What Did I Miss?

Aaron McNulty, OD, FAAO

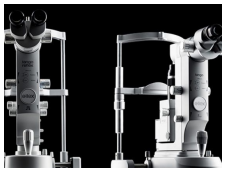
Disclosures

Instructor serves on Professional Advisory Board for Johnson & Johnson Vision.
The content and format of this course is presented without commercial bias and does not claim superiority of any commercial product or service.

Course Overview

- Review of recent literature with emphasis on anterior segment laser surgery
- Relevant studies, results, and conclusions will be presented

SLT



Factors Associated With Favorable Laser Trabeculoplasty Response: IRIS Registry Analysis

TA C. CHANG, RICHARD K. PARRISH, DANIELLE FUJINO, SCOTT P. KELLY, AND ELIZABETH A. VANNER

IRIS Registry Analysis (2021)

- "Responders": At least 20% IOP reduction after 8 weeks
- "Nonresponders": Less than 20% IOP reduction after 8 weeks

IRIS Registry Analysis (2021)

- High baseline IOP predicts response
- Angle recession, uveitis, aphakia decrease response

IRIS Registry Analysis (2021)

- Overall response rate 37%
- Among baseline IOP over 24mmHg: 69% response rate
  - Mean baseline IOP 19.1mmHg
  - These providers are offering SLT with low IOP, despite evidence that SLT is most effective with high IOP

IRIS Registry Analysis (2021)

- Nonresponders with at least 1 medication at baseline: 76% had fewer medications after SLT
- Basically replaces medications in this case

AMERICAN ACADEMY OF OPHTHALMOLOGY

Real-World Outcomes of Selective Laser Trabeculoplasty in the United Kingdom

Anthony P. Khawaja, PhD, FRCOphth,[1] Joanna H. Campbell, PhD,[2] Nicholas Kirby, BSc,[3] Hitesh S. Chandwani, MBBS, PhD,[4] Ian Keyzor, MSc,[3] Mousam Parekh, MS,[5] Andrew I. McNaught, MD,[2,6] for the UK Glaucoma Real-World Data Consortium

- The major baseline factor associated with SLT success was pre-SLT IOP
  - At low IOP, resistance to outflow may be affected by non-TM pathway including Schlemm's canal and episcleral venous pressure

- No association between concurrent glaucoma medication use and treatment success
  - Includes PGA use
- "Our study is strongly powered for examining this association and suggests that SLT is a reasonable treatment option even in patients already using drops"

www.nature.com/scientificreports

scientific reports

OPEN

Real-world data from selective laser trabeculoplasty in Brazil

Ricardo Y. Abe[1,2*], Heloisa A. Maestrini[3], Guilherme B. Guedes[4], Marcelo M. Nascimento[3], Camila I. Iguma[3], Hérika Danielle de Miranda Santos[3], Muna Georges Nasr[4], Ricarte P. Lucena-Junior[4] & Tiago S. Prata[4,5]

- Retrospective case series
- 835 eyes

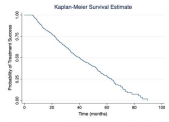


Figure 1. Kaplan-Meir survival estimates of eyes submitted to primary selective laser trabeculoplasty.

- 88% at 12 months, 70% at 24 months, 54% at 36 months

- 55% of patients in this series had good IOP control with medication; SLT was performed to reduce or eliminate eyedrops

- Multivariable model demonstrated higher probability of treatment success with heavier TM pigmentation
  - Controversial topic with mixed reports in the literature
- Those treated with steroids postoperatively had better outcomes
  -

ORIGINAL STUDY

Predictors of Success in Selective Laser Trabeculoplasty: Data From the Lausanne Laser Trabeculoplasty Registry

Sina Elahi, MD, Harsha L. Rao, MD, PhD,† Alina Dumitru, MD,* and Kaweh Mansouri, MD, MPH*‡*

	Univariate Analysis			Multivariate Analysis		
	OR	CI	*P*	OR	CI	*P*
Qualified success						
Age*				0.99	0.96-1.03	0.76
Sex (male)*				2.79	1.17-6.68	0.02
Pseudophakia*				0.60	0.23-1.57	0.30
Cup:disc ratio*				0.29	0.03-2.47	0.26
Baseline IOP*				1.15	1.04-1.25	<0.01
Presence of treatment pre-SLT*				2.53	1.10-6.01	0.03
Baseline MD†	0.97	0.91-1.07	0.74			
Baseline RNFLT†	1.02	0.99-1.05	0.24			
OHT diagnosis†	1.29	0.59-2.83	0.53			
POAG diagnosis†	0.75	0.36-1.58	0.45			
PEXG diagnosis†	1.20	0.34-4.17	0.77			
Impact number*				1.01	0.99-1.04	0.29
Total energy†	1.00	0.98-1.03	0.65			
Complete success						
Age*				1.01	0.98-1.04	0.49
Sex (male)*				1.37	0.69-2.74	0.37
Pseudophakia*				0.63	0.29-1.40	0.26
Cup:disc ratio*				1.13	0.18-6.97	0.90
Baseline IOP*				1.27	1.15-1.40	<0.01
Presence of treatment pre-SLT*				0.61	0.28-1.32	0.21
Baseline MD†	0.95	0.89-1.03	0.21			
Baseline RNFLT†	1.00	0.98-1.02	0.86			
OHT diagnosis†	1.37	0.68-2.76	0.38			
POAG diagnosis†	0.93	0.47-1.84	0.84			
PEXG diagnosis†	0.84	0.27-2.58	0.76			
Impact number*				1.01	0.99-1.04	0.22
Total energy†	1.02	1.00-1.04	0.04			

Predictive Factors for Outcomes of Selective Laser Trabeculoplasty

Matthew Hirabayashi[1,2], Vikram Ponnusamy[1] & Jella An[1,2,3]

	Values		*p*-value	
	2 month	6 month	2 month	6 month
Age (years), mean ± SD			0.540	0.869
Success	70.8 ± 11.9	70.8 ± 11.5		
Failure	69.3 ± 10.3	69.2 ± 10.4		
Type (successful cases)			0.248	0.074
POAG, n (%)	63/76 (82.9)	79/97 (81.4)		
NTG, n (%)	9/76 (11.8)	13/97 (13.4)		
SOAG, n (%)	4/76 (5.3)	5/97 (5.2)		
Severity (successful cases)			0.588	0.311
Mild, n (%)	32/76 (42.1)	41/97 (42.3)		
Moderate, n (%)	14/76 (18.4)	18/97 (18.5)		
Severe, n (%)	30/76 (39.5)	38/97 (39.2)		
TM Pigmentation (successful cases)#			0.494	0.134
Light, n (%)	61/74 (82.4)	76/92 (82.6)		
Heavy, n (%)	13/74 (17.6)	16/92 (17.4)		
Total Energy Delivery (mJ), mean ± SD			0.325	0.989
Success	61.4 ± 26.7	64.2 ± 24.5		
Failure	62.1 ± 22.8	59.7 ± 24.2		
Baseline IOP (successful cases)			<0.001*	<0.001*
>18 mmHg, n (%)	56/76 (73.7)	75/97 (77.3)		
≤18 mmHg, n (%)	20/76 (26.3)	22/97 (22.7)		

Journal of Glaucoma Publish Ahead of Print
DOI:10.1097/IJG.0000000000002062

OPEN

Energy Dose-Response in Selective Laser Trabeculoplasty: A Review

Radcliffe Nathan MD [1], Gazzard Gus MD, MBBChir FRCOphth [2,3,4], Samarchan Thomas MD [3,4], Khaw Peng MD [3,4], Sun Xinghuai MD[5], Aung Tin PhD MD [6,7], Lam Dennis MD [7b, 8], Singh Kuldev MD MPH [9], Katz L Jay MD[10], Arroyo Michael MD[11], Sacks Zachary PhD [12], Solberg Yoram PhD MD [13], Lindstrom Richard MD [14], Belkin Michael MD [15,17]

1 Associate Clinical Professor of Ophthalmology, New York Eye and Ear Infirmary of Mount Sinai, New York, NY

2 Moorfields Eye Hospital NHS Foundation Trust, London, UK

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4 UCL Institute of Ophthalmology, London, UK

5 Minnesota Eye Consultants, Minnesota, US

6 University of Minnesota Department of Ophthalmology and Visual Neurosciences, Minnesota, US

7 Department of Ophthalmology & Visual Science, Eye & ENT Hospital, Shanghai

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- Literature review to look for relationship between SLT energy and efficacy
  - SLT procedures vary widely between clinicians
  - How do we determine the optimal energy setting?

- Findings
  - No indication that higher or lower energy leads to greater or less IOP reduction
    - "All reported single pulse energies as well as total energy applied to TM lead to similar IOP reduction
  - There were indications that treating the full 360° could yield better outcomes than partial treatments
  - They speculate that there may be a threshold energy level of response (yet to be determined), above which IOP is reduced

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ORIGINAL ARTICLE

Clinical & Experimental Ophthalmology WILEY

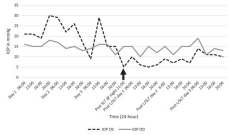
Using Icare HOME tonometry for follow-up of patients with open-angle glaucoma before and after selective laser trabeculoplasty

Mona S. Awadalla MBBS PhD | Ayub Qassim MBBS | Mark Hassall MBBS PhD | Thi T. Nguyen BMSc MOptom | John Landers FRANZCO PhD | Jamie E. Craig FRANZCO PhD

TABLE 2 Preoperative and postoperative IOP data

	Pre-SLT	Post-SLT	*P* value
Mean IOP	17.6 (3.79)	12.5 (4.20)	<.001
Maximum IOP	26.3 (6.58)	20.1 (8.54)	<.001
IOP fluctuation	4.35 (1.26)	3.29 (1.61)	<.05

Note: Values represent the mean (SD).



iCare study: Conclusions

- Significant IOP reduction at 1 week
- Reduction in IOP fluctuation

ORIGINAL RESEARCH

Consensual Ophthalmotonic Reaction Following Selective Laser Trabeculoplasty

Nariman Nassiri[1], Frank Mei[2], Hassan Tokko[3], John Zeitar[4], Sarah Syeda[5], Chaesik Kim[6], Ronald Swendris[7], Anju Goyal[8], Elise H'T Veld[9], Alma Mas-Ramires[10], Sonia W Rana[11], Mark S Juzych[12], Brot A Hughes[13]

Journal of Current Glaucoma Practice, Volume 16 Issue 1 (January-April 2022)

- Does monocular SLT affect pressure in the fellow eye? How much and how long does it last?
- Retrospective chart review
  - N=85
  - Excluded patients with previous surgery or laser in either eye

- Results: fellow eyes had a statistically significant decrease from baseline IOP for 4-9 months

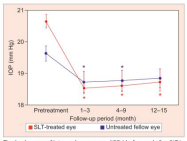


Fig. 1: Average of intraocular pressures (IOPs) before and after SLT in the treated eye and the fellow eye in different follow-up periods; * = $p < 0.05$ when compared to pretreatment (Student paired *t* test)

- How do they explain the consensual response?
  - Systemic production of prostaglandins

