

Myopie-Management

Strategien die Myopie zu kontrollieren,
statt (nur) zu korrigieren.

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Ph.D.

Offenlegung

Keine kommerziellen oder persönlichen Interessen oder
Konflikte mit irgend einem Produkt oder einer Firma
welche in diesem Vortrag erwähnt wird.

Lernziel

Die Beantwortung der folgenden Fragen:

- Was ist eine Myopie Epidemie und gibt es sie überhaupt ?
- Was sind die Gründe und Folgen von Myopie Exzess ?
- Welche Maßnahmen wirken gegen eine Myopie Progression ?
- Wie integriere ich Myopie-Management in meine Praxis / in meine interdisziplinäre Kooperation mit Ophthalmologen*Innen ?

Hände Hoch !

Betreiben Sie Myopie Management ?

- A. Ja, regelmässig
- B. Gelegentlich oder selten
- C. Nein !
- D. Was ist Myopie Management ?



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Mythen vs. Fakten



Die Jungfrau und das Einhorn
Erfurter Einhorn-Altar
Anfang 15. Jhr n. Chr.



Ur-Ochse, 6. Jhr v. Chr.
Porta d'Ishtar
Babylon, Pergamon

Myopia-Management

Kontrollierte Anwendung präventiver Massnahmen zur nachhaltigen Hemmung des Längenwachstums des Auges zwecks Minimierung krankhafter Folgeschäden.



Myopie – eine globale Epidemie?

Epidemie, Prävalenz und Evidenz

Epidemie: *Substantiv, feminin* [die]

das Auftreten einer **ansteckenden** Krankheit in einem bestimmten begrenzten Verbreitungsgebiet (wobei eine große Zahl von Menschen gleichzeitig von der Krankheit befallen wird). **WAS und WO ?**

Prävalenz: *Substantiv, feminin* [die] MEDIZIN

Rate der zu einem bestimmten Zeitpunkt oder in einem bestimmten Zeitabschnitt an einer bestimmten Krankheit Erkrankten (im Vergleich zur Zahl der Untersuchten). **WANN und WIE HÄUFIG ?**

Evidenz: *Substantiv, feminin* [die]

1a. BILDUNGSSPRACHLICH

[ohne Plural] das Evidentsein; unmittelbare und vollständige Einsichtigkeit, Deutlichkeit, Gewissheit

1b.

unumstößliche Tatsache, faktische Gegebenheit

BEWEIS / NACHWEIS ?

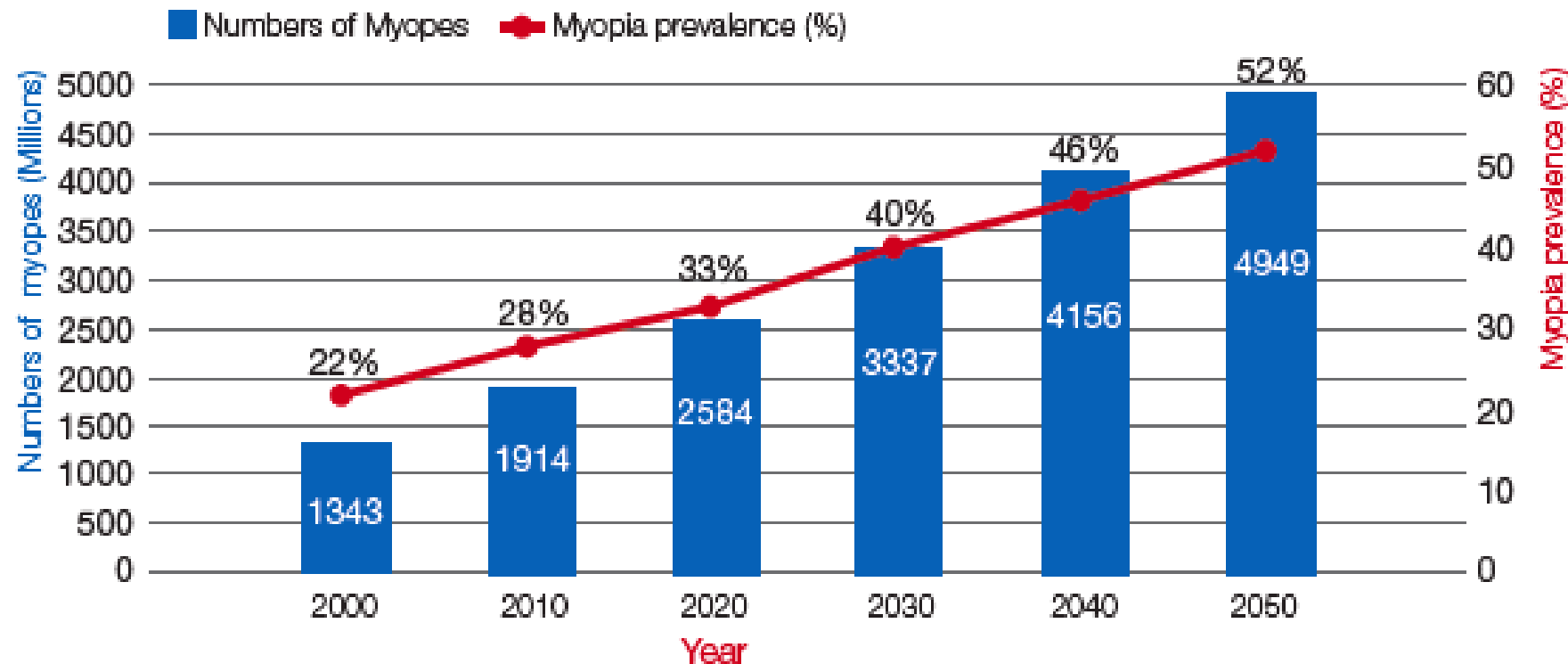
3. MEDIZIN•PHARMAZIE

empirisch erbrachter Nachweis der Wirksamkeit eines Präparats, einer Therapieform o. Ä.

Globale Myopie Prävalenz



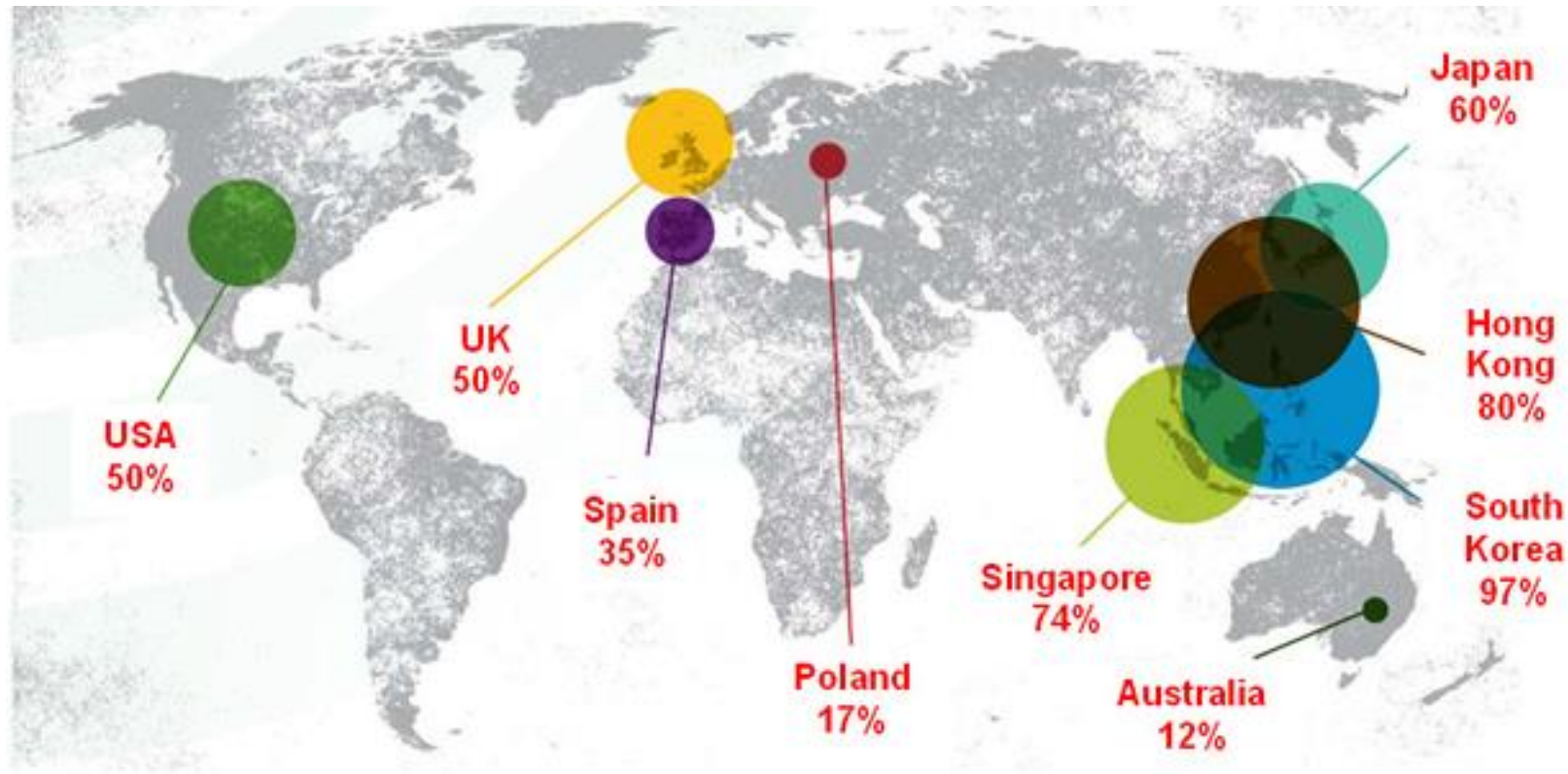
Results: Myopia - Now and in 2050



Epidemiologie

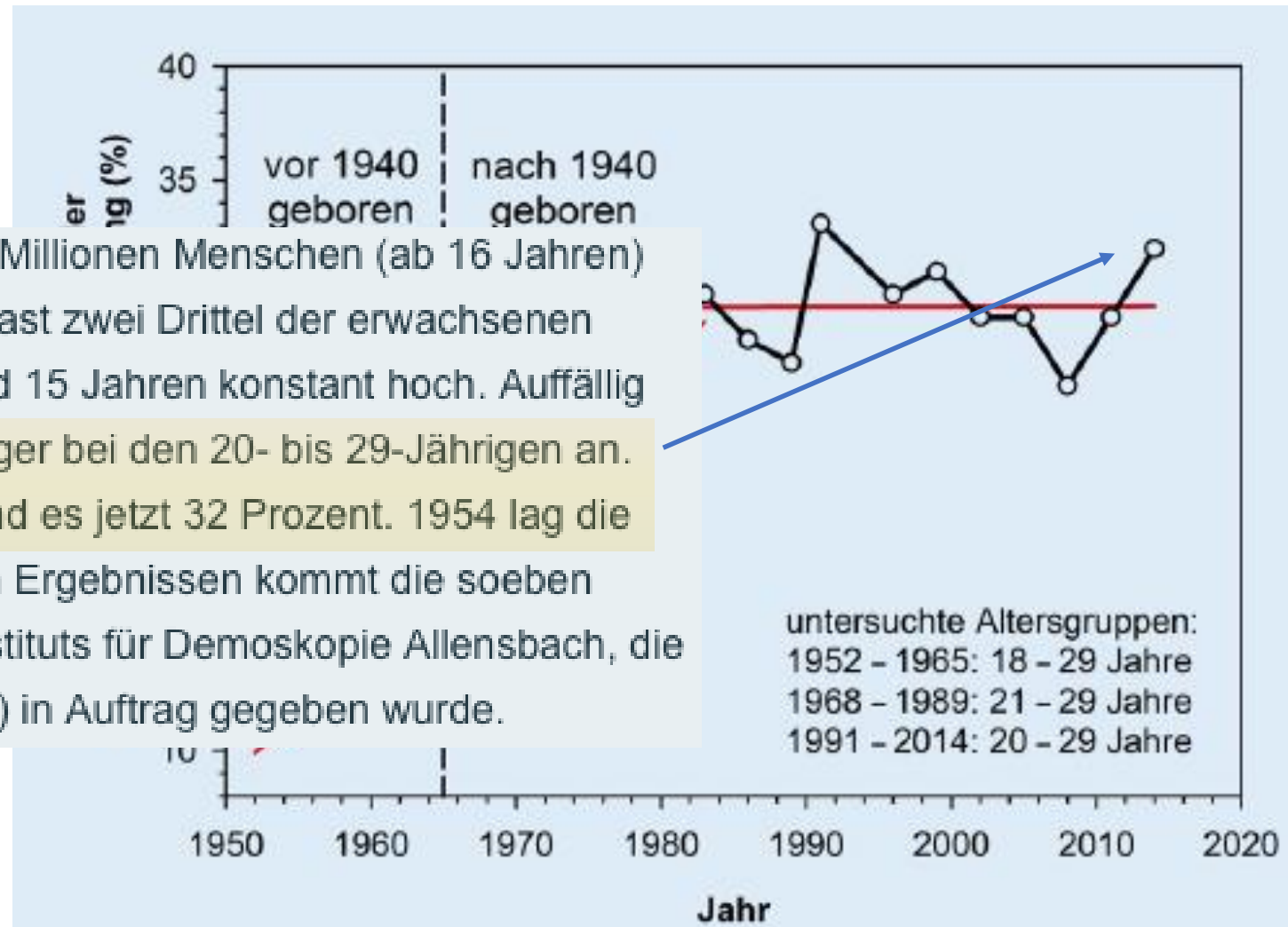
“The actual global myopia prevalence is 28.3% of the world population (2 billion). With a strong increase tendency. In 2050 half of the world population will be myope. >4 billion people !”

Hopf und Pfeiffer: Der Ophthalmologe, 01/2017



Anteil Brillenträger in Deutschland (Allensbach Untersuchungen)

Deutschland bleibt Brillenland. 40,1 Millionen Menschen (ab 16 Jahren) tragen hierzulande eine Brille, also fast zwei Drittel der erwachsenen Bevölkerung. Diese Zahl ist seit rund 15 Jahren konstant hoch. Auffällig stieg jedoch der Anteil der Brillenträger bei den 20- bis 29-Jährigen an. Waren es 2008 noch 26 Prozent, sind es jetzt 32 Prozent. 1954 lag die Quote bei nur 11 Prozent. Zu diesen Ergebnissen kommt die soeben veröffentlichte „Brillenstudie“ des Instituts für Demoskopie Allensbach, die vom Kuratorium Gutes Sehen (KGS) in Auftrag gegeben wurde.



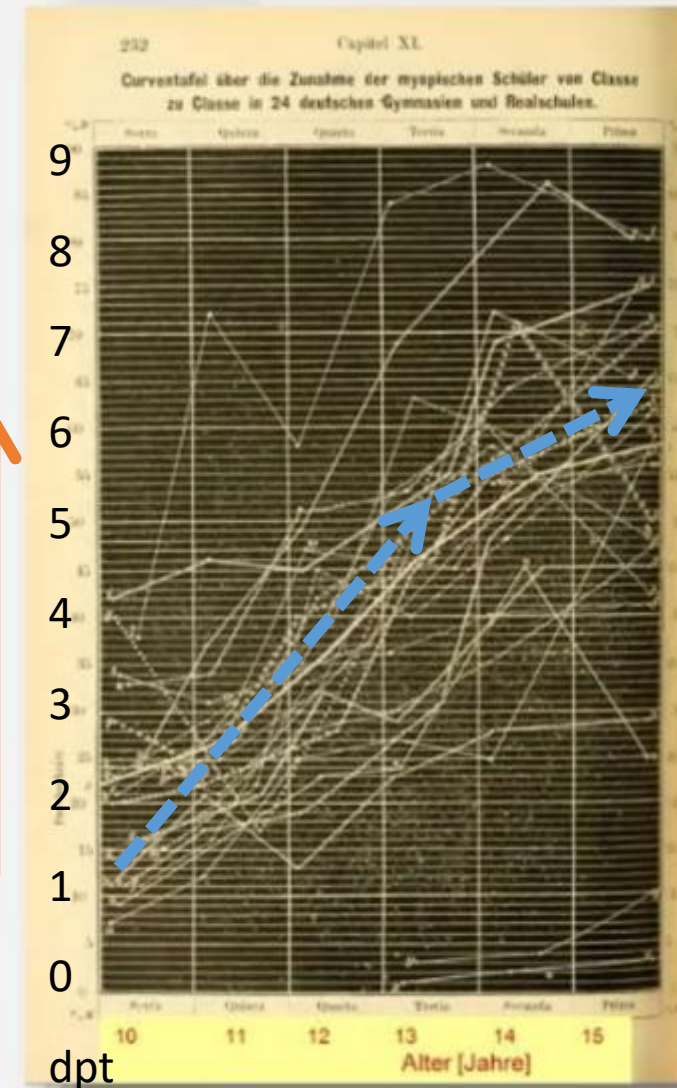
Myopie Progression 1867

Dr. med. Hermann Cohn, Breslau 1838-1906

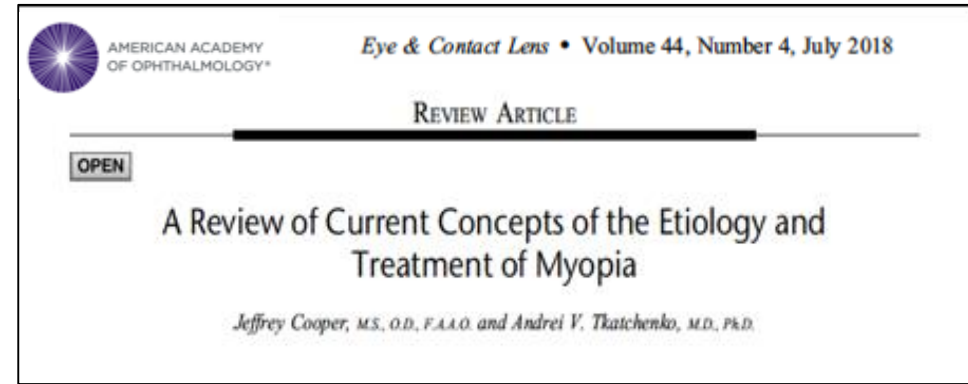
Mit Erlaubnis aus Vortrag von Dr. Hakan Kaymak, DOC 2017



