2], Rishi P. Singh[1,2], Dan Petkovsek[1], and Sunil K. Srivastava[1,2]

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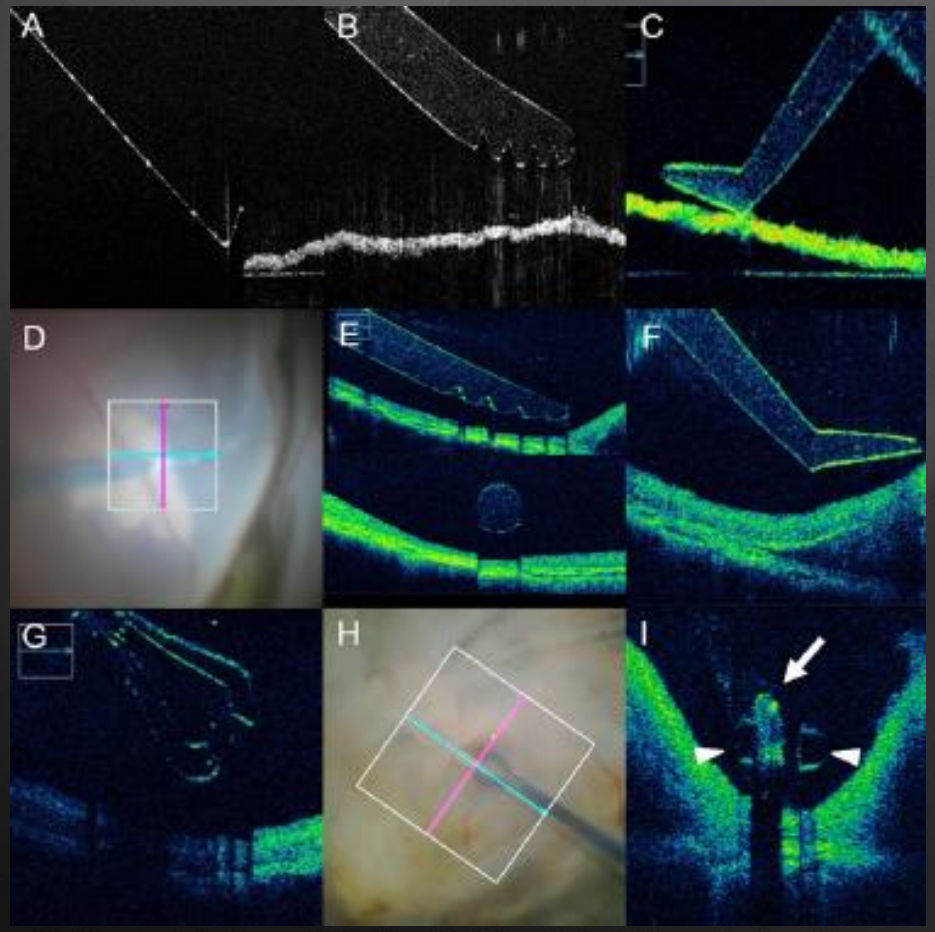
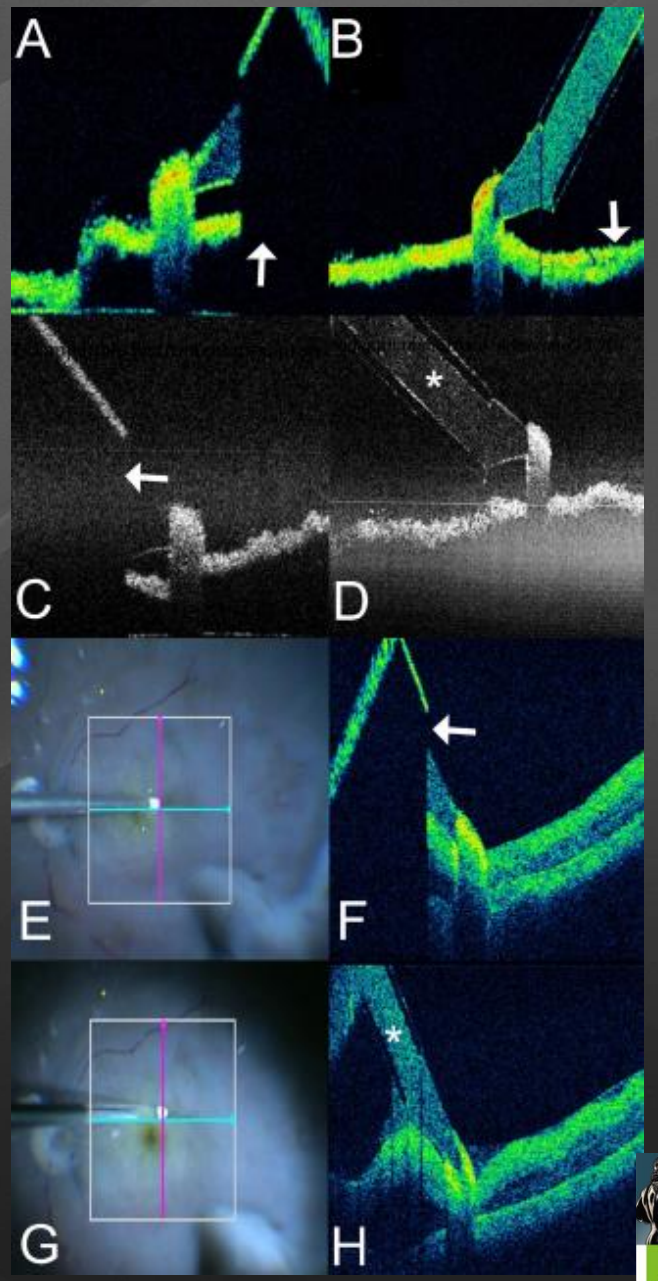
Intraoperative optical coherence tomography-compatible surgical instruments for real-time image-guided ophthalmic surgery

Justis P Ehlers, Atsuro Uchida, Sunil K Srivastava





Chirurgia 3D

- Piattaforma DAVS (*digitally assited vitrectomy surgery*)
- Heads-up surgery
- Elementi:
    - Videocamera HDR
    - Schermo HD
    - Sistema ottico di visualizzazione dello schermo
    - Workstation

Chirurgia 3D

Vantaggi:

- Miglior ergonomia operatoria
- Riduzione stanchezza nei tempi operatori prolungati
- Aumento della risoluzione e della profondità di campo
- Immagine in 3D visualizzabile da un numero anche elevato di altri operatori o spettatori
- Possibilità di ingrandimento mantenendo ampi angoli di visualizzazione
- Possibilità di applicazione filtri digitali

Nuovi approcci tecnologici

1

2

Conclusioni

Advancing technology will sustainably help us to take better care of more diseases in greater numbers of patients with better outcomes.

From this perspective, there has never been a better time to be a retinal surgeon.

KEY POINTS

- Continued improvement of existing optical viewing and lighting systems have all contributed to improved safety, efficacy, and outcomes of vitreoretinal surgery.
- HUD has been reported to have improved ergonomics, increased light intensity via amplification software, and allows multiple observes to view the three-dimensional surgical field.
- Integration with the microscope optics allow for real-time surgical intraoperative OCT imaging with may help improve surgical decision making and being a valuable research tool in understanding the anatomical changes to the retina that occur during surgery.
- Wide-angle viewing systems provide a wide viewing angle that can assist in complex peripheral disorder.
- The development of chandeliers as well illuminated surgical instruments such as vitrectors, infusion cannulas, and picks, improve options for bimanual techniques.


Grazie per l’attenzione
www.settemuse.it