-

June 2022
Volume 63, Issue 7

OPEN ACCESS

ARVO Annual Meeting Abstract | June 2022

Rates of Laser Trabeculoplasty by Ophthalmologists and Optometrists: A Comparative Analysis of the Center for Medicare & Medicaid Services Public Use File

Zain S Hussain; Lama A Al-Aswad; Ben J. Harvey; Adegbenro Fakoya; Siamak Yousefi

- Analyzed Medicare claims data
- From 2015 to 2018, overall utilization of SLT decreased
- During that time, optometry performed a higher percentage of SLT in Kentucky, Louisiana, and Oklahoma

	2015		2018		
State	Ophthalmology	Optometry	Ophthalmology	Optometry	*p-value**
KY	$212,373.4	$56,989.2	$144,185.8	$74,696.6	*<0.001*
LA	$738,728.1	$33,140.1	$351,345.1	$18,617.7	*<0.001*
OK	$388,526.3	$81,837.1	$412,630.1	$105,639.0	*<0.001*
Total	$1,339,627.7	$171,966.5	$908,161.1	$198,953.3	*<0.001*

Table 1: Fee-For-Service Medicare-Allowed Laser Trabeculoplasty Payments, $ (%)
*Chi-square Analyses Assessing Optometric-to-Ophthalmologic Ratio Differences in Summed Medicare-Allowed LTP Payments between 2015 and 2018

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Efficacy of Repeat Selective Laser Trabeculoplasty in Medication-Naive Open-Angle Glaucoma and Ocular Hypertension during the LiGHT Trial

LiGHT retreatment data

- Looked at patients requiring retreatment within 18 months
- Retreatment triggered by failure to hit individualized target IOP and/or disease progression
- 115 eyes met these criteria

LiGHT repeat SLT data

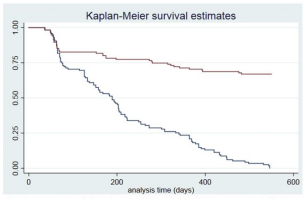


Figure 2. Kaplan–Meier plot for 115 eyes: initial selective laser trabeculoplasty (SLT) (**blue line**) versus repeat SLT (**red line**).

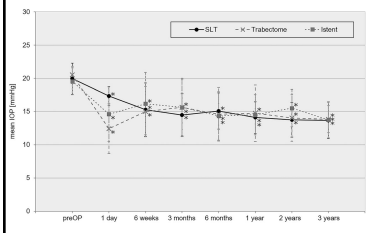
LiGHT repeat SLT: Conclusions

- "After repeat SLT, the cumulative effect of initial and repeat SLT may provide an equivalent and possibly longer duration of clinical benefit than after initial SLT alone."
- "Repeat SLT is safe, with minimal laser-related side effects seen during the LiGHT trial."

ORIGINAL RESEARCH

Selective Laser Trabeculoplasty Versus MIGS: Forgotten Art or First-Step Procedure in Selected Patients with Open-Angle Glaucoma

Milena Pahlitzsch · Anja-Maria Davids · Sibylle Winterhalter · Malte Zorn · Emanuel Reitemeyer · Matthias K. J. Klamann · Necip Torun · Eckart Bertelmann · Anna-Karina Maier



- "As 'magic dwells in each beginning', new procedures might detract from the effectiveness and safety of methods like SLT, which then become neglected."
- They advocate SLT first, followed by MIGS as needed

SLT Learning Curve

Acta Ophthalmologica

Acta Ophthalmologica 2019

Evaluation of selective laser trabeculoplasty as an intraocular pressure lowering option

SLT Learning Curve

- Residents vs "less experienced specialists" vs "senior specialists"
- Residents = attendings
- Residents & specialists < senior specialists
- Senior specialists: More spots, more energy, more success
  - No mention of complications
- Conclusion: "The data would suggest that experience is not the deciding factor in terms of outcome and IOP reduction."

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Real-World Outcomes of Selective Laser Trabeculoplasty in the United Kingdom

Anthony P. Khawaja, PhD, FRCOphth,[1] Joanna H. Campbell, PhD,[2] Nicholas Kirby, BSc,[3] Hitesh S. Chandakumi, MBBS, PhD,[4] Ian Keyser, MSc,[5] Mousam Parekh, MS,[5] Andrew I. McNaught, MD,[7,8] for the UK Glaucoma Real-World Data Consortium

- Better outcomes with trainees compared to their consultants
- They assume the more difficult cases were done by consultants
- "Certainly, our data do not suggest an increased chance of success with more experienced laser operators"

Factors Associated With Favorable Laser Trabeculoplasty Response: IRIS Registry Analysis

TA C. CHANG, RICHARD K. PARRISH, DANIELLE FUJINO, SCOTT P. KELLY, AND ELIZABETH A. VANNER

- No difference in outcomes:
  - Glaucoma specialists, nonglaucoma anterior segment surgens, and "others"
  - Varying number of LTP performed in the 12 months preceding the study
- "Technical demands of LTP are modest."

ORIGINAL ARTICLE

Laser Trabeculoplasty Perceptions and Practice Patterns of Canadian Ophthalmologists

Elizabeth Y Lee[1], Forough Farrokhyar[2], Enitan Segbesan[3]

Where does the initial LTP fall the most in your glaucoma treatment algorithm?	124
First-line treatment of glaucoma	22 (17.7)
Concurrently with medical treatment	59 (47.6)
After medical treatment but before surgery	42 (33.9)
After medical treatment and surgery	1 (0.8)

What influences your LTP practice patterns the most?	122
Evidence in literature	50 (40.3)
Teaching during training	19 (15.3)
Past clinical experience	53 (42.7)
Other	2 (1.6)

Would you benefit from a practice guideline for a laser trabeculoplasty?	124
Yes	105 (84.7)
No	19 (15.3)

Acta Ophthalmologica

Abstracts from the 2021 European Association for Vision and Eye Research Festival

Free Access

Effectiveness of selective laser trabeculoplasty in advanced open-angle glaucoma

Cheour Monia, Ouederni Meriem, Nafaa Fehmy, Rym Maamouri, Sassi Hela

First published: 03 January 2022 | https://doi.org/10.1111/j.1755-3768.2022.094

"Selective laser trabeculoplasty is an effective and easy-to-perform physical treatment of advanced open-angle glaucoma with a satisfactory safety profile. It overcomes poor adhesion problems. Our results need to be extended to assess long-term success."

Clinical Ophthalmology

Dovepress

ORIGINAL RESEARCH

Morphologic and Cellular Changes Induced by Selective Laser Trabeculoplasty

Meenakashi Gupta[1], Jae Young Heo[2], Haiyan Gong[3,4], Elliot Cha[3], Mark Latina[4,5], Douglas J Rhee[2]

[1]Department of Ophthalmology, New York Eye & Ear Infirmary of Mt. Sinai, New York, NY, USA; [2]Department of Ophthalmology & Visual Sciences, University Hospitals, Cleveland, OH, USA; [3]Department of Ophthalmology, Boston University, Boston, MA, USA; [4]Department of Ophthalmology, Massachusetts Eye & Ear Infirmary, Boston, MA, USA; [5]Department of Ophthalmology, Advanced Glaucoma Specialists, Reading, MA, USA

Correspondence: Douglas J Rhee, Department of Ophthalmology & Visual Sciences, 10900 Euclid Ave, Lakeside, 4129, Cleveland, OH, 44105, USA, Tel +1 216-844-8590, Fax +1 216-983-0344, Email douglas.rhee@uhhospitals.org

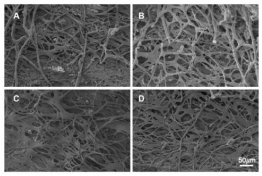

Figure 4 Scanning electron microscope photograph of the human uveal and corneoscleral trabecular meshwork (magnification 330x) at 2 days (**B**) and 7 days (**D**) after SLT treatment. (**A**) and (**C**) depict tissue 2 days and 7 days after sham laser treatment. The architecture of TM is well conserved, showing similar appearance in the control and treated segments.

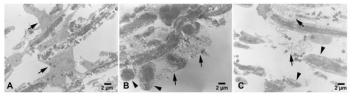

Figure 5 Transmission electron microscope of human trabecular meshwork (TM) after SLT treatment compared to sham control. (**A**) In the sham treatment, trabecular beam are covered by TM endothelial cells (arrows), with pigment particles inside the cells. (**B**) One day after SLT treatment, TM cell damage (arrows) or loss of cells that cover TM beams (arrowheads) are seen in uveal beams. (**C**) Seven day after SLT treatment, TM cell damage (arrows) or cell loss (arrowheads) are seen in uveal beams. Pigment particles and intracellular contents released extracellularly following SLT treatment.

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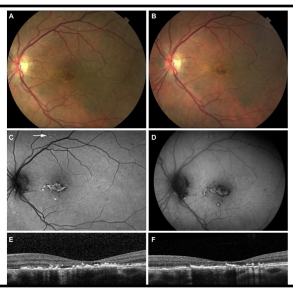
Reports

Dual-mode Capsulotomy and Selective Laser Trabeculoplasty Lasers Continue to Cause Severe, Permanent Macular Injuries

- Case report of a 65-year-old woman complaining of severe vision loss after a failed capsulotomy one week prior
- She was informed that the laser procedure could not be performed in her left eye because of “laser focusing problems”



What happened?

- “Severe macular injuries after inadvertent attempts to use and SLT laser beam to perform capsulotomy"

Who is to blame?

- “Administrative controls were absent or ignored. Laser safety officials at any facility with a capsulotomy- SLT laser system should be aware of its potential misuse”
- “Engineering controls to prevent improper laser mode selection were also inadequate"

American Journal of Ophthalmology Case Reports 18 (2020) 100675

Contents lists available at ScienceDirect

American Journal of Ophthalmology Case Reports

journal homepage: www.elsevier.com/locate/ajoc

Hypopyon following selective laser trabeculoplasty

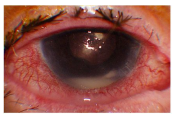
Lisa R. Koenig*, Kyle D. Kovacs, Mrinali P. Gupta, Sarah H. Van Tassel

Weill Cornell Medical College, Department of Ophthalmology, New York, NY, United States

- 85 yr old woman with POAG
- Routine SLT (95 total mJ 360)

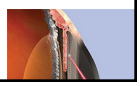
Day 6 Post SLT

- HM vision
- IOP 32mmHg
- Epithelial defect
- Unremarkable uveitis w/u
- A/c paracentesis negative for herpes



Novel SLT approaches

- Annual low-power SLT for OHTN
  - 2014 ARVO paper
  - 0.4mJ; 40-50 spots over 360 degrees
  - Repeated yearly, regardless of IOP level
  - Followed 3-10 years
  - Mean treated IOP similar to traditional SLT
  - Fewer patients needed medications to control IOP vs traditional SLT



Novel SLT approaches

REVIEW

A Review of Selective Laser Trabeculoplasty: Recent Findings and Current Perspectives

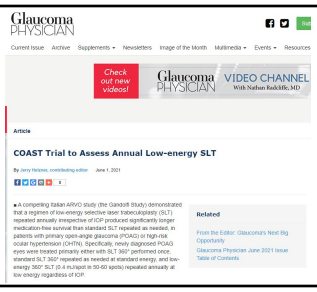
Yujia Zhou · Ahmad A. Aref

- 2018 Review:
  - Shorter time interval between the initial and repeat SLT can result in higher success rates because of ongoing action of initial SLT application

> J Glaucoma. 2021 Jul 1;30(7):545-551. doi: 10.1097/IJG.0000000000001788.