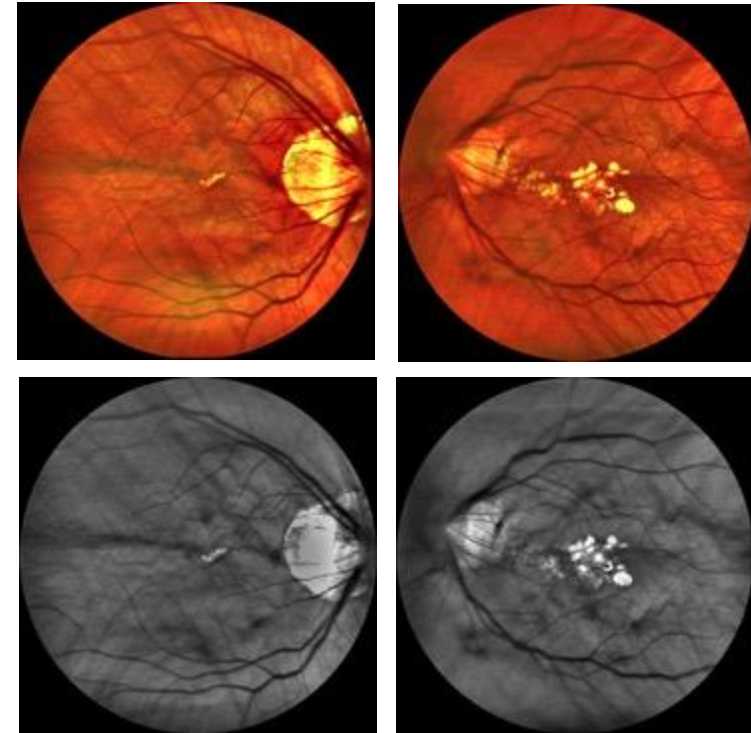
-1.5 --> -6dpt in 5 Jahren
= ca. 0.9dpt / Jahr



Klinische Evidenz

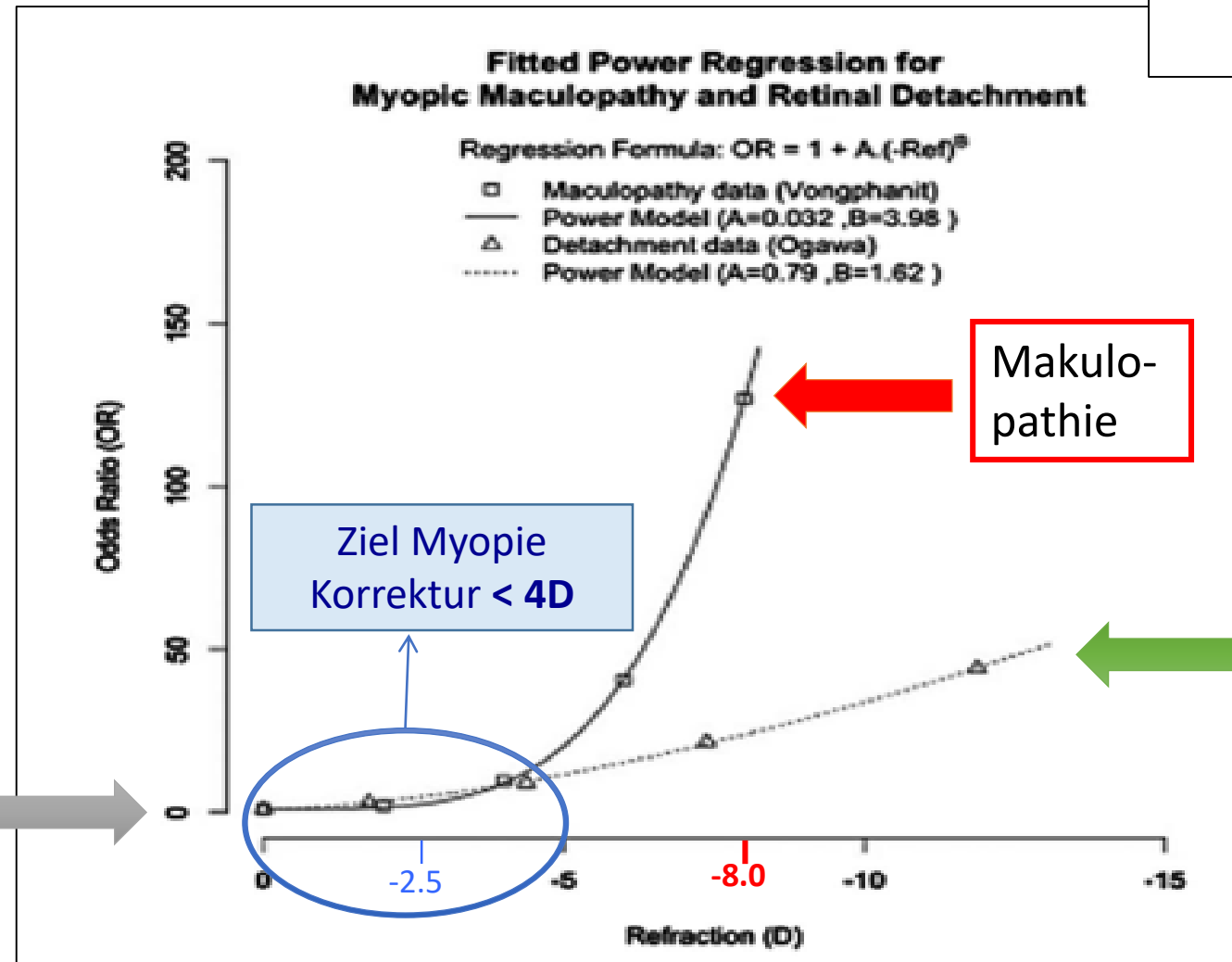


- Myopische Makulopathie (Degeneration)
- Ablatio/Amotio Retinae
- Katarakt
- Glaukom



SER = - 4.5 / - 5.0 dpt (eyeness 2019)

Risiko (Odds) Ratio





Myopia Prevention and Outdoor Light Intensity in a School-Based Cluster Randomized Trial

Vol. 125/8,p.1239-50, August 2018

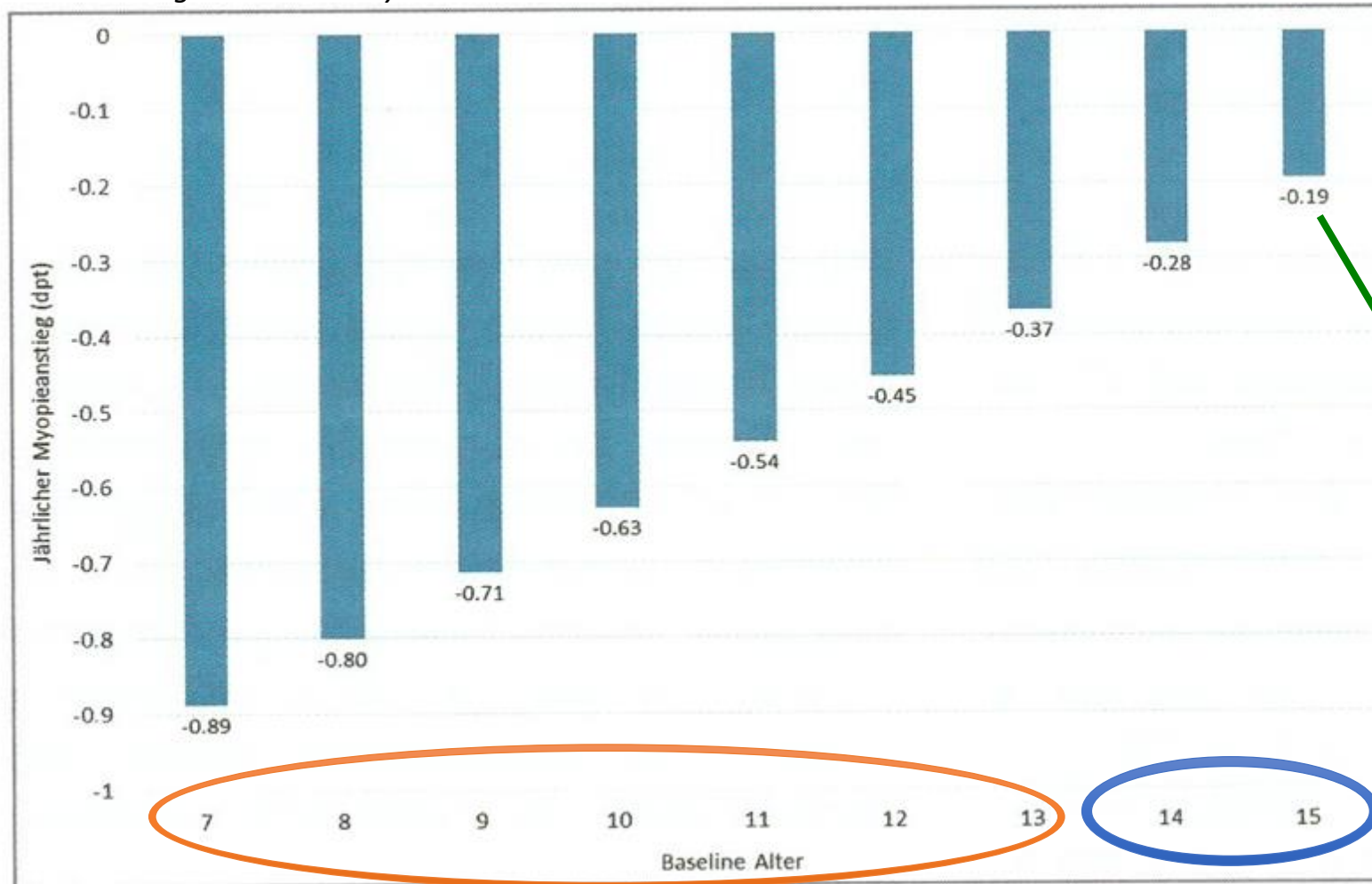
Pei-Chang Wu, MD, PhD,¹ Chueh-Tan Chen, MS,¹ Ken-Kuo Lin, MD,² Chi-Chin Sun, MD, PhD,³ Chien-Neng Kuo, MD,⁴ Hsiu-Mei Huang, MD,¹ Yi-Chieh Poon, MD,¹ Meng-Ling Yang, MD,² Chau-Yin Chen, MD,⁴ Jou-Chen Huang, MD,⁴ Pei-Chen Wu, MD,⁴ I-Hui Yang, MD,¹ Hun-Ju Yu, MD,¹ Po-Chiang Fang, MD,¹ Chia-Ling Tsai, DDS,⁵ Shu-Ti Chiou, PhD,^{6,7,8,*} Yi-Hsin Yang, PhD^{9,*}

„Currently, myopia maculopathy is the leading cause of blindness in Taiwan, Japan and China.“

Ophthalmology, 2018

Alters abhängige Myopie Progression

Sankaridurg und Holden: Eye 2014



Therapie
STOP !?

„In most of our participants, Axial Length (AL) increases rapidly at younger ages and then slowed down and stabilized.“ *Hou W. et al (COMET Group). Eye & Contact Lens: July 2018; Vol. 44/4, p.248-59*

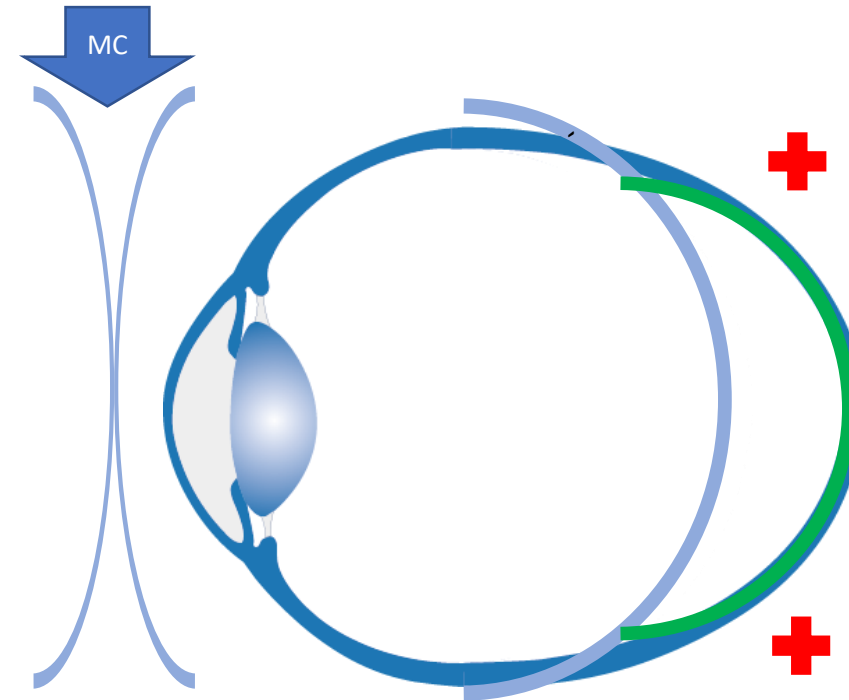
Kausalität : Multifaktoriell !

Viele Theorien, häufig kontroverse Resultate !

- **Genetik** (Wu und Edwards 1999, Morgan und Rose 2005, Foster und Jiang 2014)
- **Umwelt / Dopamin** (Feldkämper und Schäffel 2003, Jones et al 2007, Rose und Morgan 2008, Pan, Chen et al. 2015, Xiong et al 2017)
- **Emmetropisierung** (Xiang et al 2012, Zadnik et al 2015)
- **Naharbeit/ Digitalisierung** (McBrian et al 1993 (-), Lin et al 2004, Mutti und Zadnik 2009 (-), Wojciechowski 2011 (+), Mirshahi et al 2014 (+), Huang et al 2016 (-))
- **Accomodative lag /Esophorie** (Gwiazda et al 2004 (-), Cheng et al 2014 (+), Huang et al 2016 (-))
- **Peripherer Defokus** (Smith et al 2005/2013 (+), Atchinson et al 2005 (+), Cagnolati et al 2011(-))

Optische Mechanismen

Periphere Refraktion

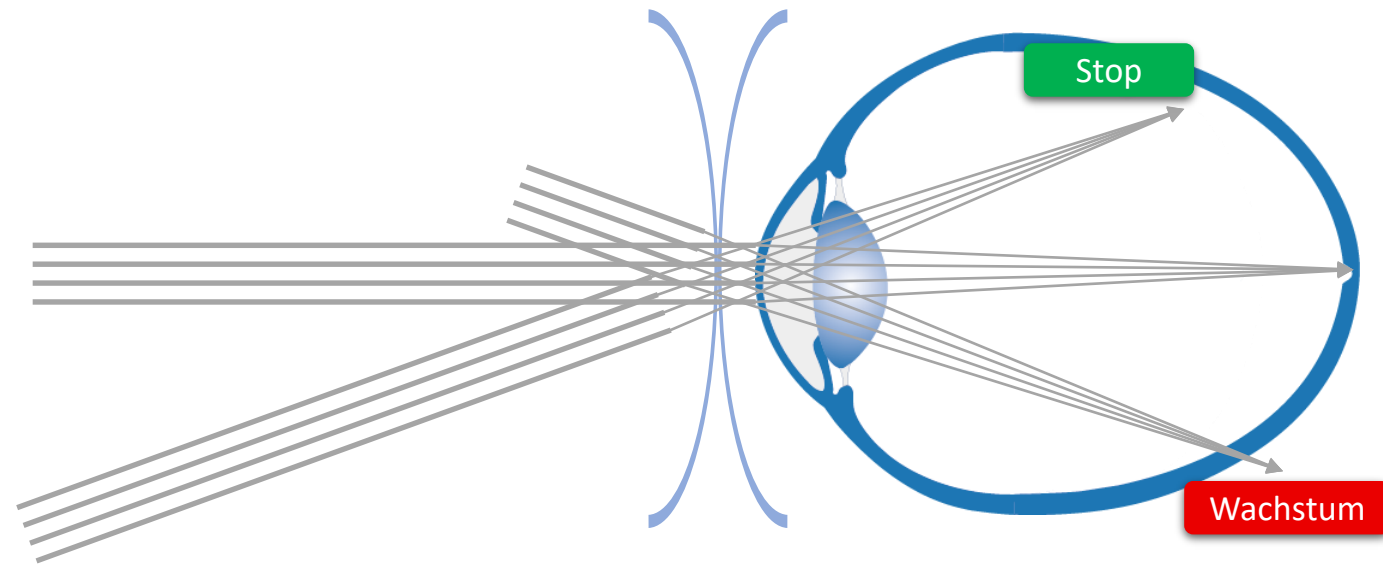


Nicht korrigierte Myopie

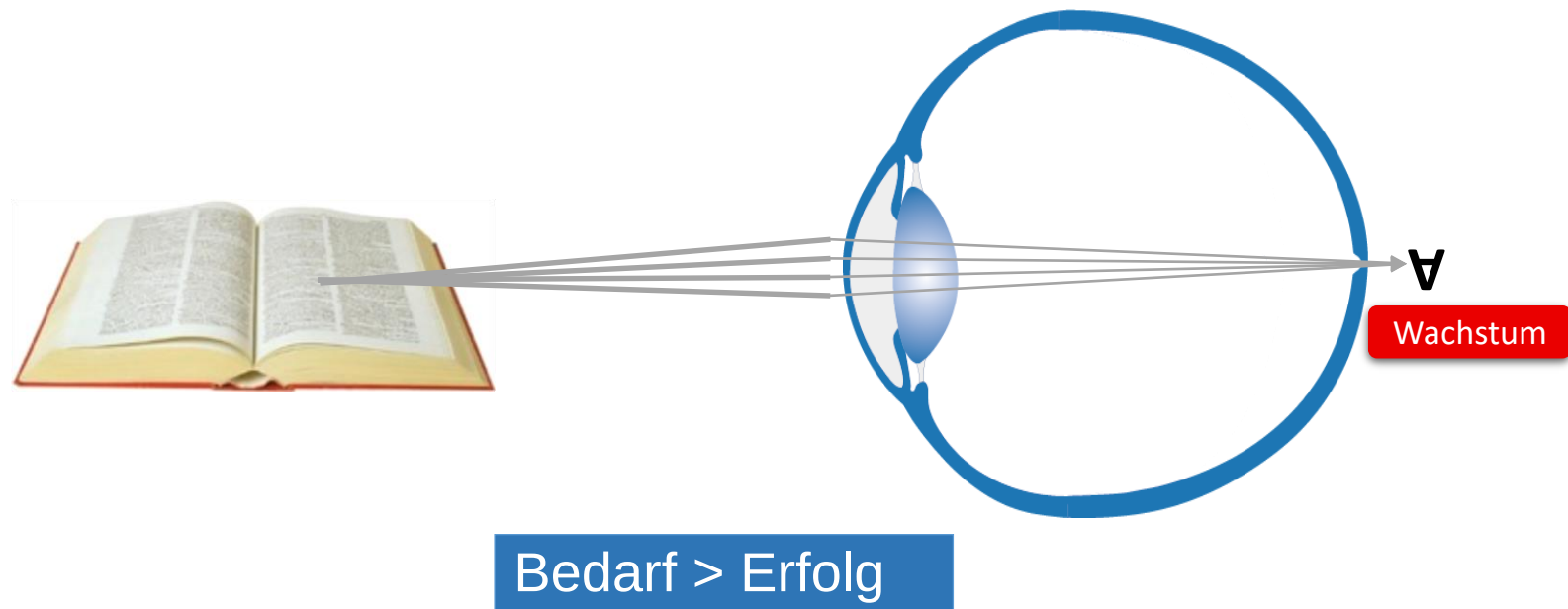
Myopie mit Myopie-management – Zentrale Abbildung auf, periphere Abbildung auf oder vor der Netzhaut