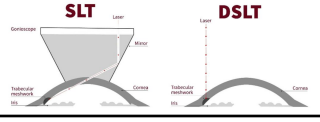
Low-energy Selective Laser Trabeculoplasty Repeated Annually: Rationale for the COAST Trial

Tony Realini [1], Gus Gazzard [2 3], Mark Latina [4], Michael Kass [4 5]



Novel SLT approaches

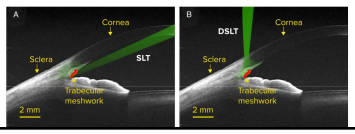
- Trans-scleral approach (Direct SLT)
  - 2014 ARVO paper
  - SLT applied to sclera overlying TM
  - IOP reduction equivalent to traditional SLT



Automated Direct Selective Laser Trabeculoplasty: First Prospective Clinical Trial

Mordechai Goldenfeld[1], Michael Belkin[2], Masha Dobkin-Bekman[3], Zachary Sacks[3], Sharon Blum Meirovitch[1], Noa Geffen[4,5], Ari Leshno[1,4], and Alon Skaat[1,4]

[1] The Sam Rothberg Glaucoma Centre, Goldschleger Eye Institute, Sheba Medical Centre, Tel Hashomer, Israel
[2] Goldschleger Eye Research Institute, Tel Aviv University, Sheba Medical Centre, Tel Hashomer, Israel
[3] BELKIN Laser, Ltd, Yavne, Israel
[4] Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel
[5] Rabin Medical Centre, Petach Tikvah, Israel



Direct SLT Goldenfeld et. al (2021)

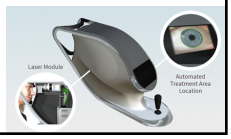
- 15 eyes IOP >21mmHg
- OAG, OHTN, PXG
- 1mJ for 100 shots versus 1.4mJ for 120 shots

Direct SLT Goldenfeld et. al (2021)

		1 Month Postop			3 Months Postop			6 Months Postop		
Total Cohort and Subgroups	Baseline IOP*	IOP	% Reduction	P	IOP	% Reduction	P	IOP	% Reduction	P
Total cohort (n = 15)[a,c]	26.7 ± 2.3	21.7 ± 4.2	18.1	0.005	20.8 ± 2.5	21.4	<0.001	21.5 ± 4.8	18.8	0.003
1 mJ/shot (n = 13)[b,c]	26.8 ± 2.5	21.5 ± 4.4	19.4	0.001	20.7 ± 2.7	22.1	0.001	20.7 ± 3.8	22	0.002
0.8 mJ/shot (n = 2)	26 ± 0.7	23.5 ± 0.7	9.6	ND	21.5 ± 0.7	17.3	ND	26 ± 2.8	0	ND
1 mJ/shot (n = 6)[b]	27.3 ± 3.0	20.0 ± 4.2	26.4	0.03	22.0 ± 2.4	19.4	0.06	22.7 ± 5.1	16.8	0.1
1.4 mJ/shot (n = 6)	26.7 ± 3.2	21.2 ± 2.3	19.9	0.06	19.8 ± 2.9	24.9	0.03	19.3 ± 2.8	27.7	0.03

Direct SLT

- EAGLE Device (External Automatic GLaucoma LasEr)
  - Automated device being investigated
  - 100 spots simultaneously
  - 1 second treatment time
  - No gonio lens



OPEN ACCESS
ARVO Annual Meeting Abstract | June 2022

GLAUrious, a multicentre, randomised, controlled non-inferiority study of direct selective laser trabeculoplasty in open angle glaucoma

Michael Belkin

+ Author Affiliations & Notes

June 2022
Volume 63, Issue 7

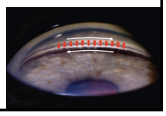
- Purpose: first-line treatment of glaucoma is currently limited by nonadherence to topical medication and by *lack of access to SLT*
- Evaluator masked, randomized, controlled, non-inferiority study
- 13 sites in the UK, Italy, Israel, and the Republic of Georgia
- Patients randomized to direct SLT (DSLT) or SLT
- Results are expected by end of 2022

Direct SLT- What's the point?

- "Given the efficacy of SLT, we considered ways to simplify the procedure. We achieved this goal by irradiating the TM through the limbus."
- "It is possible that a simpler SLT would make general ophthalmologists and other trained allied health professionals more inclined to use it"
- "Optometrists and glaucoma nurses are likely to provide eyecare in the years ahead"

Pattern SLT (PSLT)

- Computer-guided treatment algorithm
- Spots are placed without overlap or gaps
- 100um spot size; 3 rows
- 400mJ/mm (PSLT) vs 9mJ/mm (SLT)



Acta Ophthalmologica 2021

Outcomes of pattern scanning laser trabeculoplasty and selective laser trabeculoplasty: Results from the lausanne laser trabeculoplasty registry

Sina Elahi,[1] Harsha L. Rao,[2] Archibald Paillard[3] and Kaweh Mansouri[1,3]

[1]Glaucoma Research Center, Montchoisi Clinic;Swiss Vision, Lausanne, Switzerland
[2]Narayana Nethralaya, Bangalore, India
[3]Department of Ophthalmology, University of Colorado School of Medicine, Denver, Colorado, USA

Efficacy and safety of selective laser trabeculoplasty and pattern scanning laser trabeculoplasty: a randomised clinical trial

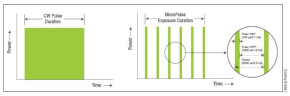
Mandy Oi Man Wong,[1,2] Isabel SW Lai,[1,2] Poemen Puiman Chan,[1,2] Noel CY Chan,[1,3] Alison YY Chan,[1,2] Gilda WK Lai,[1] Vivian SM Chiu,[1] Christopher Kai-Shun Leung[1,2]

- Success = 20% reduction in IOP
- SLT 25% success
- PSLT 15% success

- "PSLT is similar in safety and not superior in efficacy compared to SLT"

Micropulse laser trabeculoplasty (MLT)

- Delivers small, repetitive micropulses rather than one continuous pulse
  - Cooling periods between micropulses reduces tissue damage
  - Does not destroy pigmented cells
  - Less pain during and after procedure

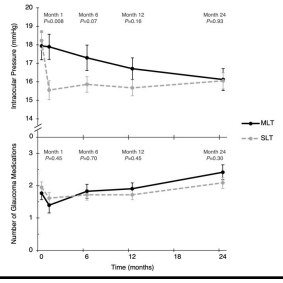


Clinical Ophthalmology

Dovepress

ORIGINAL RESEARCH

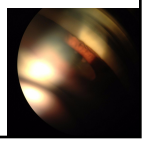
Clinical Outcomes of Micropulse Laser Trabeculoplasty Compared to Selective Laser Trabeculoplasty at One Year in Open-Angle Glaucoma



Iridotomy

Laser peripheral iridotomy (LPI)

- How likely is this patient to develop glaucoma?
- How do we predict whether she will progress?
- How effective is LPI?
- What do we do if LPI fails?



How are we doing?

Eye
https://doi.org/10.1038/s41433-020-1003-0

The ROYAL COLLEGE of OPHTHALMOLOGISTS

ARTICLE

Predictors of narrow angle detection rate—a longitudinal study of Massachusetts residents over 1.7 million person years

Cecilia S. Lee[1] · Michael L. Lee[2] · Ryan T. Yanagihara[1] · Aaron Y. Lee[1]

Received: 2 March 2020 / Revised: 14 May 2020 / Accepted: 21 May 2020
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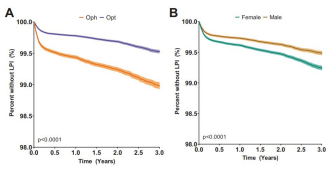


Fig. 1 Kaplan–Meier curves on narrow angle detection in patients grouped by type of provider (a) and sex (b). *X*-axis: years since the first eye evaluation. *Y*-axis: percent of study population who has not received laser peripheral iridotomy (LPI). **a** Purple: patients seen by optometrists; Orange: patients seen by ophthalmologists; **b** Yellow: male; Green: female.

Conclusions

- "Lower rate of narrow angle detection in patients who are only followed by optometrists has important clinical implications"
- "Evaluation by ophthalmologists may benefit patients who are at increased risk of PACG"
- "These differences raise concerns regarding recently increased scope of practice for optometrists in some US states"

ELSEVIER

Ophthalmology
Volume 129, Issue 2, February 2022, Pages 147-158

Original Article

The Singapore Asymptomatic Narrow Angles Laser Iridotomy Study: Five-Year Results of a Randomized Controlled Trial

Purpose

To examine the efficacy of laser peripheral iridotomy (LPI) in patients who received a diagnosis of primary angle-closure suspect (PACS).

Design

Prospective, randomized controlled trial.

- N = 480 patients
- Age 50 and up
- Participants were asymptomatic PACS = At least 2 quadrants of appositional angle closure on gonioscopy
- 93% Chinese
- 76% women

- Iridotomy in one randomly selected eye
- Fellow eye was control
- Followed yearly for five years

Main outcome measure: development of primary angle closure, primary angle closure glaucoma, or acute angle closure over five years

Singapore study results

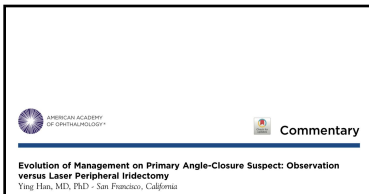
- Treated eyes: 24 with progression
- Untreated eyes: 45 with progression

  (Statistically significant difference)

- Number needed to treat: 22 eyes

Singapore study conclusion

- "In patients with bilateral asymptomatic PACS, eyes that underwent prophylactic LPI reached significantly fewer end points compared with control eyes over 5 years. However, the overall incidence of PAC or PACG was low."



AAO Commentary

- Is LPI overused for PACS?
- 50,000/yr in US
- 28 million cases of PACS in China alone

AAO Commentary

- Points out that ZAP and ANA-LIS both support observation of PACS without LPI
- However, in both trials, high-risk PACS patients were excluded
  - Therefore the reported conversion rates may be artificially low
- Perhaps these trials oversimplify the issue?

AAO Commentary

- "The management of PACS is evolving as we gain a better understanding of the natural history of this condition."

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www.nature.com/eye

EDITORIAL

Prevention of angle-closure glaucoma: balancing risk and benefit

- Purpose: To implement recent evidence from EAGLE, LiGHT, and ZAP trials to modify NHS (UK) practice guidelines
  - "The huge backlog for routine care makes it vital that clinical capacity be used for maximum benefit."
- EAGLE: PACG or PAC and IOP > 30 should receive lens extraction
- LiGHT: SLT works and is cost-effective
- ZAP: Minimal progression from PACS, treated or untreated.