Periphere Refraktion

- Die Refraktion in der Peripherie reguliert die Emmetropisierung

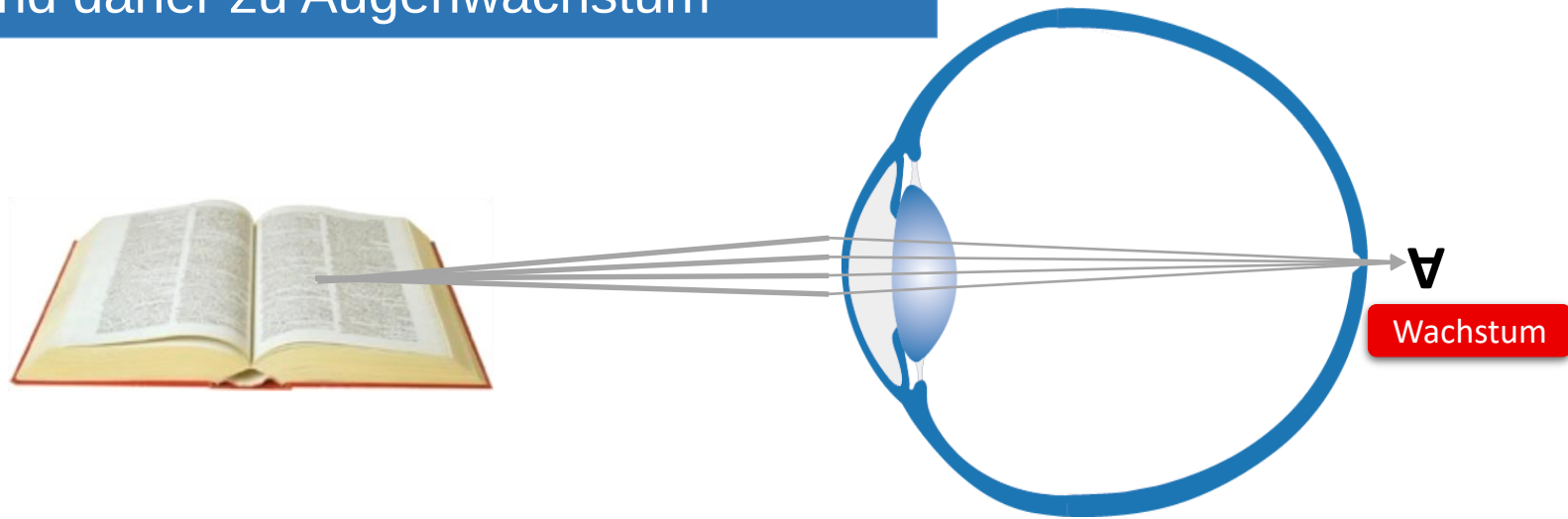


Akkommodatives Defizit

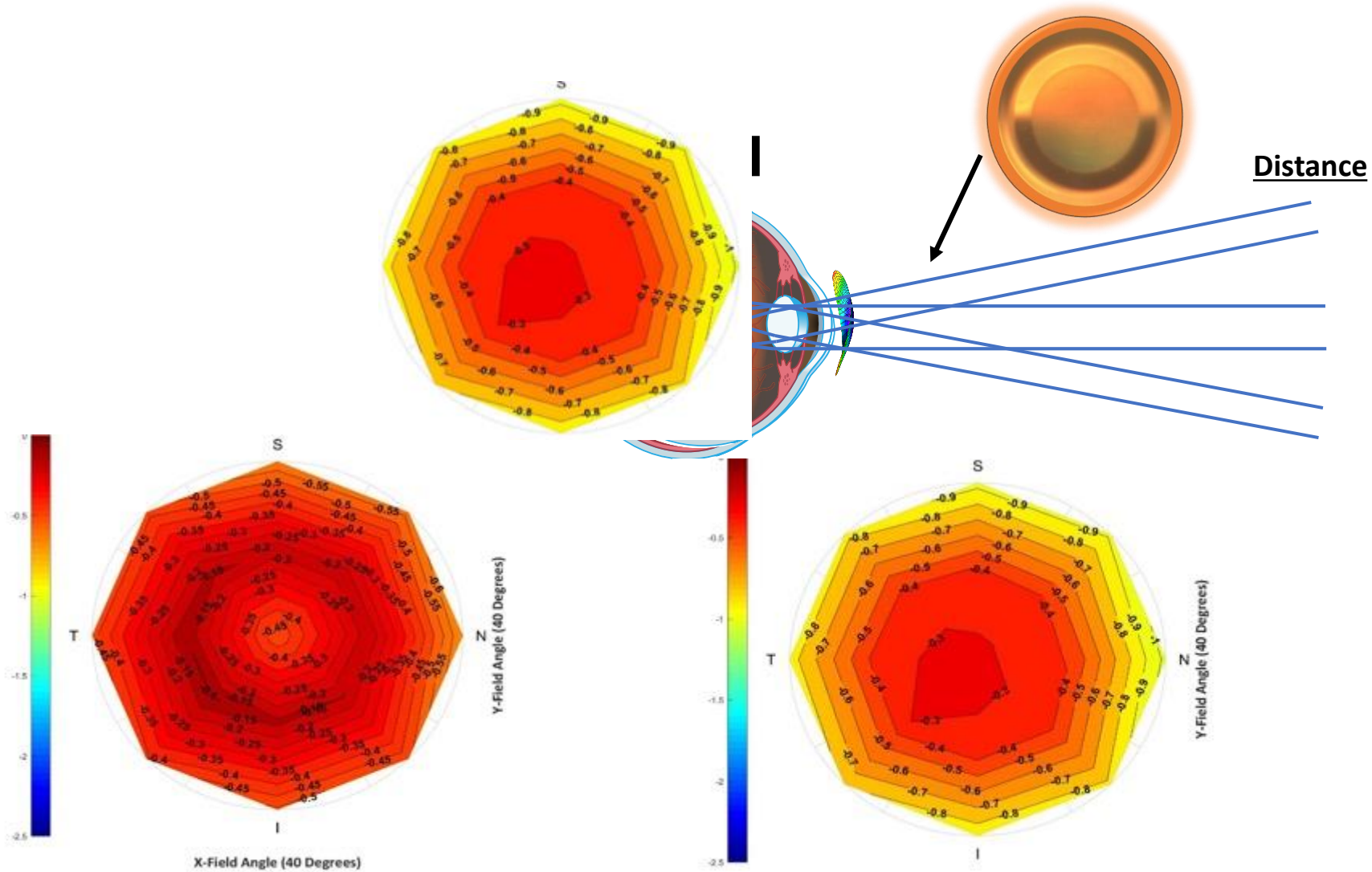


Akkommodatives Defizit

- Die Refraktion in der Peripherie reguliert die Emmetropisierung
- Akkomodatives Defizit führt zu hyperopem Defokus und daher zu Augenwachstum



Globale Bildqualität (GRIQ) - SV

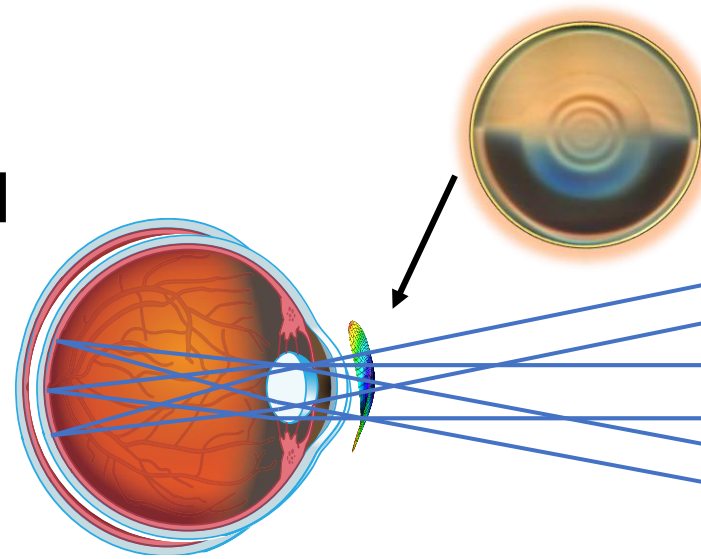


Wachstum

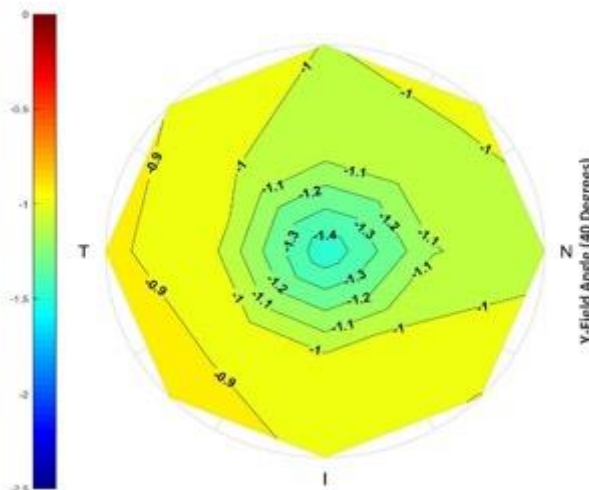
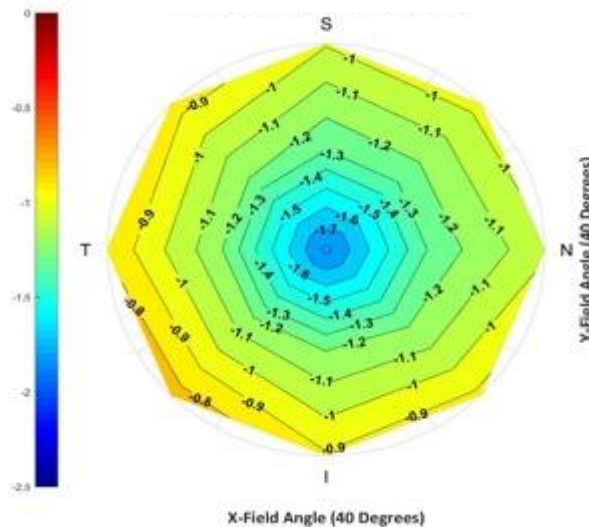
Vision and retinal image quality (RIQ):
RIQ of -0.2 – Excellent Vision
RIQ of -0.5 – Good Vision
RIQ of -0.9 – Satisfactory Vision
RIQ of -1.6 – Acceptable Vision

Globale Bildqualität (GRIQ) - EDOF

← Augenwachstum



- Die Refraktion in der Peripherie reguliert die Emmetropisierung
- Akkommodatives Defizit führt zu hyperopem Defokus und daher zu Augenwachstum
- Das Auge versucht eine optimale Bildqualität auf der Netzhaut zu erreichen

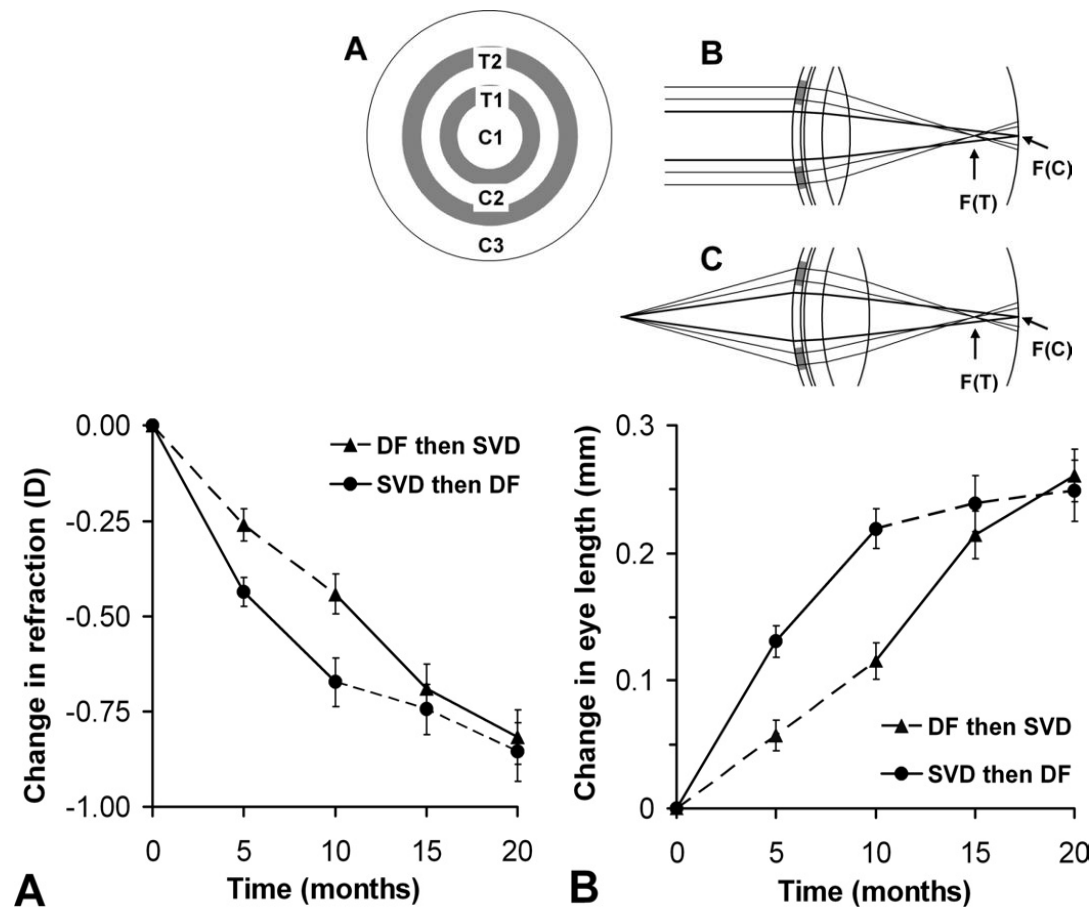


Vision and retinal image quality (RIQ):
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RIQ of -1.6 – Acceptable Vision

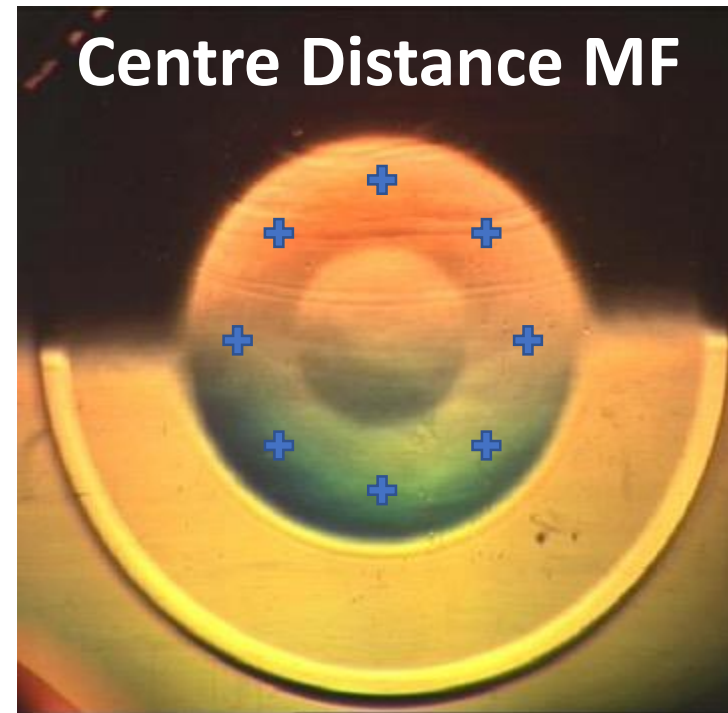
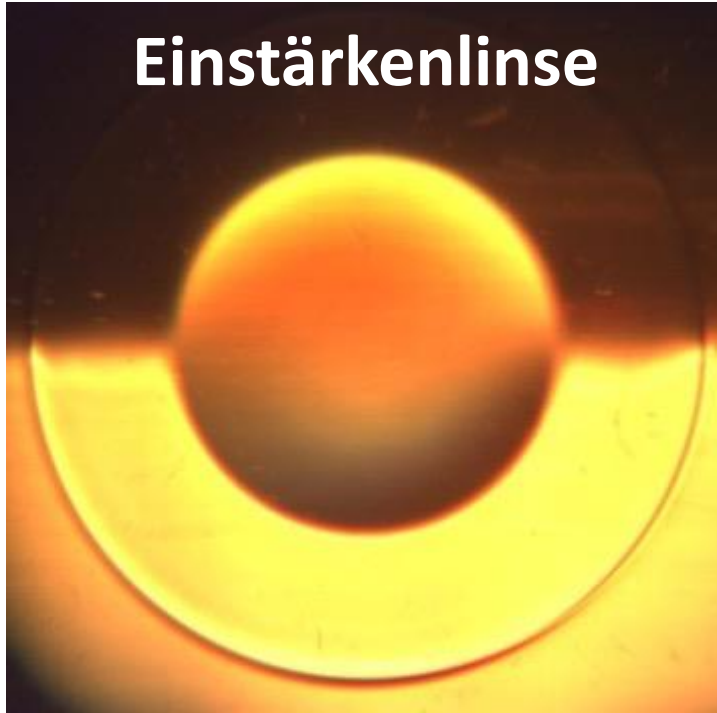
Klinische Studien mit SCL

Bifocal soft Dual Focus lens (MiSight)

- 3 Studien
 - 36% / 49% (SE / AL)
 - 39% / 36% (SE / AL)
 - 59% / 52% (SE / AL)
- Hypothese: Simultaner Defokus

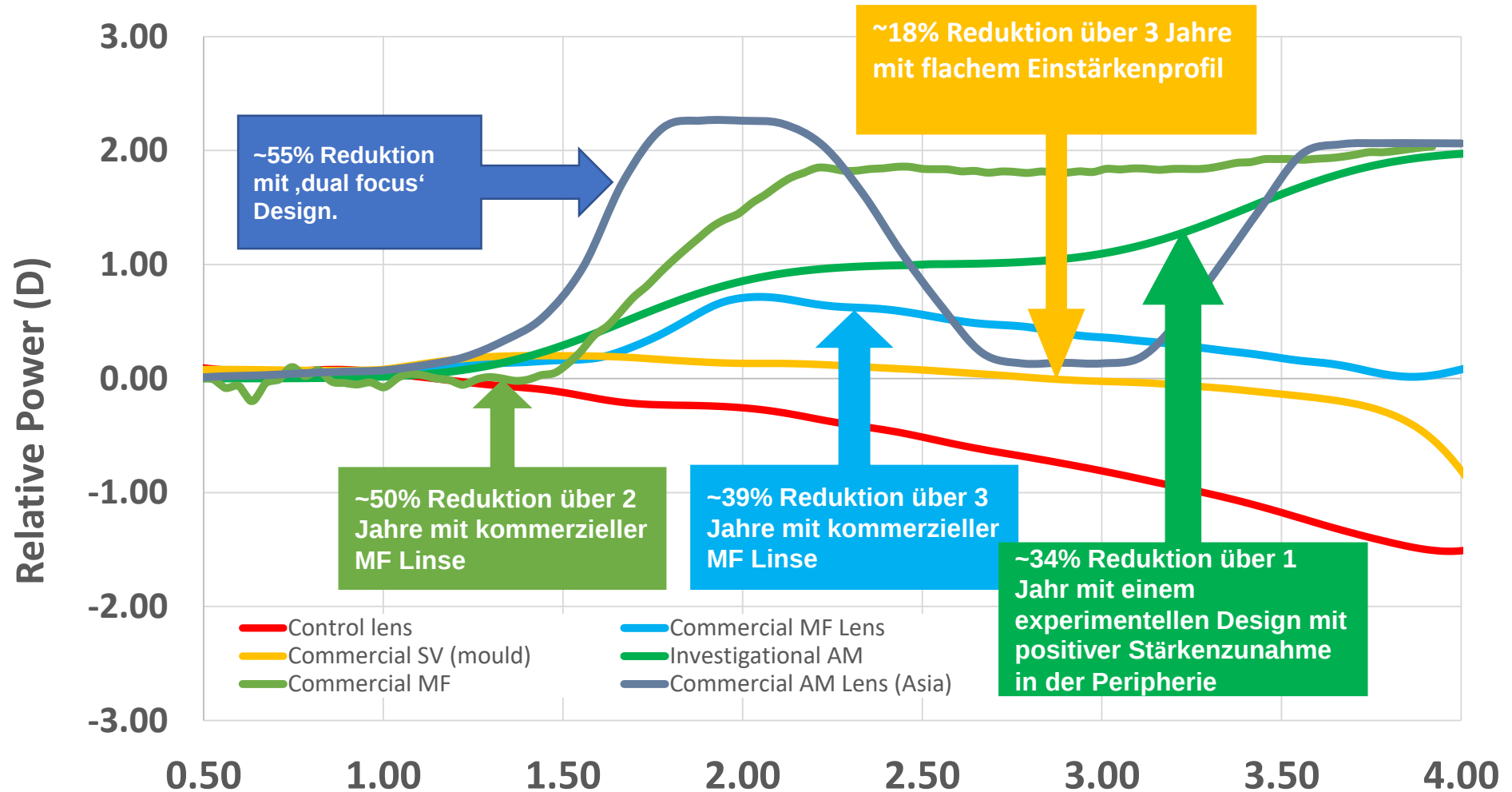


Einstärken vs. periphere Pluswirkung



Hypothese: Simultaner (peripherer) Defokus und / oder Lag

Klinische Studien – periphere Pluswirkung



EDOF

- 508 Chinesische Kinder (7-13 Jahre)
- -0.75D bis -3.50D (SE)
- Cyl <0.75D
- 4 Test (2x Defokus + 2x EDOF) + SV CL
- Mehr plus (2.50D vs. 1.50D) nicht besser
- Bessere Ergebnisse bei Kindern welche die Linsen mindestens 6 Tage / Woche tragen

Myopia control with novel central and peripheral plus contact lenses and extended depth of focus contact lenses: 2 year results from a randomised clinical trial

Padmaja Sankaridurg^{1,2} , Ravi C Bakaraju^{1,2}, Thomas Naduvilath^{1,2}, Xiang Chen³, Rebecca Weng¹, Daniel Tilia¹, Pauline Xu¹, Wayne Li¹, Fabian Conrad¹, Earl L Smith III⁴ and Klaus Ehrmann^{1,2}

¹Brien Holden Vision Institute, ²School of Optometry and Vision Science, University of New South Wales, Sydney, Australia, ³State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Centre, Sun Yet Sen University, Guangzhou, China, and ⁴College of Optometry, University of Houston, Houston, USA

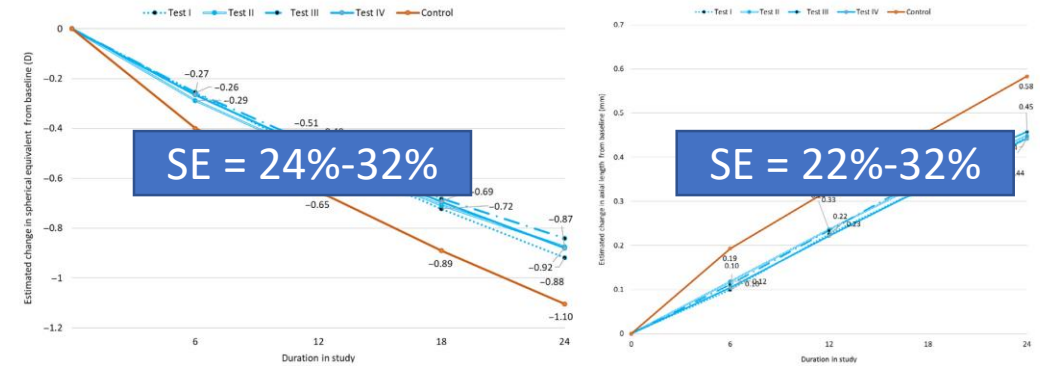


Figure 3. Estimated rate of progression (change in spherical equivalent and axial length from baseline).

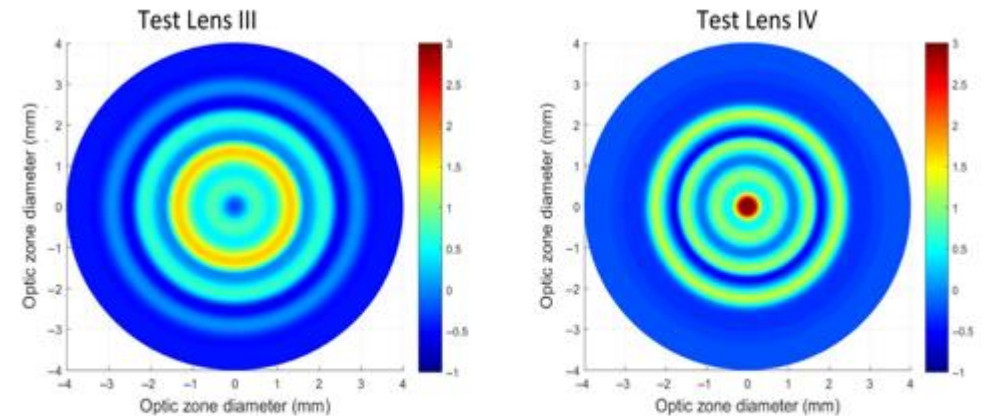
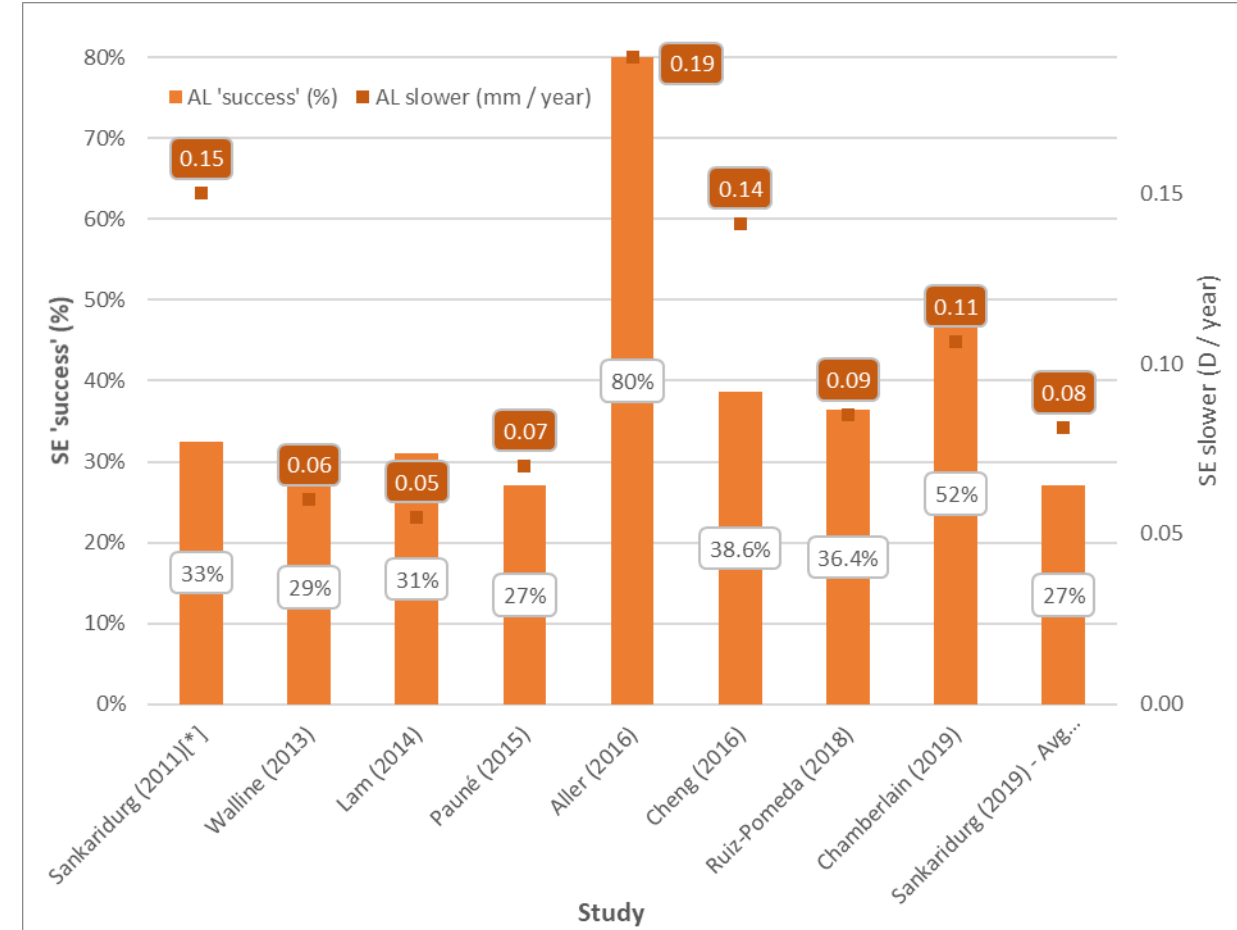
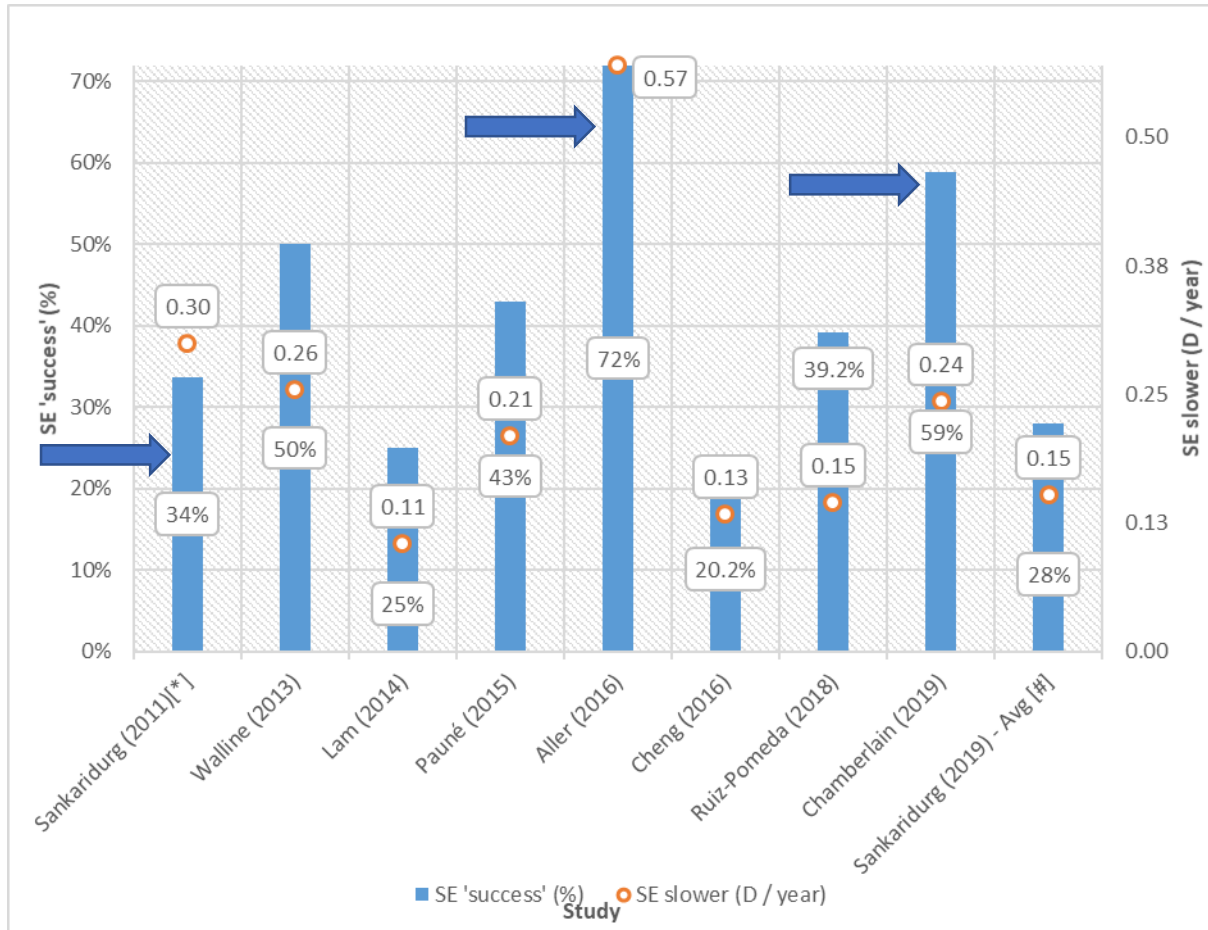
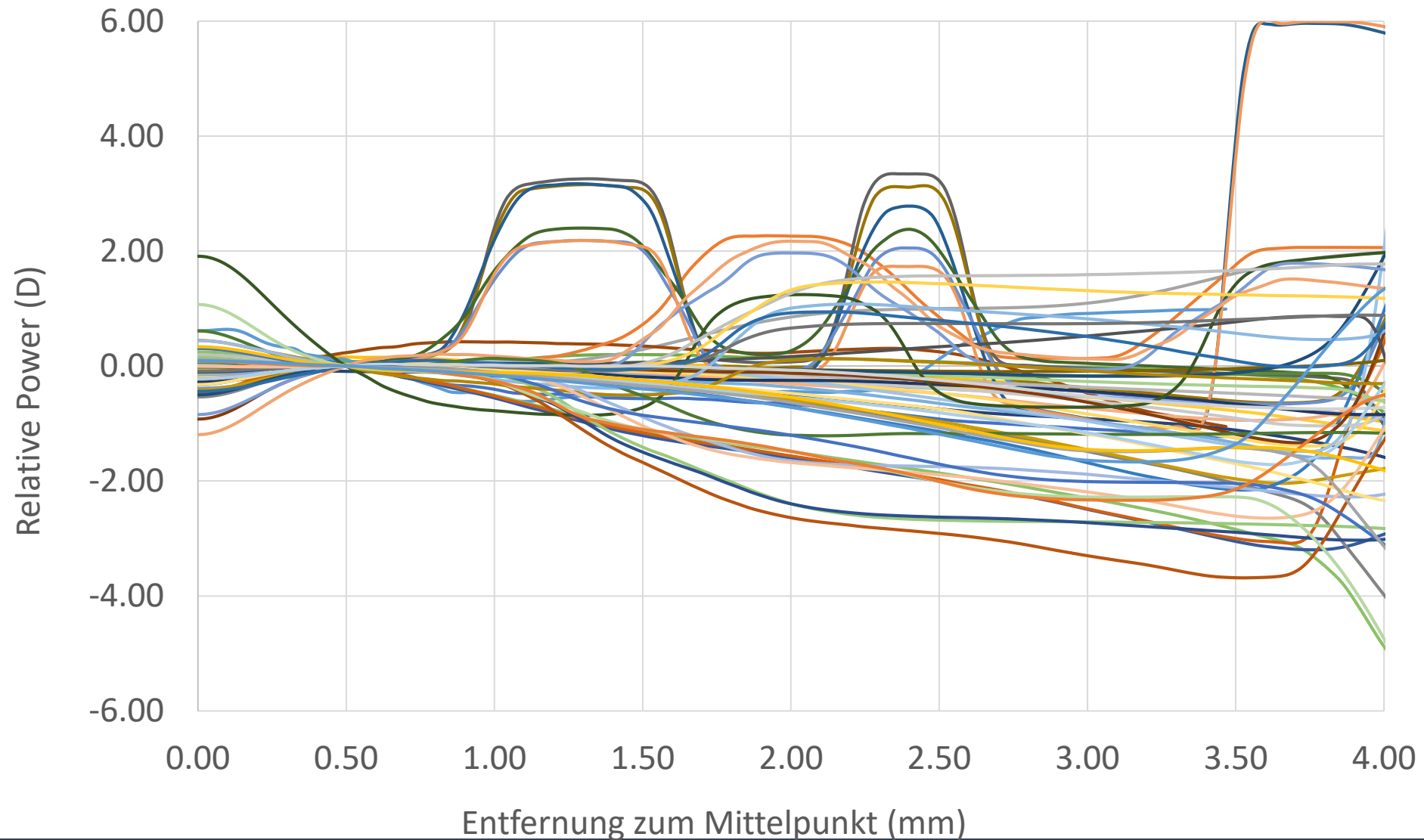


Figure 1. 2-D plot depicting the power profile across the optical zone of the test lenses. x- and y- axes represent the optical zone diameter and the colours represent the power.