- "Not a final definitive policy for PACG management in the UK, but an important stage in its evolution"

- "Prophylactic LPI should only be offered to those individuals at highest risk"

Table 2. "PACS PLUS" - Criteria for referral of people with suspected occluded angles to Hospital Eye Service or secondary care provider.

Angle criteria
Either—an anterior segment OCT showing irido-trabecular contact (ITC)
Or—a limbal chamber depth grade <25%
PLUS: one of the following criteria
• People with only one "good eye" in which deterioration of vision may threaten independent living or livelihood.
• Vulnerable adults who may not report ocular or vision symptoms
• Family history of significant angle-closure disease
• High hypermetropia (>+6.00 dioptres)
• Diabetes or another condition necessitating regular pupil dilation
• Those using antidepressants or medication with an anticholinergic action
• People either living in remote locations (such as foreign aid workers, armed forces stationed overseas or oil rig workers etc.) where rapid access to emergency ophthalmic care is not possible
The finding of "PACS PLUS" should trigger referral to the Hospital Eye Service
"PACS MINUS"
If an individual has the angle-characteristics specified above but none of the "plus" criteria, and does not meet NICE glaucoma referral guidelines, they should be advised to seek an annual NHS sight test.

Appositional angle closure and conversion of primary angle closure into glaucoma after laser peripheral iridotomy

Li Qiu,[1,2] Yujie Yan,[1,3] Lingling Wu [1]

- 128 PAC patients received LPI in China
- Looked at conversion from PAC to PACG more than 5 years after LPI

Conclusions

- 25% of PAC eyes converted to PACG during mean follow-up of 6.6 years
- Difficulty applying this to different ethnicities

Table 2 Baseline characteristics of the PAC converting (PAC converting into PACG) and PAC non-converting groups

	PAC converting (n=18)	PAC non-converting (n=40)	P value
Age (years)	67.0±8.63	61.15±8.24	0.017*
Sex (male/female)	8/10	12/28	0.284†
Duration of follow-up (years)	6.83±1.29	6.60±1.35	0.541*

*Independent sample t-test for age and follow-up duration.
†χ^2 test for sex.
PAC, primary angle closure; PACG, primary angle closure glaucoma.

Table 3 Baseline AppAC range and angle closure of converting and non-converting eye groups

	Converting eyes (n=20)	Non-converting eyes (n=60)	P value
AppAC range (quadrant)			
> 1	40.0% (8/20)	30.0% (18/60)	0.408
> 2	35.0% (7/20)	8.3% (5/60)	0.008* (CR: 0.308, p=0.004)
Synechia angle closure range (quadrant)			
Positive	80.0% (16/20)	60.0% (36/60)	0.104
Synechia angle closure plus AppAC range (quadrant)			
> 1	70.0% (14/20)	58.3% (35/60)	0.354
> 2	50.0% (10/20)	23.3% (14/60)	0.024 (CR: 0.224, p=0.024)

SURVEY OF OPHTHALMOLOGY XXX (2020) 1–13

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/survophthal

Major review

Clear lens extraction in eyes with primary angle closure and primary angle-closure glaucoma

Vital P. Costa, MD, PhD[a,*], Christopher K.S. Leung, MD, PhD[b], Michael S. Kook, MD[c], Shan C. Lin, MD[d], On behalf of the Global Glaucoma Academy

Table 1 – Summary of clinical studies: phacoemulsification and IOL implantation in eyes with cataract and PAC or PACG

Author	Sample size	PAC or PACG	Mean follow-up (months)	Preoperative IOP (mm Hg)	Postoperative IOP (mm Hg)	% IOP reduction	Preoperative # meds	Postoperative # meds	% reduction in # meds
Hayashi et al[27] (2001)	74	PACG	25	21.4	14.5	34	1.3	0.6	53.8
Di Staso et al[18] (2002)	12	PACG	9	21	15	28.6	2.1	1.0	52.4
Nonaka et al[64] (2005)	13*	PACS/PAC/PACG	3	19.3	14.8	23.3	No data	No data	No data
Lai et al[38] (2006)	21	PACG	20.7	19.7	15.5	21.3	1.91	0.52	73.6
Liu et al[50] (2006)	29	PACG	3	14.3	12.2	14.7	1.93	0.83	57
Tham et al[87] (2008)	35	Medically controlled PACG	24	16.3	13.2	19	2.2	1.1	50
Mierzejewski et al[57] (2008)	29	PACG	15.9	20	14	30	1.5	1.2	20
Hata et al[26] (2008)	27	Medically controlled PAC/PACG	6	14.8	10.8	27	0.4	0	100
Zhuo et al[110] (2009)	10	Medically uncontrolled PACG	6	32	16.7	47.8	3	0.2	93.3
Tham et al (2009)[88]	27	Medically uncontrolled PACG	24	24.4	16.1	34	3.3	1.7	48.5
Liu et al[49] (2011)	50	PACG	12	16.4	13.5	18	1.8	1.0	44.4
Shams and Foster[77] (2012)	55	PAC/PACG	Mean 7.2	18.7	14.1	24.6	No data	No data	No data
Latifi et al[42] (2013)	62	PACG	1.5	23.1	16	30.7	1.1	0.07	93.6
Moghimi et al[59] (2015)	46	PACG	12	22.3	14.0	37	1.2	0.1	91.6
Zhang et al[107] (2015)	36	PACG	6	19.8	13.7	30.8	No data	No data	No data
Özyol et al[65] (2016)	39	PACG	3	18.5	14	24.3	1.9	0.8	57.9
Selvan et al[76] (2019)	18	PAC	6	31.6	14	55.7	4	2	50

IOP, intraocular pressure; PAC, primary angle closure; PACG, primary angle-closure glaucoma; PACS, primary angle closure suspects.
* Some eyes had clear lens, but the exact number was not mentioned in the manuscript.

Conclusion

"Ten years ago, performing clear lens phacoemulsification in eyes with angle closure would probably have been considered
unethical. With the scientific evidence that has been built over the past decade, it is evident that clear lens extraction is beneficial in eyes with PAC and PACG"

Graefe's Archive for Clinical and Experimental Ophthalmology
https://doi.org/10.1007/s00417-020-04672-1

GLAUCOMA

Check for updates

Impact of laser iridotomy on headache symptoms in angle-closure subjects

Filipa Jorge Teixeira[1,2] · Filipa Caiado Sousa[1,2] · Nuno Pinto Ferreira[1,2] · Raquel Esteves Marques[1,2] · Rafael Correia Barão[1,2] · Luís Abegão Pinto[1,2,3]

Table 3 Comparison between symptomatic and asymptomatic patients using the HIT-6 scoring system

	Symptomatic (HIT ≥ 50)			Asymptomatic (HIT < 50)			*p* value
Patients, *n* (%)	24 (77.4%)			7 (22.6%)			
Male:female ratio	3:21			5:2			< 0.01
Age (years)	54.0 ± 15.2			64.7 ± 4.4			0.07
SE (diopters)	+ 1.6 ± 1.4			+ 1.8 ± 0.3			0.50
Diagnosis							
PACS	16			2			
PAC	4			2			-
PACG	4			3			
	Pre-LPI	**Post-LPI**	***p* value**	**Pre-LPI**	**Post-LPI**	***p* value**	
HIT-6 score	65.3 ± 6.2	46.2 ± 8.3	< 0.01	41.1 ± 4.7	42.5 ± 4.4	0.22	
HIT-6 score mean difference	− 19.1			+ 1.4			
Subjective improvement: frequency	19 (79.2%)			0 (0%)			
Subjective improvement: intensity	19 (79.2%)			0 (0%)			

HIT, Headache Intensity Questionnaire; *SE*, spherical equivalent; *LPI*, laser peripheral iridotomy; *PACS*, primary closure suspect; *PAC*, primary angle closure; *PACG*, primary angle-closure glaucoma; *SD*, standard deviation

Iridotomy and Headaches

- Authors didn't necessarily link these headaches to angle closure attacks
- Postulated a link to migraine-like headaches, possibly mediated by activity of iris and/or ciliary body muscles

Case Report

Descemet's Membrane Injury Post YAG Peripheral Iridotomy

Harsh Kumar, Chirag Mittal, Arushi Puri

Centre For Sight Eye Hospital, New Delhi, India

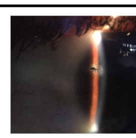

Figure 1. Anterior segment photograph of Right eye showing three small circular defects in the Descemet's membrane just above the lasered PI.

Figure 2. Anterior- Segment OCT of Right eye shows two defects in the descemet's membrane.

BMJ Journals

British Journal of Ophthalmology

Clinical science

Cataract progression after Nd:YAG laser iridotomy in primary angle-closure suspect eyes

- Analyzed 889 eyes from ZAP study for cataract progression following iridotomy
- Accelerated cataract development has long been included on the list of risks of iridotomy
- What is the actual risk?

- After six years, no statistically significant different in cataract development in treated versus untreated eyes
- Conclusion: prophylactic YAG iridotomy does not increase the risk of developing clinically meaningful cataract worsening over time

OPEN ACCESS

ARVO Annual Meeting Abstract | June 2022

A systematic review of laser peripheral iridotomy placement for reducing the incidence of dysphotopsia symptoms in primary-angle closure

Rachel Xuan; Keith Ong

+ Author Affiliations & Notes

Investigative Ophthalmology & Visual Science June 2022, Vol.63, 162 – A0355. doi:

- Authors searched five electronic databases for randomized controlled trials
- Five RCTs involving 2364 eyes were reviewed
- Result: Moderate certainty evidence shows no difference between superior and horizontal placement. Low certainty evidence demonstrated conflicting results.
- Conclusion: more high-certainty trials are needed

ELSEVIER

Canadian Journal of Ophthalmology

Volume 57, Issue 1, February 2022, Pages 23-28

Original Article

Assessing the quality of online information on glaucoma procedures

Ammar M. Khan MD *, Hzaris M. Khan BSc † ‡, Paul Huang MD *, Kevin Warrian MD, FRCSC *, Patrick Gooi MD, FRCSC *

- Performed Google searches for "peripheral iridotomy" and "trabeculectomy"
- Graded the first 50 results for each using JAMA assessment tools for information quality

- Only 22% of websites for iridotomy and 34% of websites for trabeculectomy were rated as high quality
- Conclusion: information found online for common ophthalmic procedures is of variable and poor quality. Patients may be receiving misinformation online.