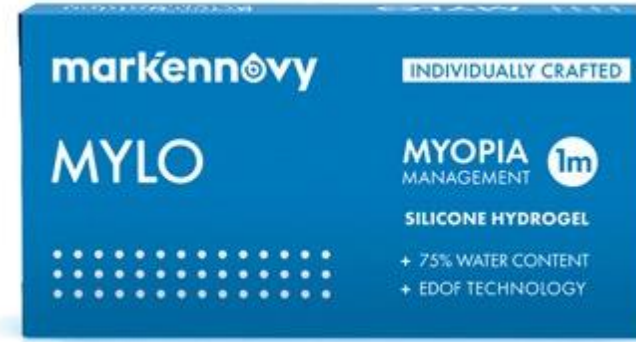
Studien mit weichen Linsen



Verfügbare Stärkenprofile (Massenmarkt)



Produkte

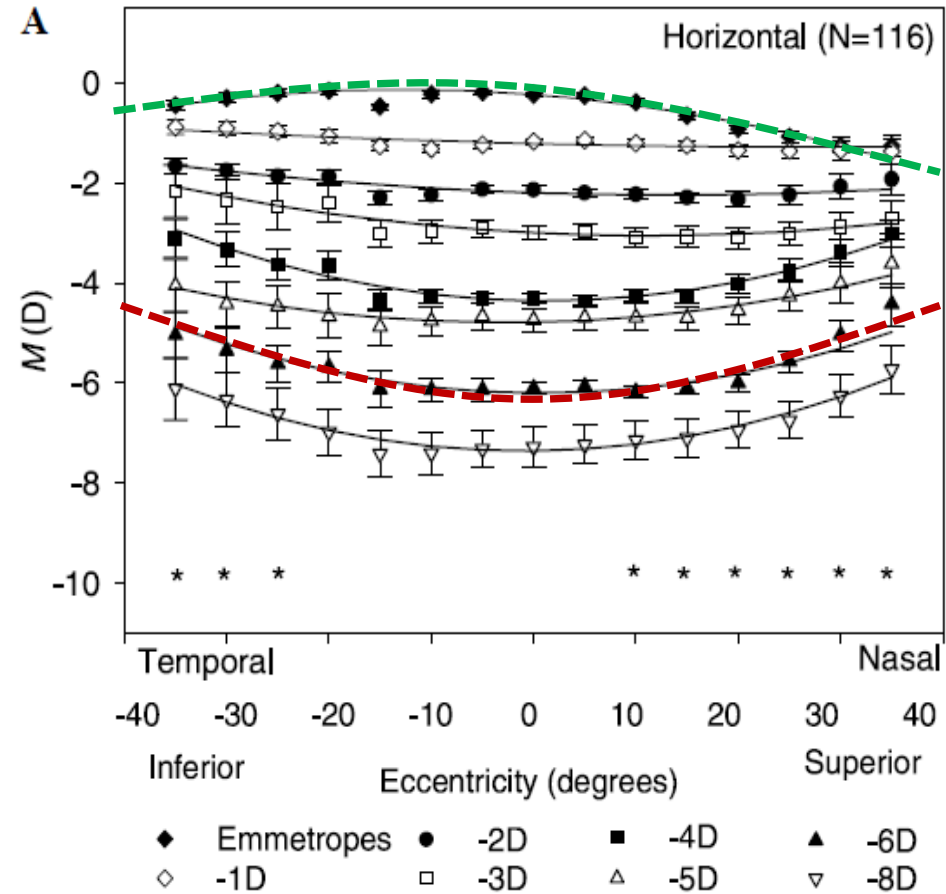


Menicon
BLOOM™



Individuelle Peripherie?

- Periphere Refraktion:
 - Periphere Myopie bei Emmetropen
 - Zunehmende periphere Hyperopie mit ansteigender Myopie
 - Individuelle Unterschiede
 - Individuell versorgen?



Zusammenfassung

- Verschiedene Produkte – on- und off-label
- Starke Unterschiede bei den Ergebnissen in den Studien
- Effektivität ist da
 - Tragen der Linsen hilft
- Probleme bei bilateralen Studien
 - Individuelle Erfolgsquote?
 - Dropouts
 - % Erfolg irreführend?
- Individuell besser?
 - Periphere Refraktion ist unterschiedlich
 - Mehr plus = größerer Effekt -> nicht beobachtet
 - Individuelles plus = größerer Effekt -> (noch) nicht gemacht

Ortho-Keratologie

Ortho-Keratology und Sicherheit

AMERICAN JOURNAL
OF OPHTHALMOLOGY®

Myopia Control in Children through Refractive Therapy Gas Permeable Contact Lenses: Is it for Real?

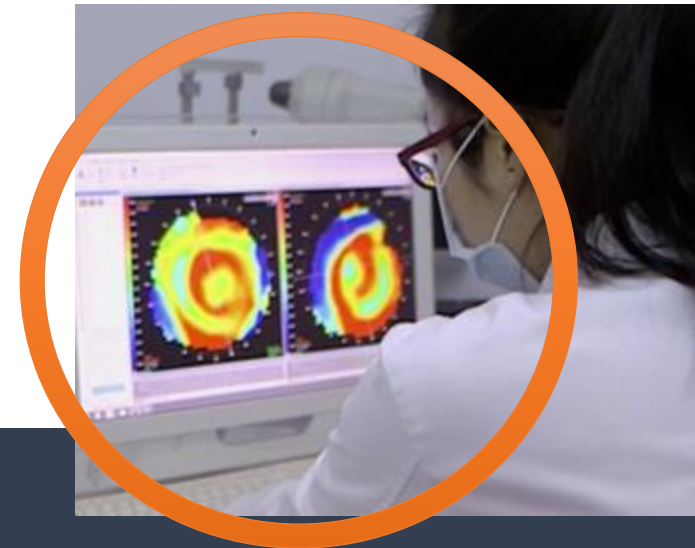
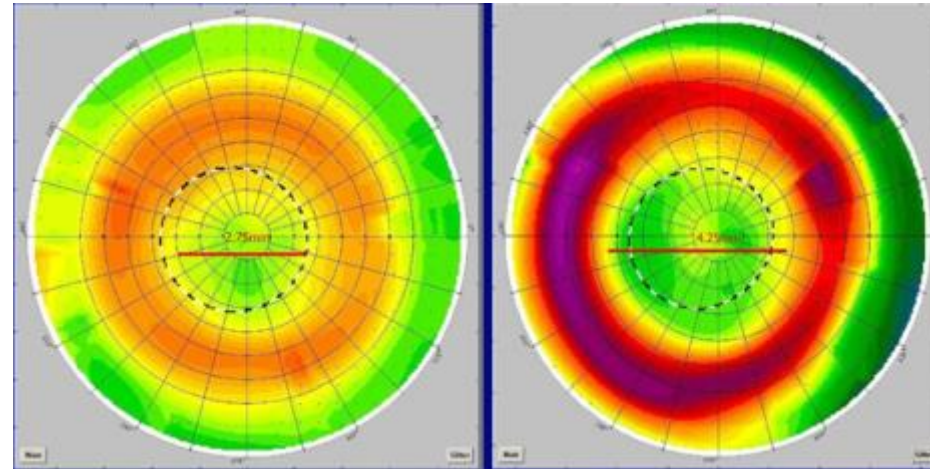
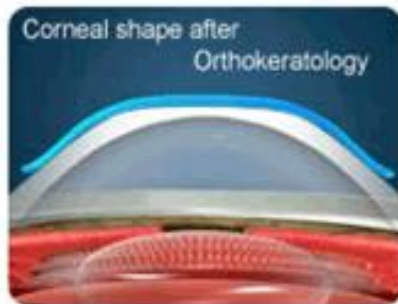
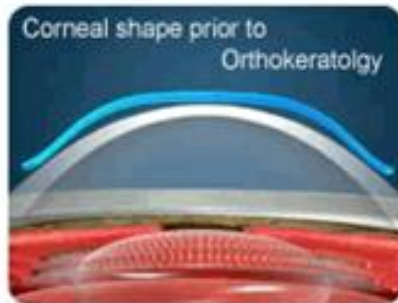
[Bruce H. Koffler](#) , [James J. Sears](#) [Am J Ophthalmol.](#) 2013 Dec;156(6):1076-1081.e1. doi: 10.1016/j.ajo.2013.04.039.

Conclusions

Studies show that the use of orthokeratology is a safe and efficacious nonsurgical treatment for myopia and that it is capable of slowing axial elongation, making it an effective myopic treatment for children.

Ortho-Keratologie

Kontrollierte Verformung der kornealen Topographie zur temporären Korrektur der Ammetropie

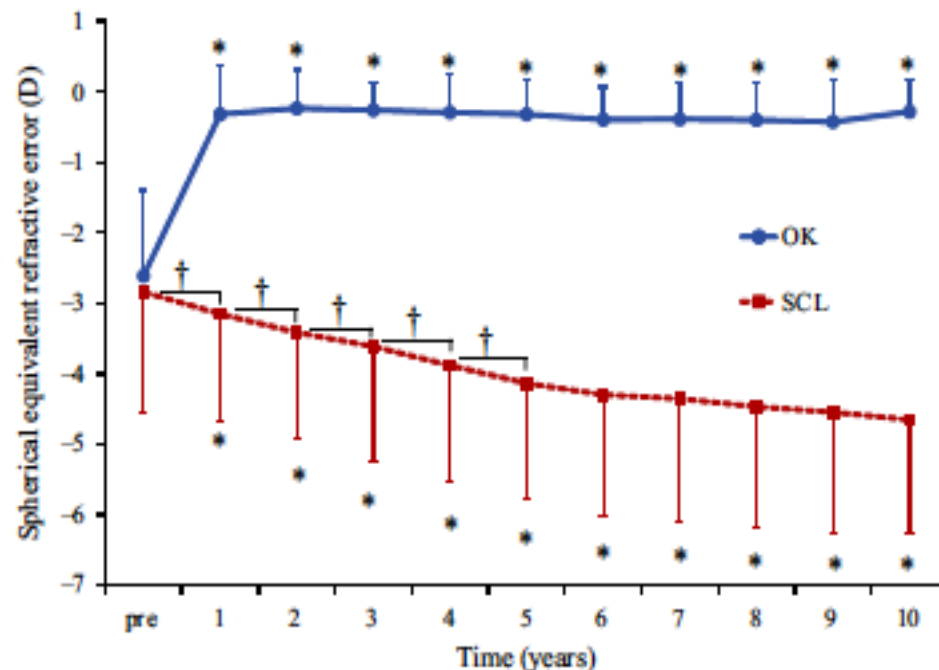


Safety and efficacy following 10-years of overnight orthokeratology for myopia control

Takahiro Hiraoka¹ , Yasuo Sekine², Fumiki Okamoto¹, Toshifumi Mihashi¹ and Tetsuro Oshika¹

¹Faculty of Medicine, Department of Ophthalmology, University of Tsukuba, Ibaraki, and ²Kashiwa Eye Clinic, Chiba, Japan

Citation information: Hiraoka T, Sekine Y, Okamoto F, Mihashi T & Oshika T. Safety and efficacy following 10-years of overnight orthokeratology for myopia control. *Ophthalmic Physiol Opt* 2018; 38: 281–289. <https://doi.org/10.1111/opo.12460>



In conclusion, the present findings showed that OK treatment was effective in slowing myopia progression over a 10-year treatment period and demonstrated a clinically acceptable safety profile among patients between the ages of 8 and 16 years. Patients undergoing OK treatment do not need to wear any vision-correction aids during day-

Figure 1. Changes over time in manifest refraction for the OK and SCL groups. OK, orthokeratology; SCL, soft contact lens. *Statistically significant differences compared to the baseline value by the Bonferroni post-hoc test. #Statistically significant differences between successive years by the Bonferroni post-hoc test.

Three years experience of myopia control with contact lenses in Berne

Alexander Meyenberg (MD)¹, Michael Bärtschi (PhD)², Marc Fankhauser (BSc)^{1,2}

¹ Augenärzte am Bollwerk Bern, dr.meyenberg@augen-arzt.ch

² Eyeness AG Bern, mbaertschi@eyeness.ch

SOG-SSO 2017 Davos

Table 1.

Patient demographics and annual changes in refraction and axial length of age and caucasian ethnicity correlated study groups

	Ortho-k	Bifoc-soft	Glasses
Eyes / patients (n)	14 / 7	13 / 7	27 / 14
Females / males (n)	4 / 3	4 / 3	5 / 9
Age mean $\pm$ SD (years)	12.3 $\pm$ 2.4	12.2 $\pm$ 1.9	12.1 $\pm$ 1.5
Moderate or high myopic parents (%)	57	86	71
Follow-up mean $\pm$ SD (days)	604.5 $\pm$ 180.0	744.5 $\pm$ 82.6	595.7 $\pm$ 154.9
SE refractive error at first visit, mean $\pm$ SD (D)	-2.841 $\pm$ 1.510	-4.212 $\pm$ 1.720	-2.949 $\pm$ 1.333
Annual change of SE refraction error, mean $\pm$ SD (D)	non available	-0.333 $\pm$ 0.257	-0.301 $\pm$ 0.255
Axial length at first visit, mean $\pm$ SD (mm)	24.566 $\pm$ 0.997	25.369 $\pm$ 0.965	24.381 $\pm$ 1.014
Annual change of axial length, mean $\pm$ SD (mm)	0.059 $\pm$ 0.072	0.175 $\pm$ 0.081	0.131 $\pm$ 0.094

Effect of Orthokeratology on Axial Length Elongation in Anisomyopic Children.

Zhang Y¹, Chen Y.

TABLE 2. Axial length and axial length elongation in the anisomyopic orthokeratology group (mean/ $\bar{x} \pm$ SD)

	More myopic eyes (n = 49)	Less myopic eyes (n = 49)	P
Baseline axial length (mm)	25.33 $\pm$ 0.87	24.61 $\pm$ 0.86	<.0001
1-y axial length (mm)	25.36 $\pm$ 0.86	24.73 $\pm$ 0.84	<.0001
2-y axial length (mm)	25.42 $\pm$ 0.92	24.86 $\pm$ 0.89	<.0001
1-y axial elongation (mm)*	0.03	0.065 0.10	<.0001
2-y axial elongation (mm)*	0.08	0.140 0.20	.001

*Axial elongation data are presented as median values.

TABLE 4. Axial length and axial length elongation in the anisomyopic spectacle group (mean/ $\bar{x} \pm$ SD)

	More myopic eyes (n = 49)	Less myopic eyes (n = 49)	P
Baseline axial length (mm)	25.32 $\pm$ 0.75	24.59 $\pm$ 0.87	<.0001
1-y axial length (mm)	25.57 $\pm$ 0.83	24.83 $\pm$ 0.82	<.0001
2-y axial length (mm)	25.79 $\pm$ 0.90	25.01 $\pm$ 0.78	<.0001
1-y axial elongation (mm)*	0.24	0.230 0.22	.26
2-y axial elongation (mm)*	0.46	0.445 0.43	.32

*Axial elongation data are presented as median values.

Three years experience of myopia control with contact lenses in Berne

Alexander Meyenberg (MD) ¹, Michael Bärtschi (PhD) ², Marc Fankhauser (BSc) ^{1,2}

¹ Augenärzte am Bollwerk Bern, dr.meyenberg@augen-arzt.ch

² Eyeness AG Bern, mbaertschi@eyeness.ch

SOG-SSO 2017 Davos

Results

138 eyes of 71 patients between the age of 7 and 18 years, mean $12.9 \pm \text{SD } 2.1$ years, were included, 12 patients (7 females, 5 males) choosing ortho-k contact lenses, 14 patients (9 females, 5 males) bifoc-soft contact lenses, 45 patients (17 females, 28 males) spectacles. Full data sets including valid optical biometry measures were available for 24 eyes of the ortho-k group, 27 eyes of the bifoc-soft group, 87 eyes of the glasses group, respectively. Follow-up was 139 to 883 days, mean $520.8 \pm \text{SD } 203.4$ days. Contact lens fitting was successful in 92% of cases, all without complications during the follow-up period.

Conclusions

Ortho-k and bifocal silicone-hydrogel contact lenses showed a high level of safety for children and youths. Ortho-k contact lenses are a promising strategy to reduce myopia progression.

Ortho-Keratologie und MK !

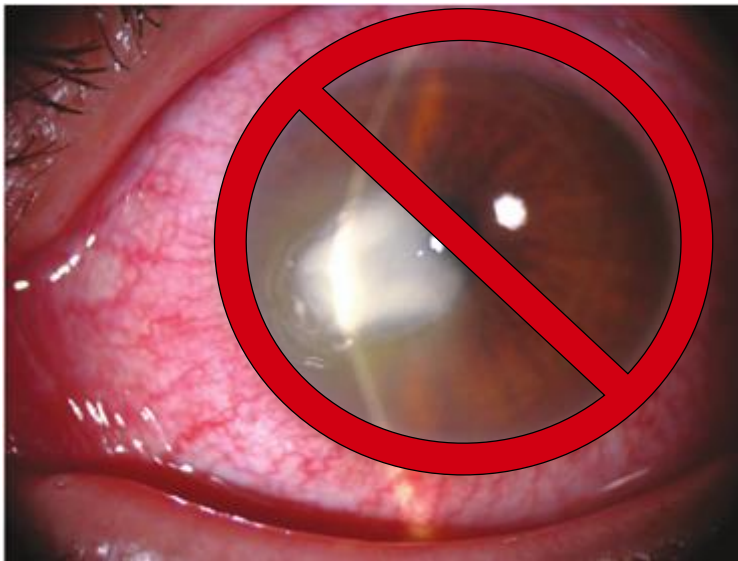
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Orthokeratology-Associated Infectious Keratitis in a Tertiary Care Eye Hospital in Hong Kong

[Tommy C.Y. Chan](#), [Emmy Y.M. Li](#), [Victoria W.Y. Wong](#), [Vishal Jhanji](#)  

Hong Kong Eye Hospital, Hong Kong SAR, China; and Department of Ophthalmology & Visual Sciences, The Chinese University of Hong Kong, Hong Kong SAR, China

Am J Ophthalmol. 2014 Dec;158(6):1130-1135.e2. doi: 10.1016/j.ajo.2014.08.026. Epub 2014 Aug 23.



Infection. 2017 Dec;45(6):727-735. doi: 10.1007/s15010-017-1023-2. Epub 2017 May 22. *

Infectious keratitis and orthokeratology lens use: a systematic review.

[Kam KW](#)^{1,2}, [Yung W](#)², [Li GKH](#)^{1,2}, [Chen LJ](#)^{1,2}, [Young AL](#)^{3,4}.

173 Fälle* (>85% vor 2010)

Fallreporte und -serien 2002 – 2010/16

0.77 Fälle / 1'000 Px**

Optom Vis Sci. 2013 Sep;90(9):937-44. doi: 10.1097/OPX.0b013e31829cac92. **

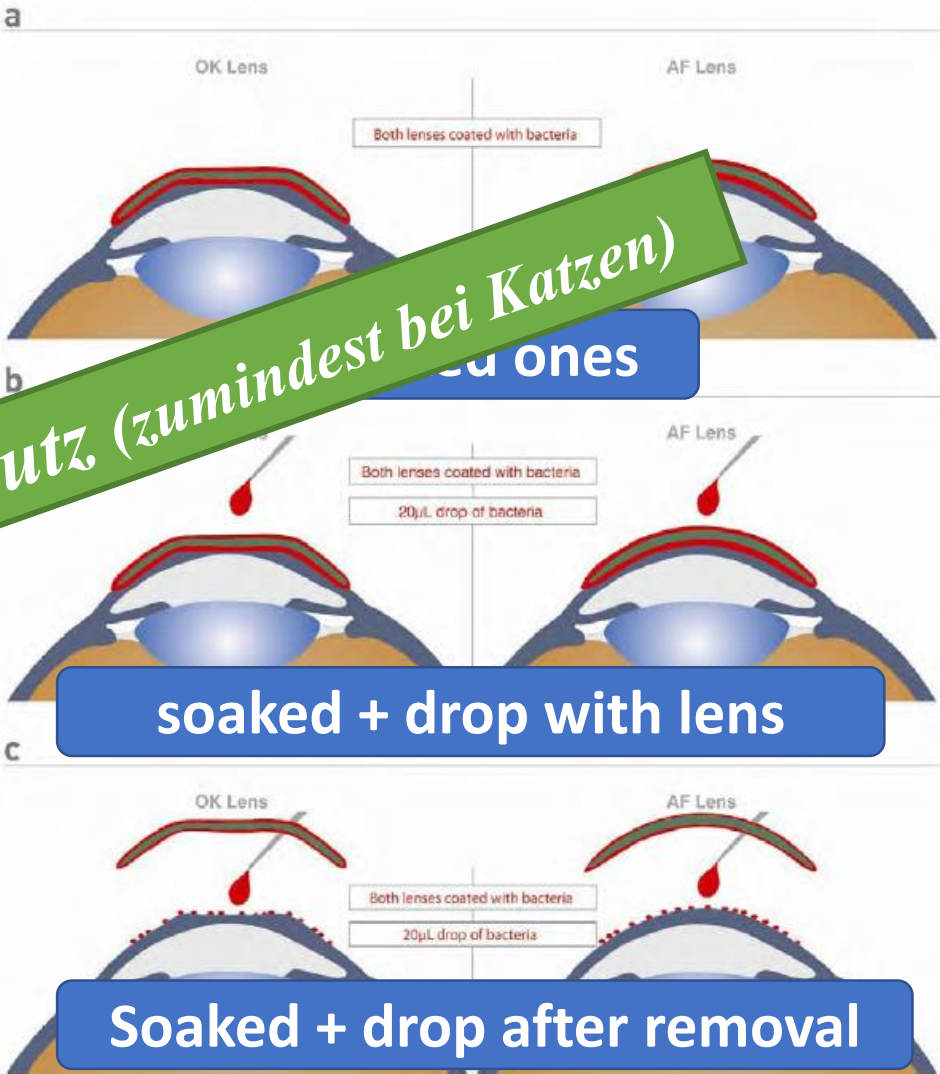
The risk of microbial keratitis with overnight corneal reshaping lenses.

[Bullimore MA](#)¹, [Sinnott LT](#), [Jones-Jordan LA](#).

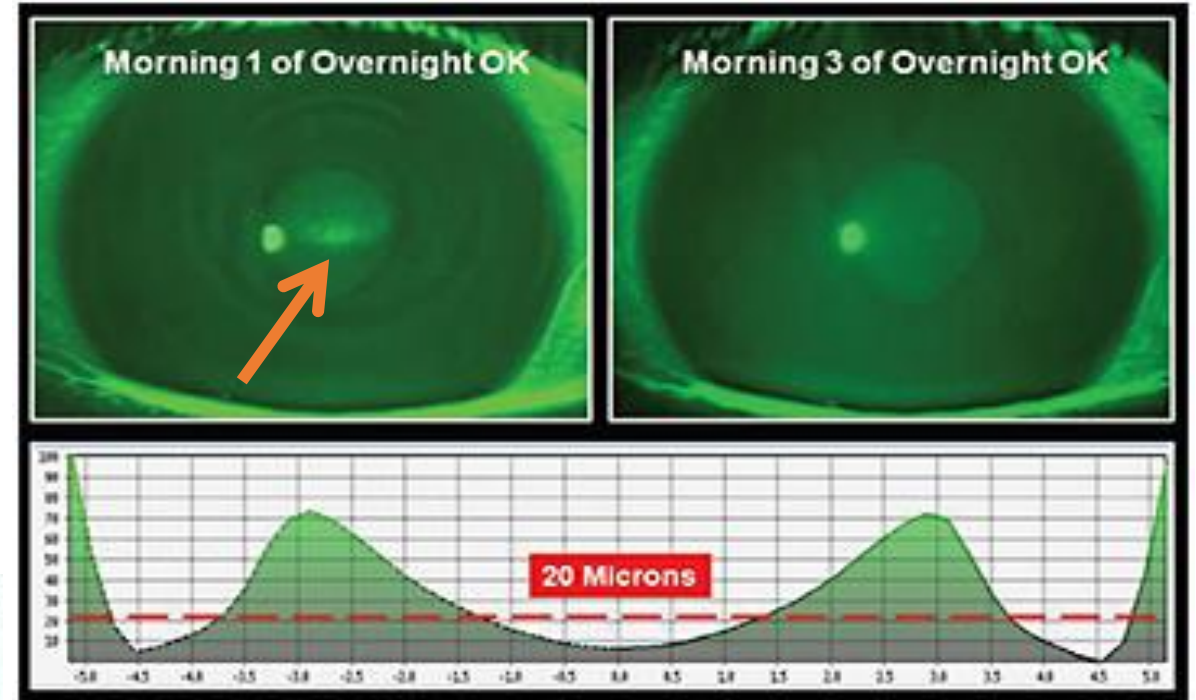
Schutzwirkung des intakten Epitheliums

CH	Inoc. Score	Animals Started Study	Animals Completed Study	Infections
I	1	22	18	0
II	1	18	18	0
III	28	18	14	0
IV	14	14	0	0
V	1	16	0	0
VI	16	N/A	0	0
VII	1	14	14	0

Intaktes Epithelium ist ein effektiver Schutz (zumindest bei Katzen)



Hygiene, Anpassung und Nachbetreuung !



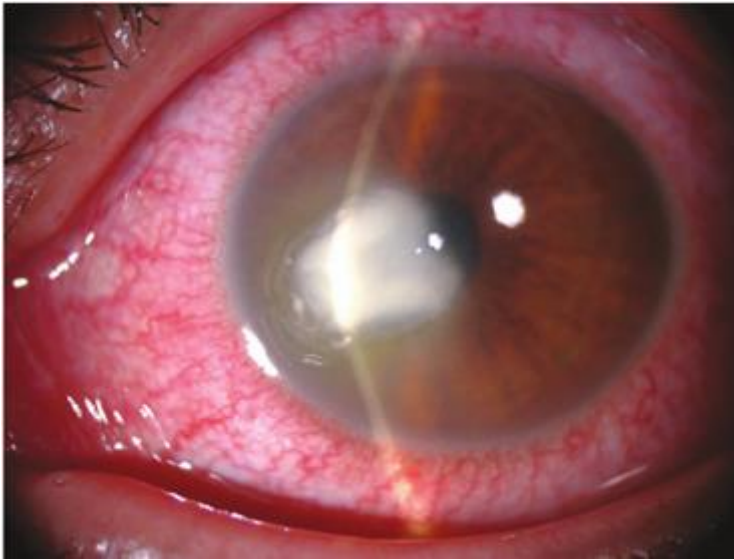


OPEN

Level of Compliance in Orthokeratology

Jiang Jun, M.D., Bian Zhiwen, M.D., Wang Feifu, M.D., O.D., Lian Lili, M.D., and Lu Fan, M.D., O.D.

Conclusions: The level of compliance with ortho-k lens wear in Mainland China is not high, necessitating ECPs to stress to patients the details of wear and care behaviors, especially avoiding exposing lenses to nonsterile solution. Improving monitoring of follow-up visits, particularly within the first 9 months of wearing ortho-k lenses, is needed.



„Microbial Keratitis with Ortho-K“

0.77 cases / 1'000 Px

Optom Vis Sci. 2013 Sep;90(9):937-44. doi: 10.1097/OPX.0b013e31829cac92.

The risk of microbial keratitis with overnight corneal reshaping lenses.

Bullimore MA¹, Sinnott LT, Jones-Jordan LA.



Figure 1 Acute-onset postoperative endophthalmitis (note the sutured corneal wound and hypopyon).

Clinical Ophthalmology

Open Access Full Text Article

Endophthalmitis: state of the art

This article was published in the following Dove Press journal:
Clinical Ophthalmology
8 January 2013
Number of times this article has been viewed

Kamyar Vaziri
Stephen G Schwartz
Krishna Kishor
Harry W Flynn Jr
Department of Ophthalmology,
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University of Miami Miller School
of Medicine, Miami, FL, USA



NIH Public Access

Author Manuscript

Curr Opin Ophthalmol. Author manuscript; available in PMC 2013 September 19.

Published in final edited form as:

Curr Opin Ophthalmol. 2012 May ; 23(3): 219–225. doi:10.1097/ICU.0b013e31823524068.

Serious Adverse Events After Cataract Surgery

Joshua D. Stein, MD, MS

Department of Ophthalmology and Visual Sciences, University of Michigan Medical School

A t r o p i n



AMERICAN ACADEMY
OF OPHTHALMOLOGY®

Eye & Contact Lens • Volume 44, Number 4, July 2018

REVIEW ARTICLE

OPEN

A Review of Current Concepts of the Etiology and Treatment of Myopia

Jeffrey Cooper, M.S., O.D., F.A.A.O. and Andrei V. Tkatchenko, M.D., Ph.D.



AMERICAN ACADEMY
OF OPHTHALMOLOGY®

Ophthalmology Volume 126, Number 1, January 2019

Low-Concentration Atropine for Myopia Progression (LAMP) Study

A Randomized, Double-Blinded, Placebo-Controlled Trial of 0.05%, 0.025%, and 0.01% Atropine Eye Drops in Myopia Control

Jason C. Yam, FCOphthHK, FRCS(Edin),¹ Yuning Jiang, MMED,¹ Shu Min Tang, PhD,¹
Antony K.P. Law, MSc,¹ Joyce J. Chan, MRCSEd(Ophth),¹ Emily Wong, MBCChB, MRCS(Edin),¹
Simon T. Ko, FCOphthHK, FHKAM(Oph),² Alvin L. Young, MMedSc(Hons), FRCOphth,^{1,3}
Clement C. Tham, FCOphthHK, FRCOphth,¹ Li Jia Chen, MRCSEd(Ophth), PhD,^{1,3} Chi Pui Pang, DPhil¹

ATROPIN : **1%** vs **0.5%** vs **0.1%** vs **0.01%**

ATOM 2 Study

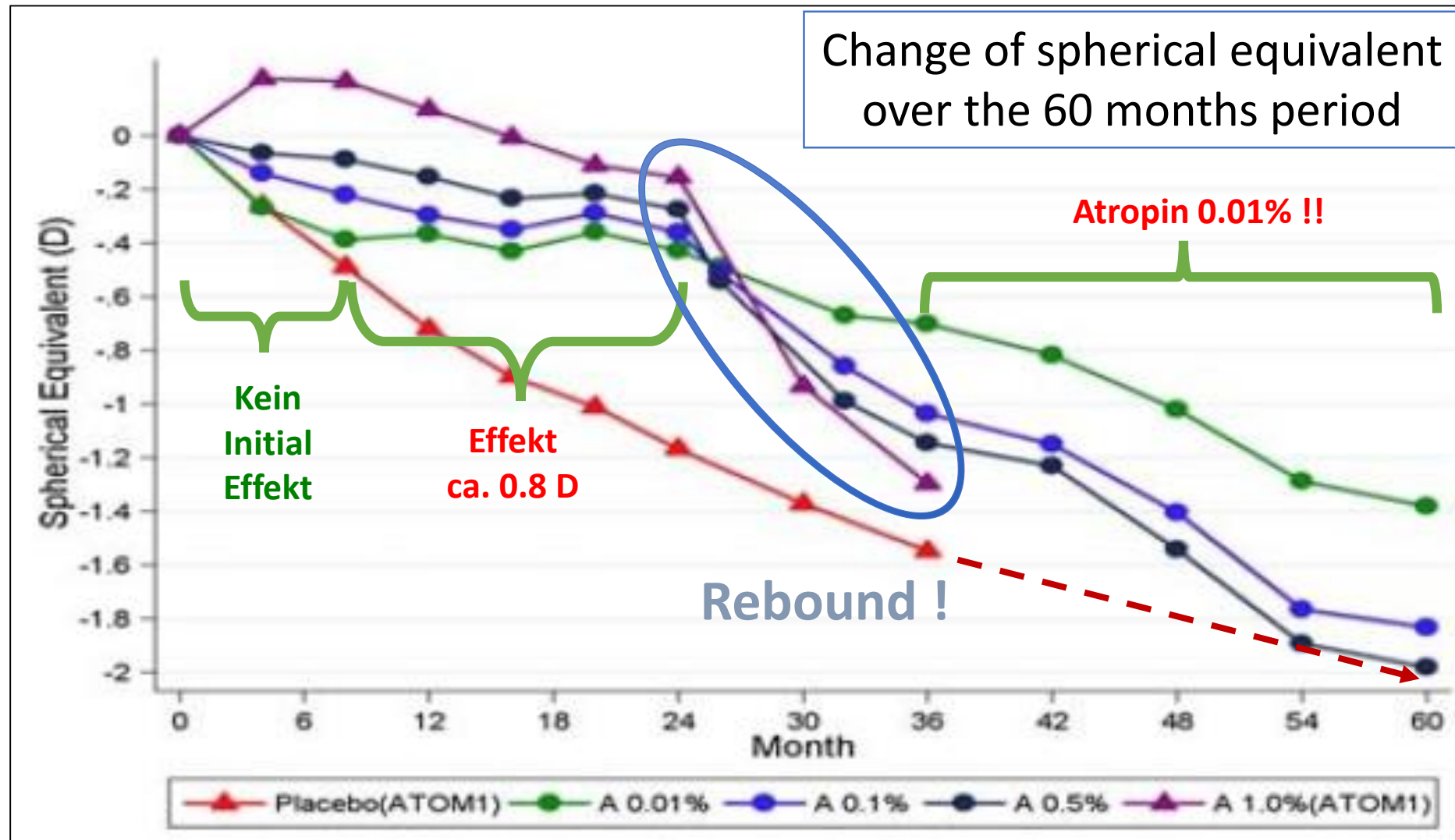
“Over 5 years, atropine **0.01%** eye drops were more effective in slowing myopia progression with less visual side effects compared with higher doses of atropine.”

Chia, Lu, Tan: Ophthalmology 2016



ATROPIN : 1% vs 0.5% vs 0.1% vs 0.01%

ATOM 1&2 Study



Chia et al.: Ophthalmology 2016

Was heisst “Less side effects” ?