YAG Capsulotomy

Eradication of Posterior Capsule Opacification

Documentation of a Marked Decrease in Nd:YAG Laser Posterior Capsulotomy Rates Noted in an Analysis of 5416 Pseudophakic Human Eyes Obtained Postmortem

Clinical Ophthalmology

Dovepress
open access to scientific and medical research

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ORIGINAL RESEARCH

Academy IRIS® Registry Analysis of Incidence of Laser Capsulotomy Due to Posterior Capsule Opacification After Intraocular Lens Implantation

Jeffrey D Horn[1], Bret L Fisher[2], Daniel Terveen[3], Helene Fevrier[4], Mohinder Merchea[5], Xiaolin Gu[6]

[1]Vance for Life, Nashville, TN, USA; [2]Eye Center of North Florida, Panama City, FL, USA; [3]Vance Thompson Vision, Sioux Falls, SD, USA; [4]Verana Health, San Francisco, CA, USA; [5]Alcon Vision LLC, Fort Worth, TX, USA

- Utilized IRIS registry data to determine incidence of PCO diagnosis following cataract surgery
- 90,000 eyes had cataract surgery in the registry

- Result: 28% had diagnosis of PCO within one year of cataract surgery
  - 10% underwent YAG capsulotomy

Acta Ophthalmologica / Early View

Original Article

Nd:YAG capsulotomy is not a risk factor for retinal detachment after phacoemulsification cataract surgery

Uri Elbaz,Laura Hakkala,Idan Hecht,Asaf Achiron,Assaf Gershoni,Raimo Tuuminen

First published: 10 January 2021
https://doi.org/10.1111/aos.14757

- Chart review from Finland
- Over 17,000 eyes
- 83 RDs (0.11% per year)
- Risk factors for RD: Age, male gender, Low IOL Power
- Conclusion: "Real world evidence suggests that Nd:YAG capsulotomy does not increase the risk for PRD"

REVIEW

Open Access

Refraction Shift After Nd:YAG Posterior Capsulotomy in Pseudophakic Eyes: A Systematic Review and Meta-analysis

Yuan Tan, MD; Jianing Zhang, MD, PhD; Wei Li, MD; Guangming Jin, MD, PhD; Lixia Luo, MD, PhD; Zhenzhen Liu, MD, PhD

Journal of Refractive Surgery • Vol. 38, No. 7, 2022

- Purpose: does YAG Capsulotomy cause a refractive shift?
- Meta-analysis of 18 studies including 805 eyes
- Conclusion: no significant change in spherical error, cylinder error, or anterior chamber depth

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www.nature.com/eye

ARTICLE

Check for updates

"Comparing outcomes of advanced nurse practitioners to ophthalmologists performing posterior YAG capsulotomy, a six-year study of 6308 eyes"

George Moussa[1,2], Dimitrios Kalogeropoulos[1,2], Soon Wai Ch'ng[1], Jesse Panthagani[1], Ziad Abdel-Karim[1] and Walter Andreatta[1,3,4]

- Compared visual acuity outcomes and need for repeat procedure
- Retrospective case series of over 6000 eyes
  - 2100 performed by ANP
  - ANP Training
    - Laser course
    - Observation
    - 40 supervised cases

Table 3. Differences in characteristics and outcomes of eyes with primary YAGPC and those requiring further YAGPC.

	No Further YAGPC 6213 (98.5%)	Further YAGPC 95 (1.5%)	*p* value
Age (years, IQR)	75.0 (67.0 to 82.0)	66.0 (51.0 to 78.0)	**<0.001**
Ocular co-morbidity (% Yes)			
No	4565 (98.9%)	51 (1.1%)	**<0.001**
Yes	1648 (97.4%)	44 (2.6%)	
Gender			
Male	2649 (98.5%)	39 (1.5%)	0.835
Female	3564 (98.5%)	56 (1.5%)	
Operator Grade			
ANP	2073 (99.3%)	15 (0.7%)	**<0.001**
Ophthalmologist	4140 (98.1%)	80 (1.9%)	
SAS	1191 (98.0%)	24 (2.0%)	0.982
Resident	797 (98.2%)	15 (1.8%)	
Fellow	940 (98.0%)	19 (2.0%)	
Consultant	1212 (98.2%)	22 (1.8%)	
Pre-YAGPC VA (LogMAR)	0.48 (0.30 to 0.78)	0.48 (0.30 to 1.00)	0.188
Post-YAGPC VA (LogMAR)	0.18 (0.10 to 0.30)	0.30 (0.18 to 0.78)	**<0.001**
LogMAR Gain	0.30 (0.08 to 0.48)	0.18 (0.00 to 0.48)	**0.023**

ANP YAG Safety and Efficacy

- No difference in visual outcomes
- ANPs had fewer cases requiring repeat YPC
- No difference in complication rates

Case Report

SAGE Open Medical Case Reports

SAGE Open Medical Case Reports
Volume 10: 1–4

DOI: 10.1177/2050312122109775
journals.sagepub.com/home/sco
SAGE

Cataract extraction after inadvertent Nd:YAG laser capsulotomy in a phakic eye

Majid Moshirfar[1,2,3], Alyson N Tukan[4] and Nour Bundogji[4]

Abstract

Inadvertent neodymium: yttrium–aluminum–garnet (Nd:YAG) capsulotomies are rare, with only one incident reported in the literature prior to the present case. We discuss the management of a phakic patient with a dense posterior subcapsular cataract who underwent yttrium–aluminum–garnet (YAG) capsulotomy for presumed posterior capsular opacification. Operative course involved cataract surgery with anterior vitrectomy for prolapsed lens fragments due to the disrupted posterior capsule. This patient experienced excellent visual outcomes postoperatively, with ultimate best-corrected visual acuity of 20/20. This case underscores the importance of thorough preoperative time out, including confirmation of patient's understanding of the intended procedure.

- "After firing several shots with the YAG laser, the ophthalmologist realized that the patient was phakic, and her dense posterior subcapsular cataract had been mistaken for PCO."

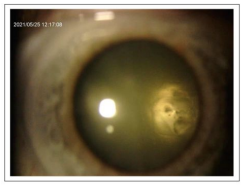


Figure 1. Patient's left eye on slit-lamp evaluation after inadvertent YAG capsulotomy showing disruption of the posterior subcapsular cataract and posterior capsule.

- Patient underwent cataract surgery and vitrectomy for prolapsed lens fragments
- Conclusion: "Preventable errors such as performing YAG capsulotomy in a phakic eye are unacceptable. Preoperative timeouts should be considered an essential component of any procedure and performed with diligence."

Hindawi
Journal of Ophthalmology
Volume 2020, Article ID 4153108, 10 pages
https://doi.org/10.1155/2020/4153108

Hindawi

Research Article

The Effect of Capsulotomy Shape on Intraocular Light-Scattering after Nd:YAG Laser Capsulotomy

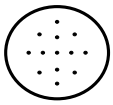
Table 1: The OSI, SE, and CDVA before and after capsulotomy.

	Circular group	Cruciate group	U or t	*P*
PCO score	7.30 ± 1.27	7.57 ± 1.14	−0.73	0.47
Laser energy	93.48 ± 31.04 mJ	77.19 ± 22.47 mJ	1.95	0.06
CDVA before capsulotomy	0.86 ± 0.40 logMAR	0.78 ± 0.43 logMAR	−0.78	0.44
CDVA 1 week after capsulotomy	0.19 ± 0.07 logMAR	0.08 ± 0.07 logMAR	207.50	0.72
CDVA 1 month after capsulotomy	0.06 ± 0.06 logMAR	0.04 ± 0.05 logMAR	180.00	0.25
OSI before capsulotomy	8.58 ± 1.76	8.27 ± 2.07	0.52	0.61
OSI 1 week after capsulotomy	2.57 ± 1.25	3.69 ± 1.53	−2.61	0.01
OSI 1 month after capsulotomy	1.82 ± 0.73	3.00 ± 1.21	3.82	<0.001
SE before capsulotomy	−0.67 ± 3.40 D	0.07 ± 3.50 D	−0.70	0.49
SE 1 week after capsulotomy	−0.25 ± 0.68 D	−0.11 ± 0.83 D	−0.61	0.55
SE 1 month after capsulotomy	−0.30 ± 0.63 D	−0.12 ± 0.74 D	−0.84	0.41

mJ = millijoules; OSI = objective scatter index; SE = spherical equivalent; CDVA = corrected distance visual acuity. The results are presented as mean ± SD.

Octagonal approach

- Goal is to combine benefits of both cruciate and circular techniques



Int Ophthalmol
https://doi.org/10.1007/s10792-020-01397-2

ORIGINAL PAPER

Comparison of wavefront aberrations in eyes with multifocal and monofocal iols before and after Nd:YAG laser capsulotomy for posterior capsule opacification

Esat Cinar · Berna Yuce · Fatih Aslan · Gökhan Erbakan

Table 3 Aberration compared to baseline and baseline or after and after Nd:YAG laser capsulotomy in both groups (6.0 mm pupil)

Multifocal compared to Monofocal IOL						
Parameter	Baseline (MfIOL)	Baseline (MoIOL)	*P* value	After capsulotomy (MfIOL)	After capsulotomy (MoIOL)	*p* value
Coma Z (3 ± 1)	0.294 ± 0.18	0.268 ± 0.15	0.842	0.190 ± 0.18	0.188 ± 0.15	0.852
Trefoil Z (3 ± 3)	0.307 ± 0.21	0.259 ± 0.17	0.737	0.285 ± 0.16	0.206 ± 0.15	0.483
Astigmatism Z (2 ± 2)	0.621 ± 0.36	0.677 ± 0.44	0.124	0.548 ± 0.28	0.639 ± 0.34	0.374
Spherical aberration Z (4 ± 0)	0.213 ± 0.11	0.219 ± 0.17	0.954	0.180 ± 0.11	0.192 ± 0.17	0.645
Astigmatism II Z (4 ± 2)	0.068 ± 0.048	0.079 ± 0.048	0.235	0.059 ± 0.041	0.069 ± 0.045	0.785
Quadrafoil Z (4 ± 4)	0.064 ± 0.054	0.077 ± 0.064	0.217	0.060 ± 0.045	0.052 ± 0.045	0.673
Coma II Z (5 ± 1)	0.037 ± 0.026	0.047 ± 0.044	0.114	0.028 ± 0.025	0.031 ± 0.040	0.836
Trefoil II Z (5 ± 3)	0.043 ± 0.028	0.041 ± 0.026	0.683	0.027 ± 0.024	0.039 ± 0.024	0.701
Pentafoil Z (5 ± 5)	0.022 ± 0.019	0.025 ± 0.021	0.934	0.024 ± 0.020	0.021 ± 0.021	0.736
Spherical aberration II Z (6 ± 0)	0.003 ± 0.057	-0.0095 ± 0.03	0.937	0.003 ± 0.042	-0.0042 ± 0.04	0.951
Astigmation III Z (6 ± 2)	0.016 ± 0.013	0.035 ± 0.029	0.654	0.014 ± 0.011	0.036 ± 0.033	0.203
quadrifoil II Z (6 ± 4)	0.033 ± 0.021	0.029 ± 0.022	0.374	0.031 ± 0.035	0.030 ± 0.027	0.971
Exafoil Z (6 ± 6)	0.041 ± 0.040	0.030 ± 0.030	0.279	0.030 ± 0.027	0.031 ± 0.035	0.956
RMS						
Total	0.863 ± 0.27	0.862 ± 0.31	0.914	0.504 ± 0.24	0.466 ± 0.26	0.357
HOAs	0.546 ± 0.23	0.500 ± 0.21	0.828	0.364 ± 0.19	0.346 ± 0.18	0.111

MfIOL Multifocal IOL, *MoIOL* Monofocal IOL, *RMS* Root mean square, *HOAs* Higher Order Aberrations

Analysis of YAG Laser-Induced Damage in Intraocular Lenses: Characterization of Optical and Surface Properties of YAG Shots

Andreas F. Borkenstein Eva-Maria Borkenstein
Borkenstein & Borkenstein, Privatklinik der Kreuzschwestern Graz, Graz, Austria

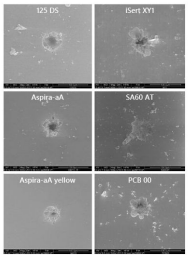
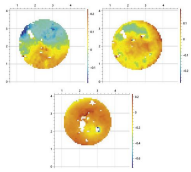


Fig. 11

Examples of IOL wavefront analysis, showing white spots. IOL, intraocular lens.