ATOM 2 Study

Table 4. Changes in Pupil Size, Accommodation, and Visual Acuity in Children within Different Atropine Groups (0.01%, 0.1%, and 0.5%) Who Were Re-treated and Who Did Not Require Re-treatment

	Atropine 0.01% (N = 17)		Untreated Children			
		P Value	Atropine 0.01% (N = 53)	Atropine 0.1% (N = 57)	Atropine 0.5% (N = 43)	P Value
Photopic pupil size, mm, mean (SD)						
Screening	3.93 (0.56)		3.89 (0.58)	3.86 (0.67)	4.02 (0.60)	0.363
24 mos	5.18 (1.02)	<0.001	5.02 (0.92)	6.46 (1.07)	7.28 (1.46)	<0.001
36 mos	5.78 (0.58)	0.993	3.73 (0.58)	3.59 (0.49)	3.74 (0.47)	0.193
48 mos	4.89 (0.99)	0.775	3.63 (0.52)	3.59 (0.51)	3.68 (0.40)	0.633
60 mos	5.13 (0.89)	0.275	3.58 (0.59)	3.48 (0.49)	3.58 (0.46)	0.448
Final visit	3.81 (0.59)	0.264	3.58 (0.59)	3.48 (0.49)	3.58 (0.46)	0.448
Accommodation, D, mean (SD)						
Screening	17.29 (3.24)	0.041	15.99 (3.15)	16.83 (2.72)	15.93 (2.76)	0.149
24 mos	10.88 (4.01)	<0.001	11.95 (2.73)	7.52 (2.58)	4.55 (2.16)	<0.001
36 mos	13.55 (2.49)	0.059	0.03 (0.06)	0.02 (0.07)	0.02 (0.06)	0.440
48 mos	11.37 (3.21)	<0.001	0.01 (0.07)	0.07 (0.12)	0.27 (0.22)	<0.001
60 mos	11.01 (3.20)	0.434	-0.02 (0.05)	-0.02 (0.06)	-0.02 (0.06)	0.676
Final visit	13.44 (2.48)	0.728	-0.01 (0.05)	-0.02 (0.06)	-0.03 (0.06)	0.049
		0.535	-0.02 (0.05)	-0.02 (0.06)	-0.04 (0.05)	0.191
		0.451	-0.02 (0.05)	-0.02 (0.06)	-0.04 (0.05)	0.191

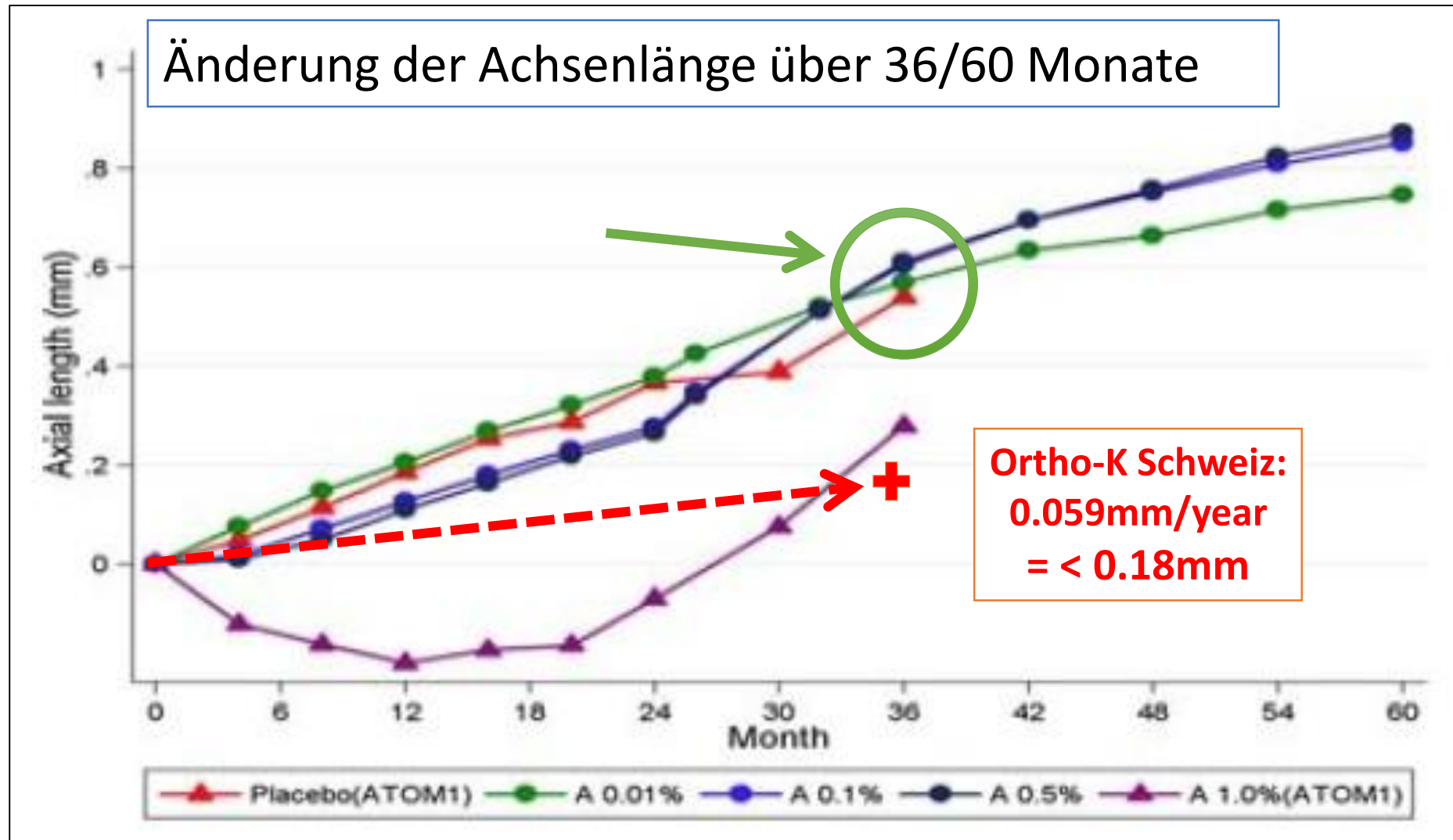
(Table 4). On restarting atropine 0.01%, there was a mean increase in photopic pupil size of approximately 1 mm and a loss of accommodation of 2.00 to 3.00 D, which were similar to the change noted in eyes treated with atropine 0.01% during phase 1 (Table 4). These mild side effects were deemed clinically insignificant, because there was no change or loss in distance or near visual acuity. Children were offered progressive addition myopic lenses (Gint) before if they were not comfortable.

(Table 4). On restarting atropine 0.01%, there was a mean increase in photopic pupil size of approximately 1 mm and a loss of accommodation of 2.00 to 3.00 D, which were similar to the change noted in eyes treated with atropine 0.01% during phase 1 (Table 4). These mild side effects were deemed clinically insignificant, because there was no change or loss in distance or near visual acuity. Children were offered progressive addition

D = diopters; logMAR = logarithm of the minimum angle of resolution; SD = standard deviation.

ATROPIN : 1% vs 0.5% vs 0.1% vs 0.01%

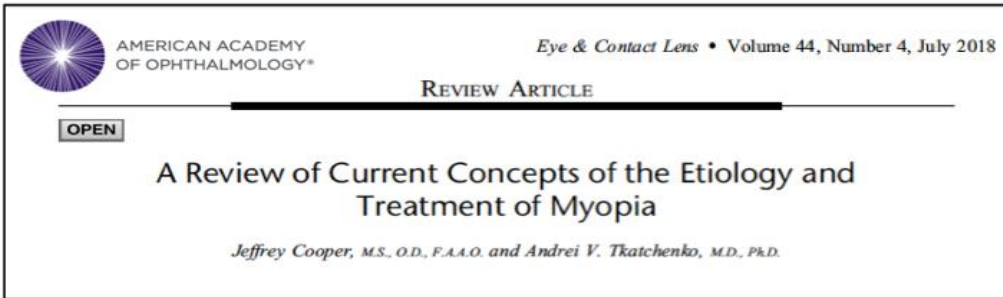
ATOM 1&2 Study



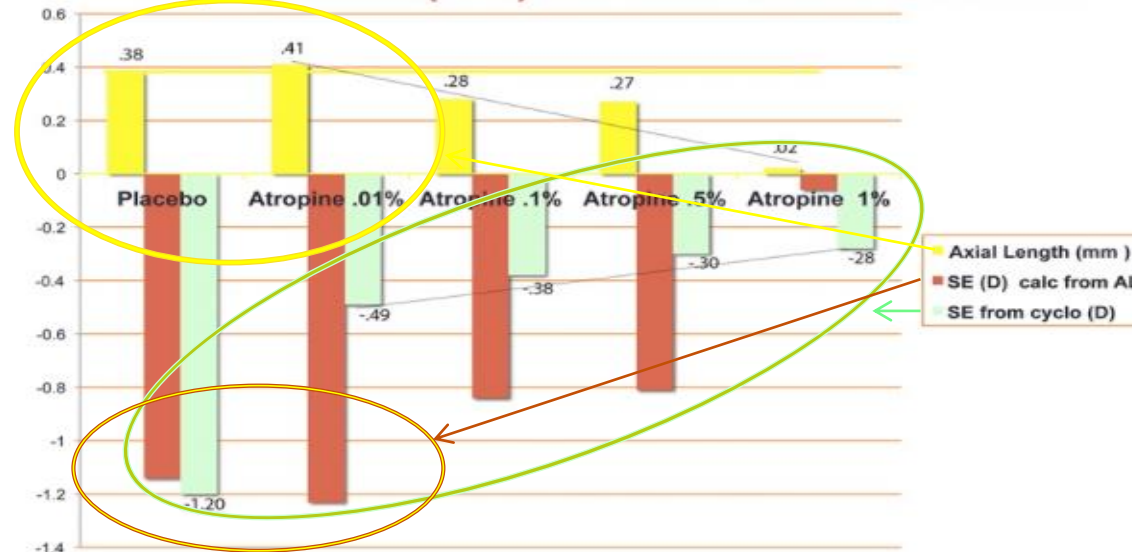
Chia et al.: Ophthalmology 2016

ATROPIN : 1% vs 0.5% vs 0.1% vs 0.01%

ATOM 1&2 Study



Changes in Axial Length and Spherical Equivalent (SE) Over 2 Years of Time



Changes in AL and SPH EQ after 2 years of treatment. Figure 10 depicts the changes in axial length in millimeters (yellow bars going up); spherical equivalent in diopters calculated from the derived from the ATOM 1 study for atropine 1% and placebo and ATOM 2 for atropine 0.01%, 0.1%, and 0.5%, respectively. It is readily apparent that there is no real difference between axial length measurements after 24 months between placebo and atropine 0.01%; moderate changes with atropine 0.1% and 0.5%; and dramatic changes with atropine 1% (yellow bars). However, the effect of atropine 0.01% and atropine 1% is not nearly as great as the concentration differences.

Was lernen wir daraus ?

Dosis, Dosis, Dosis !

Hemmung der Myopie Progression (SE)

≠

Hemmung der axialen Länge (AL)

ATROPIN 0.05% vs 0.025% vs 0.01% (LAMP Study)



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Ophthalmology Volume 126, Number 1, January 2019

Low-Concentration Atropine for Myopia Progression (LAMP) Study

A Randomized, Double-Blinded, Placebo-Controlled Trial of 0.05%, 0.025%, and 0.01% Atropine Eye Drops in Myopia Control

Jason C. Yam, FCOphthHK, FRCS(Edin),¹ Yuning Jiang, MMED,¹ Shu Min Tang, PhD,¹
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Clement C. Tham, FCOphthHK, FRCOphth,¹ Li Jia Chen, MRCSEd(Ophth), PhD,^{1,3} Chi Pui Pang, DPhil¹

ATROPIN 0.05% vs 0.025% vs 0.01% (LAMP Study)

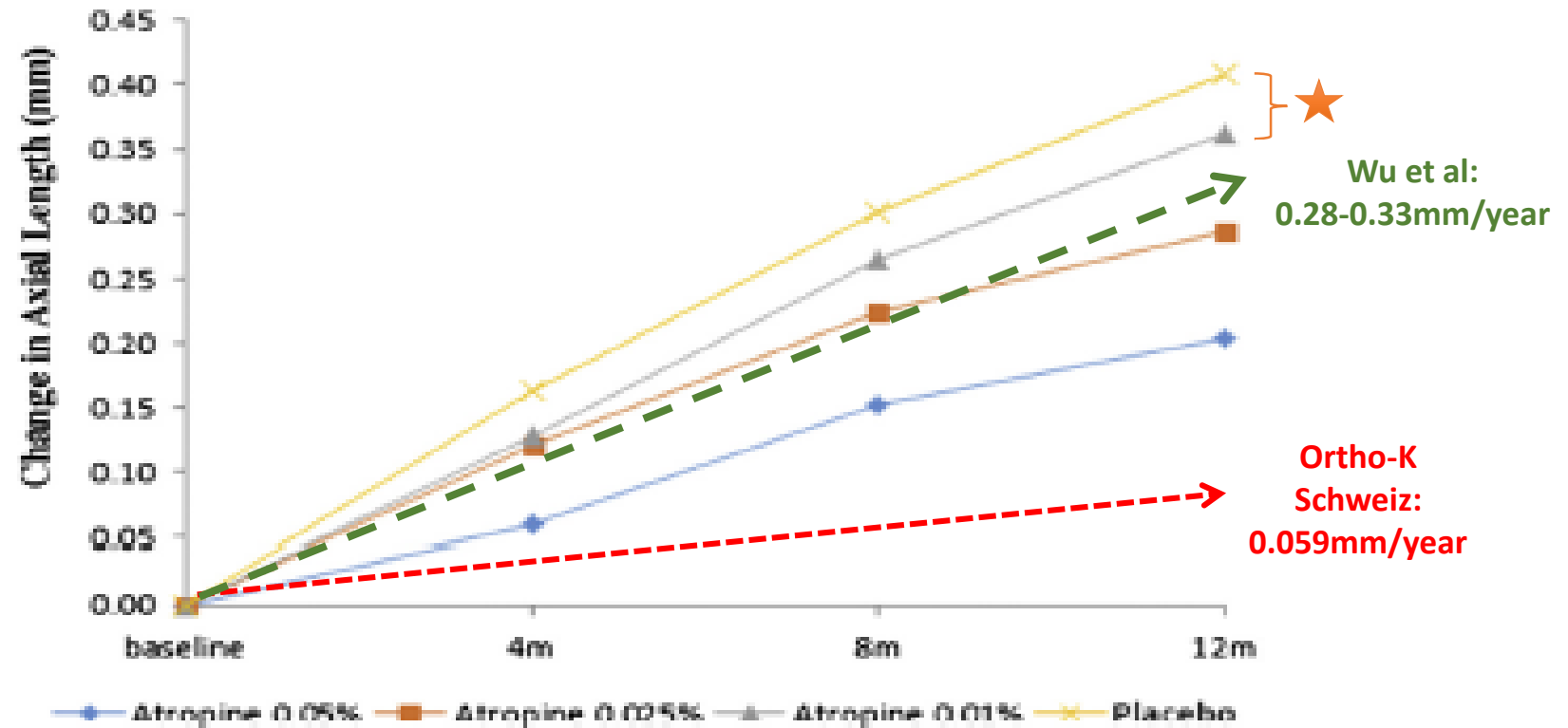


Figure 3. Change in axial length (AL) in treatment groups across time.
m = month.



It should be noted that the difference of AL changes between the 0.01% atropine and placebo groups in our study also was not significant, which was consistent with the AL results of ATOM 2. The efficacy of 0.01% atropine in ATOM 2 was similar to that of the 0.05% atropine group.

Synergie: Atropin **und** Kontaktlinse



[Japanese Journal of Ophthalmology](#)

..... September 2018, Volume 62, [Issue 5](#), pp 544–553 | [Cite as](#)

Additive effects of orthokeratology and atropine 0.01% ophthalmic solution in slowing axial elongation in children with myopia: first year results

Authors

[Authors and affiliations](#)

Nozomi Kinoshita , Yasuhiro Konno, Naoki Hamada, Yoshinobu Kanda, Machiko Shimmura-Tomita, Akihiro Kakehashi

Results

A total of 40 consecutive subjects (20 subjects in the combination group and 20 in the monotherapy group) were followed for 1 year. The increase in axial length over 1 year was 0.09 ± 0.12 mm in the combination group and 0.19 ± 0.15 mm in the monotherapy group ($P = 0.0356$, unpaired t test).

Conclusion

During the 1-year follow-up, the combination of OK and atropine 0.01% ophthalmic solution was more effective in slowing axial elongation than OK monotherapy in children with myopia.

Synergie: Atropin und Kontaktlinse



[Japanese Journal of Ophthalmology](#)

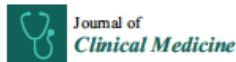
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Authors

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Article

The Synergistic Effects of Orthokeratology and Atropine in Slowing the Progression of Myopia

Lei Wan ^{1,2,3,4,*} , Chang-Ching Wei ^{5,6} , Chih Sheng Chen ^{1,7}, Ching-Yao Chang ²,
Chao-Jen Lin ^{8,9}, Jamie Jiin-Yi Chen ¹⁰, Peng-Tai Tien ^{6,10,11} and Hui-Ju Lin ^{1,10,*} 

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Contents lists available at [ScienceDirect](#)

Contact Lens and Anterior Eye

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



Adjunctive effect of orthokeratology and low dose atropine on axial elongation in fast-progressing myopic children—A preliminary retrospective study

Zhi Chen ^{a,b,c,1}, Shengmei Huang ^{d,1}, Jiaqi Zhou ^{a,b,c}, Xiaomei Qu ^{a,b,c}, Xingtao Zhou ^{a,b,c},
Feng Xue ^{a,b,c,*}

^a Department of Ophthalmology and Vision Science, Eye and ENT Hospital, Fudan University, Shanghai, China