Conclusion: "YAG capsulotomy should be... carried out with precision and without time pressure. The results of this study should draw attention to the topic and be the start for larger follow-up studies."

OPEN ACCESS

ARVO Annual Meeting Abstract | June 2021

Utility of post-operative review following Nd:YAG laser capsulotomy

Jessica F Yang; Logan Vander Woude; Mollie K Mansfield; Amit Walia; Mark B Sherwood; Siva S Radhakrishnan Iyer

+ Author Affiliations & Notes

Investigative Ophthalmology & Visual Science June 2021, Vol.62, 2055. doi:

- Chart review of over 1400 eyes at University Florida
- No significant change in mean IOP at 30 minutes or one week
  - Most patients received prophylactic brimonidine
- Glaucoma was not considered a risk factor for rise in IOP
- YAG does not seem to increase the risk of retinal tear or retinal detachment

- "In this Covid-19 era, when all practitioners aim to decrease in person visits, small changes on a large scale can make an impact. If validated, our results bring into question the necessity of postop visits after YAG."

American Journal of Ophthalmology Case Reports 23 (2021) 101122

Contents lists available at ScienceDirect

American Journal of Ophthalmology Case Reports

journal homepage: www.ajocasereports.com/

Iris epithelium detachment – An uncommon complication of Nd:YAG laser capsulotomy

Thomas Stax Jakobsen [*,1], Musa Yasin Kaya [1], Jesper Ørnegaard Hjordal, Anders Ramløv Iversen

Department of Ophthalmology, Aarhus University Hospital, DK-8200, Aarhus N, Denmark

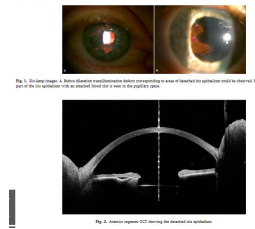


Fig. 1. Slit-lamp images. A. Before dilation examDominative defects corresponding to areas of detached iris epithelium could be observed. B. Following dilation part of the iris epithelium with an attached blood clot is seen in the pupillary space.

Fig. 2. Anterior segment OCT showing the detached iris epithelium.

Myopia

OPEN ACCESS

ARVO Annual Meeting Abstract | June 2022

Refractive error in Hong Kong preschool children and its association with near work

Seen Hang Chan; Kai Yip Choi; Henry Ho-lung Chan

+ Author Affiliations & Notes

Investigative Ophthalmology & Visual Science June 2022, Vol.63, 256 – A0110. doi:

2022 Abstract Issue

June 2022

Volume 63, Issue 7

- 336 preschool children age 3 to 7 were examined. Parental questionnaires were collected.
- Longer time spent on near work, including doing homework, reading books and drawing, and on digital devices were associated with more myopia

› Br J Ophthalmol. 2020 Jul;104(7):956-961. doi: 10.1136/bjophthalmol-2019-314101. Epub 2019 Oct 15.

Protective behaviours of near work and time outdoors in myopia prevalence and progression in myopic children: a 2-year prospective population study

- Based on data from Myopia Investigation Study
  - Over 10k Taiwanese myopic children aged 9 to 11 years, examined every 6 months for 2 years
  - Protective factors against myopia presence and progression

- Protective factors against myopia presence and progression
  - **Near working distance > 30cm**
  - Discontinuing or pausing near work every 30 minutes
  - More outdoor activity during recess

THE LANCET
Digital Health

Log in

ARTICLES | VOLUME 3, ISSUE 12, E806-E818, DECEMBER 01, 2021

Association between digital smart device use and myopia: a systematic review and meta-analysis

Joshua Foreman, PhD • Arief Tjitra Salim, BEng • Anitha Praveen, PhD • Dwight Fonseka, MEdu • Daniel Shu Wei Ting, MD • Prof Ming Guang He, MD • et al. Show all authors

Open Access • Published: October 05, 2021 • DOI: https://doi.org/10.1016/S2589-7500(21)00135-7

Check for updates

PlumX Metrics

- 33 articles in systematic review and 11 in meta-analysis
- Smart device screen time alone or in combination with computer use was significantly associated with myopia
- Limitations: studies did not include reliable measures of screen time, many did not adjust for confounders in the analysis
- Conclusion: smart device exposure might be associated with an increased risk of myopia

AMERICAN ACADEMY OF OPHTHALMOLOGY®

Prevalence Trend of Myopia after Promoting Eye Care in Preschoolers

A Serial Survey in Taiwan before and during the Coronavirus Disease 2019 Pandemic

Yu-Chieh Yang, MD,[1,] Nai-Wei Hsu, MD, PhD,[2,3,4,5,*] Chiao-Yu Wang, MD,[6,*] Mong-Ping Shyong, MD, PhD,[6,7] Der-Chong Tsai, MD, PhD[4,5,6]*

- A Taiwanese preschool district increased outdoor activities
- 24,000 kindergartners age 5 and 6, followed between 2014 and 2020
- Two hours outdoors per day, ensuring good classroom lighting, avoiding prolonged near work activities

- Prevalence of myopia decreased after implementing the program

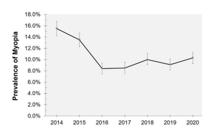


Figure 1. Line graph showing the L-shaped secular decline in the prevalence of myopia from 2014 through 2020 among preschoolers 5 to 6 years of age in Yilan, Taiwan ($P < 0.001$ for trend).

Contact Lens and Anterior Eye 45 (2022) 101530

Contents lists available at ScienceDirect

Contact Lens and Anterior Eye

journal homepage: www.elsevier.com/locate/clae

ELSEVIER

Efficacy, predictability and safety of long-term orthokeratology: An 18-year follow-up study

Joan Gispets[a,*], Pilar Yébana[a], Núria Lupón[a], Genis Cardona[a], Joan Pérez-Corral[a], Jaume Pauné[b], Bernat Cortilla[c]

- Retrospective observational study looking at 300 randomly selected patients from three practices in Barcelona
    - 66% adults

Table 2
Summary of the reported adverse effects in children and adults. Results are shown as number of complications and incidence (in cases per 10,000 patient-years).

	Cases Total	% Total	Incidence Total	Cases Children	Incidence Children	Cases Adults	Incidence Adults
Corneal staining	350	73.22	1591.39	85	1166.94	265	1801.62
Corneal erosion	44	9.21	200.06	15	205.93	29	197.16
Corneal infiltrate	27	5.65	122.76	9	123.56	18	122.37
Pigmented iron ring	10	2.09	45.47	5	68.64	5	33.99
Bulbar hyperaemia	9	1.88	40.92	6	82.37	3	20.40
Papillary conjunctivitis	8	1.67	36.37	4	54.91	4	27.19
Conjunctivitis	7	1.46	31.83	4	54.91	3	20.40
Corneal oedema	7	1.46	31.83	2	27.46	5	33.99
Palpebral oedema	5	1.05	22.73	0	0.00	5	33.99
Nebular Corneal opacity	4	0.84	18.19	1	13.73	3	20.40
Viral keratoconjunctivitis	2	0.42	9.09	0	0.00	2	13.60
Band keratopathy	2	0.42	9.09	2	27.46	0	0.00
Corneal ulcer	2	0.42	9.09	1	13.73	1	6.80
Microbial keratitis	1	0.21	4.55	0	0.00	1	6.80
Overall	**478**	**100**		**134**		**344**	

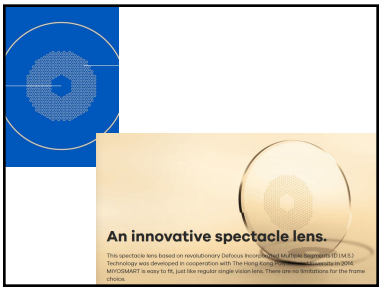
- Discontinuation rate within first year
    - 33% of adults
    - 17% of children

Clinical science

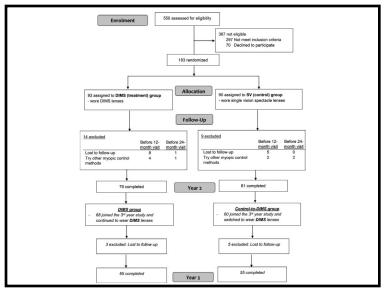
OPEN ACCESS

Myopia control effect of defocus incorporated multiple segments (DIMS) spectacle lens in Chinese children: results of a 3-year follow-up study

Carly SY Lam ,[1,2] Wing Chun Tang,[1] Paul H Lee ,[3] Han Yu Zhang ,[1] Hua Qi,[4] Keigo Hasegawa,[4] Chi Ho To[1,2]



- Original study period was two years
- 128 children
- Original study was randomized to DIMS or SV specs for 2 years
- For the third year, SV group was switched to DIMS



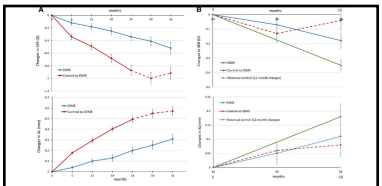


Figure 2 (A) Changes in spherical equivalent refraction (SER) and axial length (AL) from baseline to 36 months. The red dotted line represents the period (24–36 months) during which the previous single vision control group wore defocus incorporated multiple segments (DIMS) lenses. (B) The third-year changes in SER and AL in the DIMS and Control-to-DIMS groups. The green line shows the 12-month changes in SER and AL in the historical control group.

- Conclusion: "Further monitoring is required to ascertain the treatment effect over a longer period. We also plan to follow up on those children who discontinued wearing the DIMS lenses to determine if rebound occurs."

AMERICAN ACADEMY OF OPHTHALMOLOGY

Effect of Repeated Low-Level Red-Light Therapy for Myopia Control in Children

A Multicenter Randomized Controlled Trial

Yu Jiang, MD,[1,a] Zhaoting Zhu, MD, PhD,[1,a] Xingping Tan, MD,[2,a] Xianghui Kong, MD, PhD,[3,a] Hui Zhong, PhD,[4,a] Jun Zhang, MD,[1] Ruilin Xiong, MD,[1] Yexing Yuan, MD,[1] Junwen Zeng, MD, PhD,[1] Ian G. Morgan, PhD,[5] Mingguang He, MD, PhD[5,6,7]

- 264 Chinese children age 8 to 13
- Refractive error -1.00 to -5.00
- 12 months of follow up
- Desktop light therapy 650 nm wavelength, 1600 lux
- Three minute sessions twice daily, five days per week
- OCT scans to monitor for structural side effects (none noted)

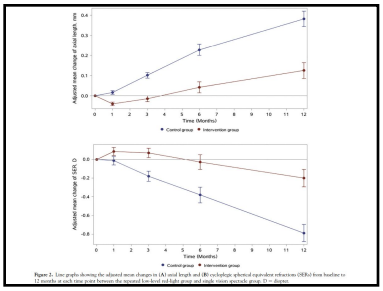


Figure 2. Line graphs showing the adjusted mean changes in (A) axial length and (B) cycloplegic spherical equivalent refractions (SERs) from baseline to 12 months at each time point between the repeated low-level red-light group and single vision spectacle group. D = diopter.

- Slowed axial elongation by 69%
- Slowed myopic progression by 77%
- Axial length decreased in 22% of participants!

- Hypothesized mechanism:
  - Recent evidence suggests scleral hypoxia may promote scleral remodeling and myopia development
  - Red light treatment might increase blood flow and metabolism of the fundus, thus decreasing scleral hypoxia

- Authors call for further research with double masking and placebo control
- Need to understand long-term efficacy and safety, rebound effects, optimal treatment strategies, and potential underlying mechanisms

Original Investigation FREE

August 11, 2020

Effect of High Add Power, Medium Add Power, or Single-Vision Contact Lenses on Myopia Progression in Children

The BLINK Randomized Clinical Trial

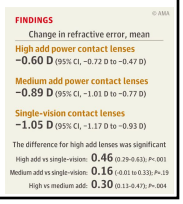
Jeffrey J. Walline, OD, PhD[1]; Maria K. Walker, OD, PhD[2]; Donald O. Mutti, OD, PhD[3]; et al

Author Affiliations | Article Information

JAMA. 2020;324(6):571-580. doi:10.1001/jama.2020.10834

- 294 children age 7 to 11
- Ohio State and University of Houston
- Followed for three years
- Medium or high add center distance multifocal soft contacts

- Multifocal contact lenses slow myopia progression in a dose-dependent fashion
  - High add is best



Contact Lenses

BCLA CLEAR

GLOBAL Contact Lens Evidence-based Academic Report

Introduction

The BCLA Contact Lens Evidence-based Academic Report (CLEAR) totals more than 300 pages across 11 papers. Coordinated by 10 committee chairs, written by 102 authors based in 16 countries, it was published in March 2021 and is available here.

BCLA CLEAR sets the standard to which eye care professionals (ECPs) can refer for the latest information in the contact lens field whilst also highlighting opportunities for future research. This summary draws on key points from the reports to help inform evidence-based practice.

- **Presence of the following risk factors for corneal infiltrative events** (CIEs) can inform recommendation of **daily disposable**, rather than reusable soft contact lenses:[19]
  - Patient age (<25 years; >50 years), prior history of CIEs, increased lid margin bioburden from blepharitis or meibomian gland dysfunction (MGD), certain health conditions (thyroid disease, self-reported poor health), history of smoking, poor hygiene.
- **Daily disposable use reduces CIE risk,[16,17] severity of microbial keratitis (MK),[18,19] and ocular allergy symptoms[20]** compared to reusable soft contact lenses

What is not proven

Other than consideration of oxygen transmissibility for high refractive error or overnight wear, **little evidence is available to inform soft lens material choice** (hydrogel vs silicone hydrogel, SiHy)

- **Comfort** can be affected by the **coefficient of friction,** and more so by the **lubricity** of the material,[14,15] but is **not** linked to increased oxygen transmissibility[14]
- Compared to soft lenses, RCLs may be better tolerated by patients with **dry eye or papillary conjunctivitis**,[21] and fewer **contact lens-related complications** occur with RCLs
- Some evidence shows that **larger diameter RCLs** are more comfortable for adapted wearers,[22, 23] but do not aid the adaptation process

Multicenter Study > Eye Contact Lens. 2021 May 1;47(5):277-282.
doi: 10.1097/ICL.0000000000000761.

Frequency of Contact Lens Complications Between Contact Lens Wearers Using Multipurpose Solutions Versus Hydrogen Peroxide in the United States and Canada

Anna A Tichenor [1], Stacey S Cofield, Drew Gann, Marian Elder, Alison Ng, Karen Walsh, Lyndon W Jones, Jason J Nichols

- No significant difference in the frequency of complications between multipurpose solution and hydrogen peroxide
- Hydrogen peroxide users were less likely to report discomfort

ARTICLE IN PRESS
Contact Lens and Anterior Eye xxx (xxxx) xxx
Contents lists available at ScienceDirect
Contact Lens and Anterior Eye
journal homepage: www.elsevier.com/locate/clae

International multi-centre study of potential benefits of ultraviolet radiation protection using contact lenses

James S Wolffsohn [a,*], Sandeep Dhallu [a], Maana Anjla [a], Debbie Laughton [a], Keith Tempany [b], Daniel Powell [c,d], Kate Gifford [e], Paul Gifford [e], Kin Wan [a], Pauline Cho [a], Ulrike Stahl [a], Jill Woods [a]

- 210 pre-presbyopic patients
- Prior use of UV-blocking CLs vs minimal UV-blocking CLs for past five years or more

- Accommodative response was higher, and accommodative latency was shorter, in the group who had warned UV-blocking lenses
  - Accommodative response was not statistically significant; accommodative latency was statistically significant
- Conclusion: UV protection may delay the onset of presbyopia

CLINICAL SCIENCE

Treatment of Severe Infectious Keratitis With Scleral Contact Lenses as a Reservoir of Moxifloxacin 0.5%

Polania-Baron, Eduardo J. MD; Santana-Cruz, Omar OD; Lichtinger, Alejandro MD; Grace-Hernandez, Enrique O. MD, MSc; Navas, Alejandro MD, PhD

Cornea: July 2021 - Volume 40 - Issue 7 - p 831-836

- Prospective consecutive case series
- 12 eyes with infectious keratitis

- Scleral lens filled with 0.5% moxifloxacin
- Replaced q24 hours until epithelialization was complete (or if culture report demonstrated a microorganism resistant to moxifloxacin)

- All infections resolved favorably at the final follow-up
- No complications or side effects were observed
- Patients reported good comfort

Dry Eye

June 2022
Volume 63, Issue 7

OPEN ACCESS

ARVO Annual Meeting Abstract | June 2022

Risk Factors for Meibomian Gland Morphology Changes in Children Aged 4 to <18 years

Manisha Parikh; Yi Pang; Lindsay Sicks

+ Author Affiliations & Notes

Investigative Ophthalmology & Visual Science June 2022, Vol.63, 425. doi:

- 160 children
- Looked at screen time, diet, outdoor activities, age, gender, race, refractive error, BMI
- Severe meibomian gland atrophy noted in 19.7% of lower eyelids!

- Significant risk factors: High BMI, unhealthy diet, decreased outdoor activity
- No association with screen time!

CLINICAL SCIENCE

Association Between Dry Eye Disease and Newly Diagnosed Obsessive-Compulsive Disorder

Eroglu, Fatma Cevik MD; Cevik, Berrak Sekeryapan MD; Ozturk, Mehmet MD; Kazancı, Burcu MD

Author Information

Cornea: July 2021 - Volume 40 - Issue 7 - p 857-921

- 30 newly diagnosed obsessive compulsive disorder patients were compared to 30 healthy controls
- Comprehensive dry eye workup showed significantly more dry eye signs in OCD group (corneal staining, conjunctival staining, Schirmer score, TBUT)
- OCD group was not using psychiatric drugs or dry eye therapy
- OCD appears to be an independent risk factor for dry eye disease

› Optom Vis Sci. 2022 Apr 1;99(4):358-362. doi: 10.1097/OPX.0000000000001891.

Assessment of Tear Film Parameters in Smokers and Subjects with a High Body Mass Index

Raied Fagehi, Gamal A El-Hiti [1], Abdullah Almojalli [1], Faisal S Alzuhairi [1], Mana A Alanazi [1], Ali M Masmali [1], Turki Almubrad [1]

- Smokers and individuals with a high BMI showed significantly lower lipid layer grades and tear meniscus height scores compared to a control group

The Ocular Surface 21 (2021) 87–95

Contents lists available at ScienceDirect

The Ocular Surface

journal homepage: www.elsevier.com/locate/jtos

The relationship between alcohol consumption and dry eye

Morten Schjerven Magno[a,b,c,1], Tishelle Daniel[b,1], Mathias Kaarstad Morthen[b,c], Harold Snieder[d], Nomdo Jansonius[e], Tor P. Utheim[f], Christopher J. Hammond[g,h], Jelle Vehof[a,b,i,*]

- Population-based study of 77,000 subjects in a Dutch database
- Alcohol significantly increased the risk of symptomatic dry eye in females but not males
- Authors theorized that differences in sex hormones may be responsible for the difference

Sun et al. BMC Ophthalmology (2022) 22:9
https://doi.org/10.1186/s12886-021-02230-9

BMC Ophthalmology

RESEARCH ARTICLE Open Access

Effects of aerobic exercise on tear secretion and tear film stability in dry eye patients

Chao Sun, Xiaofan Chen*, Yanming Huang, Huan Zou, Wei Fan, Mei Yang and Rongdi Yuan*

- Aerobic exercise increased Schirmer test scores, decreased the level of inflammatory markers in tears, improved tear breakup time, improved the number of complete blinks, and decreased incomplete blinks.
  - (30 minutes after AE)

J Clin Med. 2022 Jan 12;11(2):367. doi: 10.3390/jcm11020367.

Adherence to Eye Drops Usage in Dry Eye Patients and Reasons for Non-Compliance: A Web-Based Survey

Miki Uchino [1,2], Norihiko Yokoi [3], Jun Shimazaki [4], Yuichi Hori [5], Kazuo Tsubota [1,6], On Behalf Of The Japan Dry Eye Society

- Web-based patient survey of 2600 patients
- Many did not understand that drops should be used on a scheduled basis
- 60% only used drops when subjective symptoms became apparent

Nutrition

Acta Ophthalmologica

Acta Ophthalmologica 2022

Review Article

What did we learn in 35 years of research on nutrition and supplements for age-related macular degeneration: a systematic review

Els M. Pameijer,[1,3] Pauline Heus,[2,3] Johanna A. A. Damen,[2] René Spijker,[2] Lotty Hooft,[2] Peter J. Ringens,[3] Saskia M. Imhof[4] and Redmer van Leeuwen[1]

- Goal is to summarize all available evidence on the association between nutrition and the development or progression of AMD

Table 6. Summary table.

GRADE	Effect	Protective – decreased risk: Development of AMD	Protective – decreased risk: Progression of AMD	Threatening – increased risk: Development of AMD	Threatening – increased risk: Progression of AMD	No association: Development of AMD	No association: Progression of AMD
High	Convincing	Nutrition: DHA*; EPA*; DHA + EPA*	Nutrition: β-carotene; lutein and zeaxanthin; copper, folate; magnesium; vitamin A; niacin; vitamin B6; vitamin C; DHA; EPA; DHA + EPA; alcohol	Nutrition: -	Nutrition: Linoleic acid; monounsaturated fat; oleic acid; saturated fat	Nutrition: -	Nutrition: -
		Supplements: -	Supplements: -	Supplements: -	Supplements: -	Supplements: - β-carotene; vitamin C; vitamin E	Supplements: Omega-3 fatty acids
Moderate	Likely	Nutrition: Mediterranean; high intake of grains, fish, steamed/boiled chicken, vegetables, and nuts; β-cryptoxanthin; fish	Nutrition: Mediterranean; calcium; lycopene	Nutrition: Alcohol	Nutrition:-	Nutrition: Total fatty acid; saturated fatty acid, monounsaturated fatty acid, polyunsaturated fatty acid; α-linolenic acid; DHA‡; EPA‡; DHA + EPA‡	Nutrition: α-carotene; β-cryptoxanthin; iron; lactose; thiamine; retinol; riboflavin; vitamin B12; vitamin E; zinc; arachidonic acid; cholesterol; α-linolenic acid; vegetables
		Supplements:	Supplements: AREDS formula†	Supplements: Multivitamin	Supplements: -	Supplements: -	Supplements: -
Low	Possibly	Nutrition: Calcium; nuts	Nutrition:	Nutrition:	Nutrition: Trans-fat; meat	Nutrition: Lycopene; xanthophyll; nitrate; oils; margarine; butter; vegetables	Nutrition: High GI; calcium and vitamin D; trans-fat; fruit; whole grains; legumes; red meat; vegetables
		Supplements: Folic acid, vitamin B6 and vitamin B12	Supplements: Lutein and/or zeaxanthin; zinc	Supplements:-	Supplements:-	Supplements: Omega-3 fatty acids; selenium; vitamin D	Supplements: Vitamin D
Low to very low	Unclear	**Development of AMD**: Nutrition: Western; healthy; Western versus Asian versus vegetarian; high GI; α-carotene; β-carotene; lutein/zeaxanthin; total carotenoids; oranges; flavonoids; dairy products; eggs; recommended versus lower intake of fat products; fruit; grains; legumes; potatoes; poultry. Supplements: α-tocopherol and/or β-carotene. **Progression of AMD**: Nutrition: lutein/zeaxanthin ≥1 median versus <median; vitamin D; olive oil; fish; nuts. Supplements: mesozeaxanthin as addition on AREDS 2; combination of carotenoids, antioxidants, and omega-3 fatty acids§; ginkgo biloba; saffron; vitamin E					

DHA = docosahexaenoic acid; EPA = eicosapentaenoic acid; GI = glycaemic index.

Convincing effect: GRADE high certainty of evidence for a positive, negative, or the absence of an association. Likely effect: GRADE moderate certainty of evidence for a positive, negative, or the absence of an association. Possibly effect: GRADE low certainty of evidence for a trend of a positive or negative association or the absence of it. Unclear effect: GRADE low certainty of evidence without a trend for a positive or negative association or GRADE very low certainty of evidence.

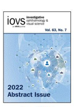
* Development of early AMD.

† AREDS formula: vitamin C (500 mg), vitamin E (400 IE), β-carotene (15 mg), zinc as zinc oxide (80 mg), and copper as cupric oxide (2 mg).

‡ Development of late AMD.

§ 10 mg lutein, 4 mg astaxanthin, 2 mg zeaxanthin, 90 mg vitamin C, 30 mg vitamin E, 22.5 mg zinc, 1 mg copper, 500 mg fish oil with 185 mg EPA, and 140 mg DHA.

- Protective effects against progression of early to late AMD:
  - B-carotene, lutein, zeaxanthin, copper, folate, magnesium, vitamin A, niacin, vitamin B6, vitamin C, DHA, EPA
  - Mediterranean diet, vegetables, whole grains, nuts



June 2022
Volume 63, Issue 7

OPEN ACCESS
ARVO Annual Meeting Abstract | June 2022

Cost analysis and adherence of over the counter supplements to the AREDS2 protocol

Jeffrey Yu; Jason Matthew Lewis Miller; Mark Johnson; Benjamin Young

+ Author Affiliations & Notes

Investigative Ophthalmology & Visual Science June 2022, Vol.63, 358 – F0189. doi:

- Searched for AREDS2 on Amazon and Google shopping
- Analyzed top 30 results
- 31% did not adhere to AREDS2 formula
- Products that deviated from AREDS2 formula were 26% more expensive than those that did not

eat right.

RESEARCH
Original Research

A Vegetarian Diet Is Associated with a Lower Risk of Cataract, Particularly Among Individuals with Overweight: A Prospective Study

Tina H. T. Chiu, PhD, RD; Chia-Chen Chang, MS; Chin-Lon Lin, MD; Ming-Nan Lin, MD

JOURNAL OF THE ACADEMY OF NUTRITION AND DIETETICS April 2021 Volume 121 Number 4

- Prospective cohort study, 6000 participants in China
- Participants 40 years and older without cataracts at recruitment were followed
- Claims data was used to track Cataract diagnoses

- Vegetarians had higher intakes of soy, vegetables, nuts, whole grains, fiber, vitamin C, folate, and vitamin A
- Vegetarian diet was associated with a 20% reduced risk of cataracts
  - After adjusting for sex, education, smoking, alcohol, physical activities, hypertension, diabetes, hyperlipidemia, steroid use, and BMI
- Association was more pronounced among individuals with BMI > 24

Retina

ORIGINAL STUDY

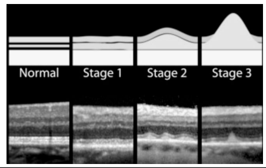
SUBRETINAL DRUSENOID DEPOSITS AND SOFT DRUSEN

Are They Markers for Distinct Retinal Diseases?

Thomson, Robert J. BS[*]; Chazaro, Joshua BS[*,†]; Otero-Marquez, Oscar MD[‡]; Ledesma-Gil, Gerardo MD[‡,§,¶]; Tong, Yuehong PhD[‡,**]; Coughlin, Arielle C. BA[††]; Teibel, Zachary R. MD[‡‡]; Alauddin, Sharmina MD[‡]; Tai, Katy BA[‡]; Lloyd, Harriet BA[‡]; Scolaro, Maria MA[§]; Govindaiah, Arun MS[§§]; Bhuiyan, Alauddin PhD[**]; Dhamoon, Mandip S. MD[¶¶]; Deobhakta, Avnish MD[‡]; Narula, Jagat MD[***]; Rosen, Richard B. MD[‡]; Yannuzzi, Lawrence A. MD[§]; Freund, K. Bailey MD[§,†††]; Smith, R. Theodore MD, PhD[‡,**]

Retina: July 2022 - Volume 42 - Issue 7 - p 1311-1318

- Subretinal drusenoid deposits (SDDs) are located above the RPE



- SDD correlated significantly with lower serum HDL, CVD, and stroke

British Journal of Ophthalmology

Clinical science

Retinal age gap as a predictive biomarker for mortality risk

Zhuoting Zhu [1], Danli Shi [2], Peng Guankai [3], Zachary Tan [4], Xianwen Shang [1], Wenyi Hu [4], Huan Liao [5], Xueli Zhang [1], Yu Huang [1], Honghua Yu [1], Wei Meng [3], Wei Wang [2], Zongyuan Ge [6,7], Xiaohong Yang [1], Mingguang He [1,2,4]

Correspondence to Dr Mingguang He, Centre for Eye Research Australia, East Melbourne, Victoria, Australia; mingguang_he@yahoo.com; Dr Xiaohong Yang; syyangxh@scut.edu.cn; Dr Zongyuan Ge; Zongyuan.ge@monash.edu; Dr Honghua Yu; yuhonghua@gdph.org.cn

First published January 18, 2022.

- Artificial intelligence model processes fundus photos to determine a "retinal age"
- Determined actual age within an average of 3.5 years
- If retinal age overestimated biological age the patient had an increased mortality risk

Odds and Ends

AMERICAN ACADEMY OF OPHTHALMOLOGY®

The Bidirectional Relationship between Vision and Cognition

A Systematic Review and Meta-analysis

Ophthalmology Volume 128, Number 7, July 2021

- Meta-analysis of 40 studies, 48M subjects
- Individuals with visual impairment are approximately twice as likely to have cognitive impairment vs individuals without visual impairment
  - Interestingly, other literature suggests that sensory impairments including hearing and olfactory deficits are risk factors of cognitive impairment

- What is the link?
  - A loss of visual sensory information may lead to cortical atrophy
  - Impaired visual input may result in errors in perceptual processing, with later decline in cognitive performance
  - Decreased interaction may lead to social isolation and restricted participation in mentally stimulating activities
  - Certain pathologies (AMD, glaucoma) may share pathophysiologic processes with dementia

Ophthalmology

REVIEW ARTICLE | ARTICLES IN PRESS

Interventions for the Management of Computer Vision Syndrome

A Systematic Review and Meta-analysis

Sumeer Singh, MPhil, PhD • Myra B. McGuinness, MBiostat, PhD • Andrew J. Anderson, MSc, PhD * • Laura E. Downie, BOptom, PhD * ✉ • Show footnotes

Open Access • Published: May 18, 2022 • DOI: https://doi.org/10.1016/j.ophtha.2022.05.009

- No evidence for reduction in visual fatigue symptoms with blue blocking glasses
- Improvement in dry eye symptoms with omega-3 supplements

CLINICAL SCIENCE

Clinical, Morphological, and Optical Correlates of Visual Function in Patients With Fuchs Endothelial Corneal Dystrophy

Okumura, Naoki PhD[1]; Padmanabhan, Vasanthi BOptom[2]; Balaji, Janarthanam Jothi M.Phil (Optometry)[2]; Srinivasan, Bhaskar MD[3]; Hanada, Naoya BS[1]; Koinoni, Yuya BS, MS[1]; Yoshii, Kengo PhD[1]; Srinivas, Sangly P. PhD[3]; Koizumi, Noriko MD, PhD[1]; Padmanabhan, Prema MD[2]

Author Information

Cornea: February 2022 - Volume 41 - Issue 2 - p 171-176
doi: 10.1097/ICO.0000000000002874

- Remember contrast sensitivity!
- Some patients maintain good BCVA but reduced contrast sensitivity
- Testing contrast sensitivity may better identify visual impairment in Fuchs' endothelial corneal dystrophy

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Research

JAMA Ophthalmology | Original Investigation

Overminus Lens Therapy for Children 3 to 10 Years of Age With Intermittent Exotropia

A Randomized Clinical Trial

Angela M. Chen, OD, MS; S. Ayse Erzurum, MD; Danielle L. Chandler, MSPH; Amra Hercinovic, MPH; B. Michele Mella, ScM; Amit R. Bhatt, MD; Donny W. Suh, MD; Marilyn Vricella, OD; John W. Erickson, OD; Aaron M. Miller, MD; Justin D. Marsh, MD; Marie I. Bodack, OD; Stacy R. Martinson, OD; Jenna R. Titelbaum, OD; Michael E. Gray, MD; Hannah L. Holtorf, OD; Lingkun Kong, MD; Raymond T. Kraker, MSPH; Bahram Rahmani, MD; Birva K. Shah, OD; Jonathan M. Holmes, BM, BCh; Susan A. Cotter, OD, MS; for the Pediatric Eye Disease Investigator Group

JAMA Ophthalmol. 2021;139(4):464-476. doi:10.1001/jamaophthalmol.2021.0082
Published online March 4, 2021.

- Over minus spectacle wear improved distance exotropia control after 12 months
- However, over minus was associated with an increased myopic shift

- Like we all learned in school…..Don't overminus!

Thank you!

mcnulty.aaron@gmail.com