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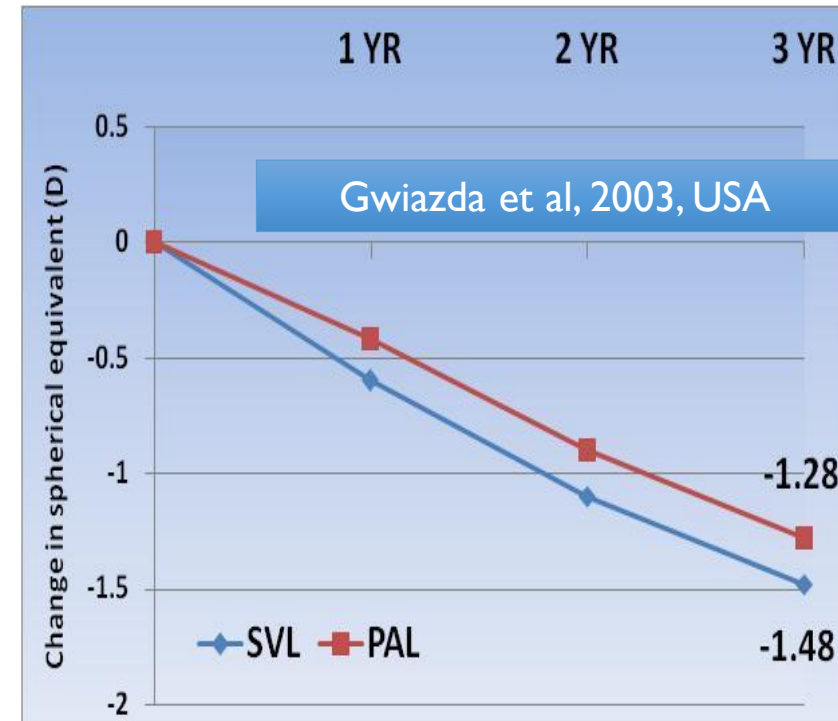
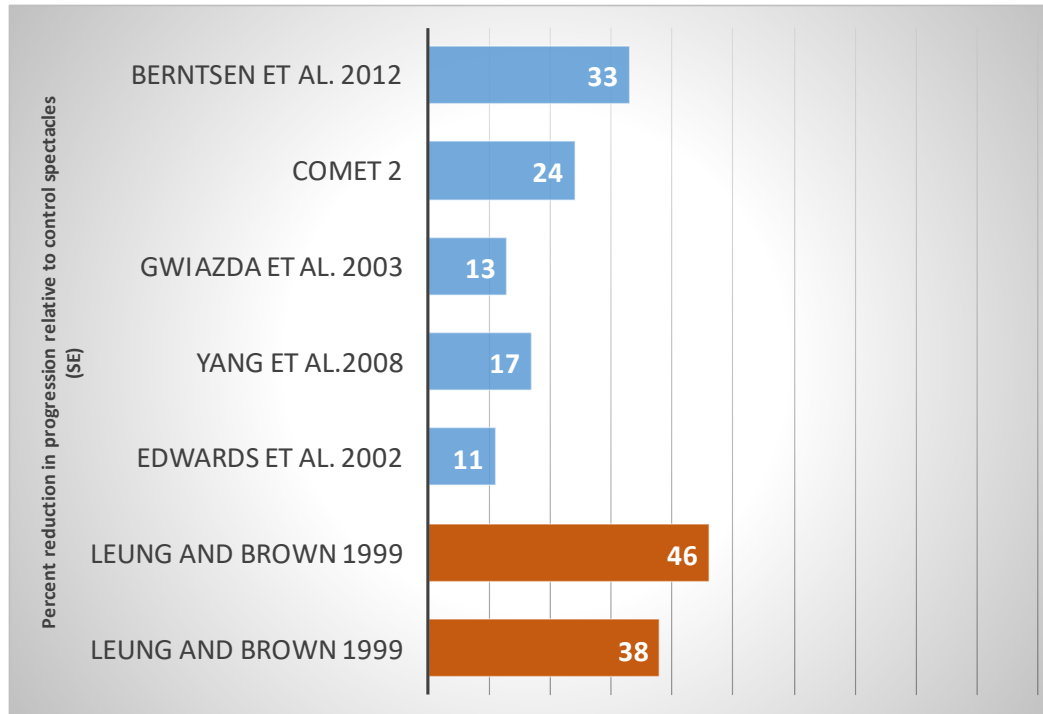
^c Laboratory of Myopia, Chinese Academy of Medical Sciences, Shanghai, China

^d Department of Ophthalmology, Shanghai Gongli Hospital of Pudong New Area, Shanghai, China



Brillengläser

Progressive Brillengläser



Hypothese: Akkommodativer Aufwand verringert, dadurch weniger Akkommodativer Fehler
Ergebnis: Statistisch signifikante aber klinisch nicht relevanter Erfolg, nicht generell empfohlen

Peripherer De-fokus

- Design:
 - 12 Monate
 - 6-16 Jahre alte Chinesische Kinder
 - 3 Designs
 - RCT
- Kein messbarer Effekt! Aber:
 - Untergruppe (6 – 12 Jahre alt mit mindestens einem myopen Elternteil; ~50% der Probanden) circa 30% weniger Myopie
- Markteinführung

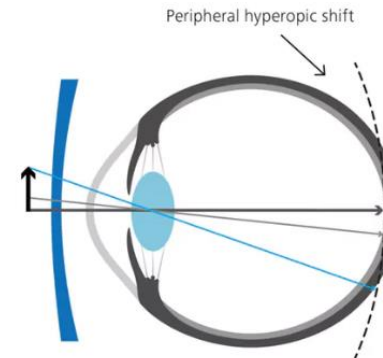
FEATURE ARTICLE ON LINE

Spectacle Lenses Designed to Reduce Progression of Myopia: 12-Month Results

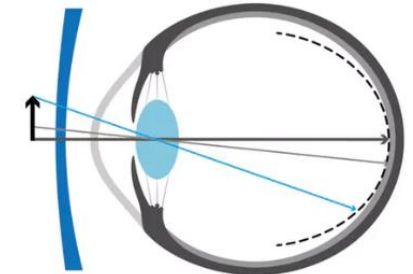
Padmaja Sankaridurg*, Leslie Donovan†, Saulius Varnas*, Arthur Ho*, Xiang Chen‡, Aldo Martinez§, Scott Fisher¶, Zhi Lin**, Earl L. Smith III§, Jian Ge††, and Brien Holden§

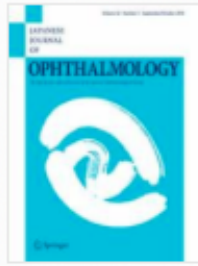
ZEISS MyoVision Design

With standard single vision lenses



With ZEISS MyoVision Lenses





[Japanese Journal of Ophthalmology](#)

September 2018, Volume 62, [Issue 5](#), pp 537–543 | [Cite as](#)

Effect of spectacle lenses designed to reduce relative peripheral hyperopia on myopia progression in Japanese children: a 2-year multicenter randomized controlled trial

Authors

[Authors and affiliations](#)

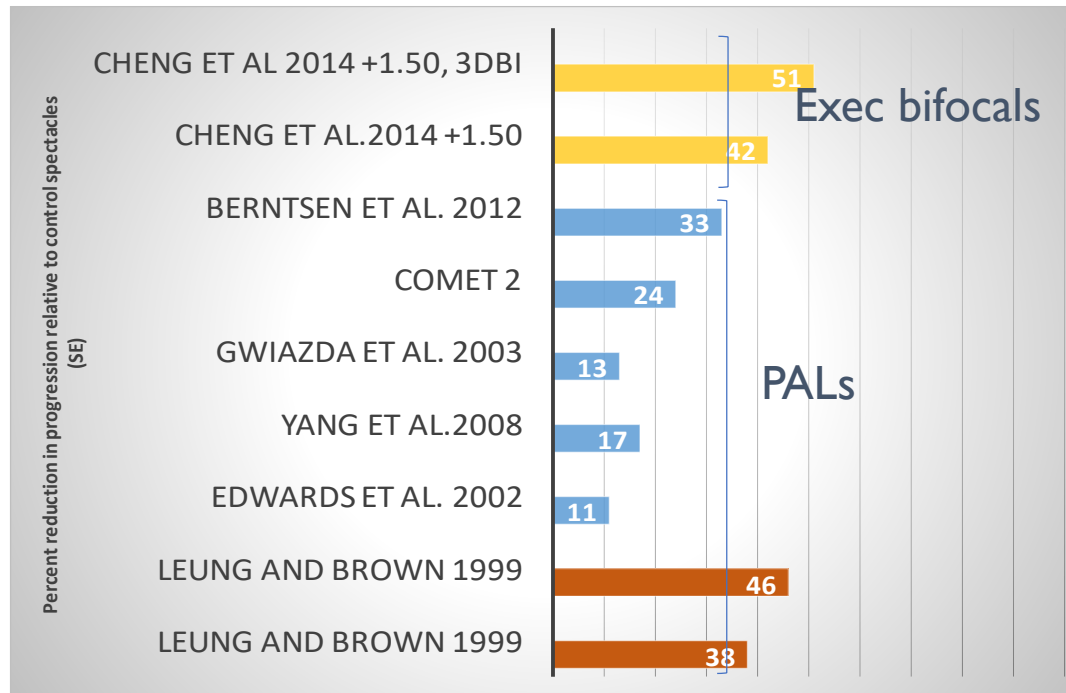
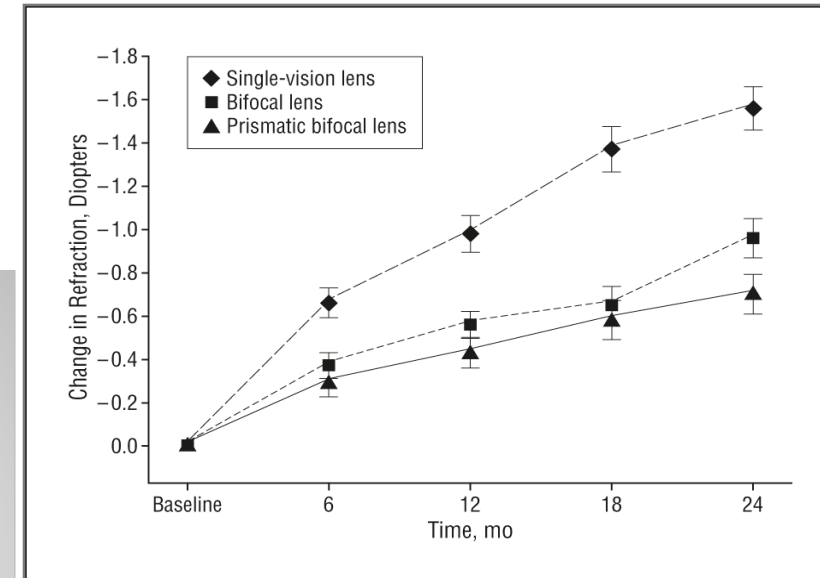
Hiroyuki Kanda, Tetsuro Oshika, Takahiro Hiraoka, Satoshi Hasebe, Kyoko Ohno-Matsui, Satoshi Ishiko, Osamu Hieda, Hidemasa Torii, Saulius R. Varnas, Takashi Fujikado 

Conclusion

MyoVision (Zeiss)

The results of this clinical trial could not verify the therapeutic effect of MyoVision for slowing down myopia progression in Japanese children. Additional studies are needed to design lenses that can reduce peripheral hyperopic defocus individually and to examine the effectiveness of these lenses in preventing myopia progression.

Executive Bifocals- +1.50d, +1.50D With 3D Base In Prism



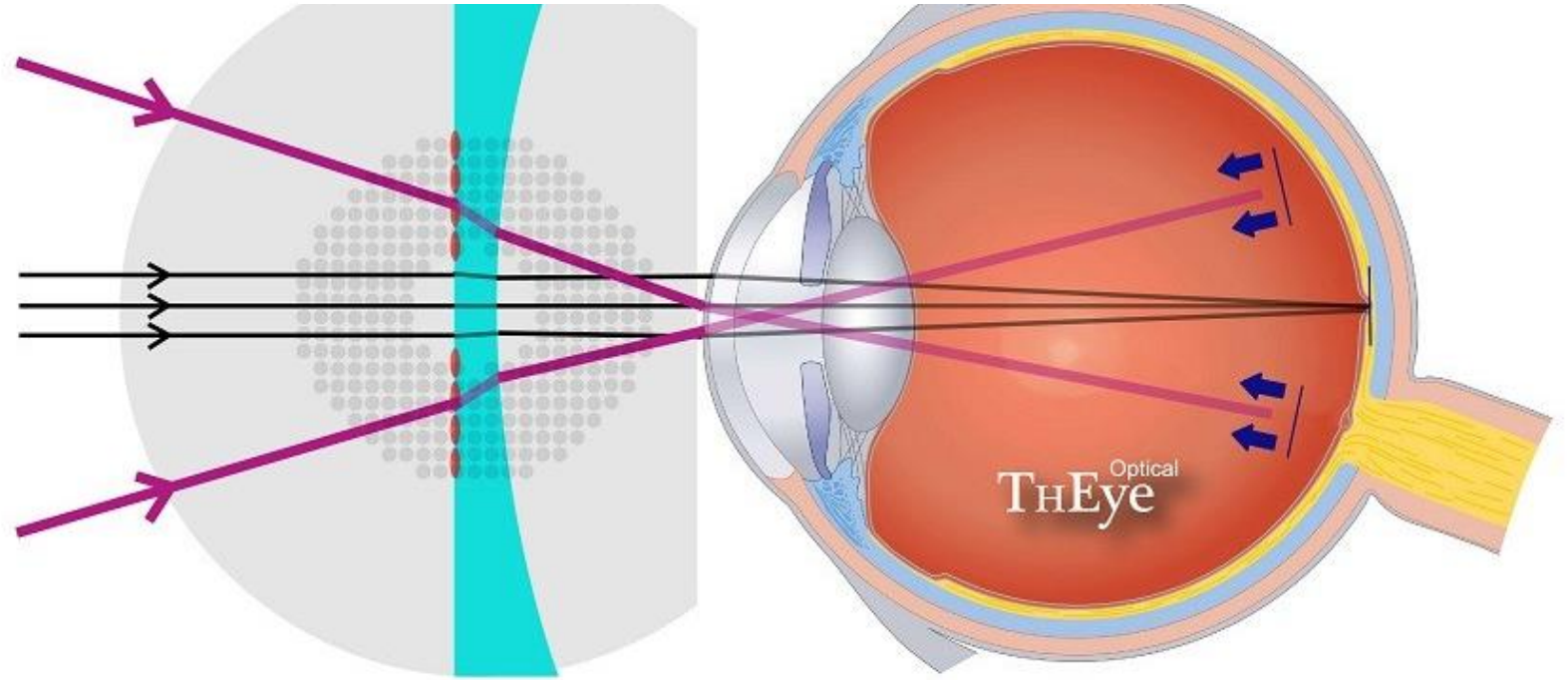
8-13 yrs, n = 135
-1.00 to -5.50 D
Progressing myopes
Asian Canadian

Treatment effect (3 years):
0.81D, 42%
1.01D, 51%

Reduzierter akkommodativer Fehler?
Periphere Netzhaut?
Markteinführung

DIMS LENS 【MyoSmart】 多區正向光學離焦近視控制鏡片

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OPEN ACCESS

- Design:
 - 24 Monate
 - 8-13 Jahre alte Chinesische Kinder
 - RCT
 - 183 Kinder
- 52% / 62% Erfolg
- 21.5% Keine Progression (7.4% mit SV)
- Markteinführung

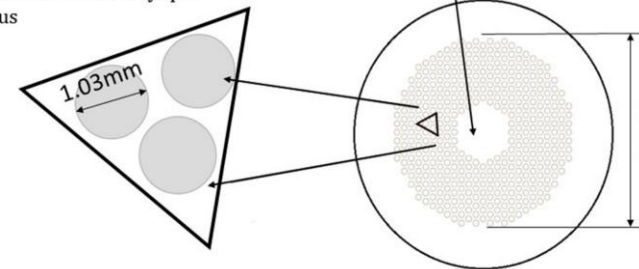
Defocus Incorporated Multiple Segments (DIMS) spectacle lenses slow myopia progression: a 2-year randomised clinical trial

Carly Siu Yin Lam,¹ Wing Chun Tang,¹ Dennis Yan-yin Tse,¹ Roger Pak Kin Lee,¹
Rachel Ka Man Chun,¹ Keigo Hasegawa,² Hua Qi,² Takashi Hatanaka,² Chi Ho To¹

Media Releases

Media Releases

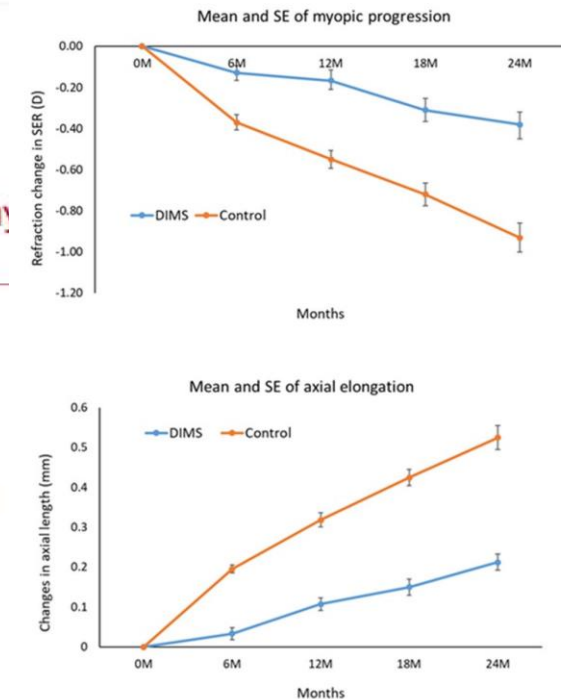
Schematic array of multiple segments; each 1.03mm in diameter and +3.5D myopic defocus



About 400 multiple defocus segments (33 mm in diameter) surrounding the central zone

launched in summer this year, offering a non-contact, spectacle lens solution to myopic children.

The Defocus Incorporated Multiple Segments (DIMS)



Produkte

MyoVision™ by ZEISS

“ the breakthrough spectacle lens that reduces myopia progression by 30 %



全新兒童近視控制鏡片

D.I.M.S. TECHNOLOGY 臨床證實有效
延緩近視加深

國際發明展總冠軍

MYOSMART

HOYA
與理工大學共同研發



KEEP YOUR CHILD'S
FUTURE IN FOCUS
WITH MYOPILEX® LENS



Zeit im Freien und Licht



Myopia Prevention and Outdoor Light Intensity in a School-Based Cluster Randomized Trial

Vol. 125/8,p.1239-50, August 2018

Pei-Chang Wu, MD, PhD,¹ Chueh-Tan Chen, MS,¹ Ken-Kuo Lin, MD,² Chi-Chin Sun, MD, PhD,³ Chien-Neng Kuo, MD,⁴ Hsiu-Mei Huang, MD,¹ Yi-Chieh Poon, MD,¹ Meng-Ling Yang, MD,² Chau-Yin Chen, MD,⁴ Jou-Chen Huang, MD,⁴ Pei-Chen Wu, MD,⁴ I-Hui Yang, MD,¹ Hun-Ju Yu, MD,¹ Po-Chiung Fang, MD,¹ Chia-Ling Tsai, DDS,⁵ Shu-Ti Chiou, PhD,^{6,7,8,*} Yi-Hsin Yang, PhD^{9,*}

- Umfangreiche Studie (!) von bisher 12 Monaten
- Durchschnittsalter 6.34 Jahre (SD 0.48)
- Interessante und praktikable Interventionen
- Myopie Zunahme 0.35D (Intervention) vs. 0.47D (control) $p=0.002$
- Längenwachstum 0.28mm (Intervention= 0.84D) vs. 0.33mm (control= 0.99D) $p=0.003$
- Überlappung verschiedener Interventionen fragwürdig

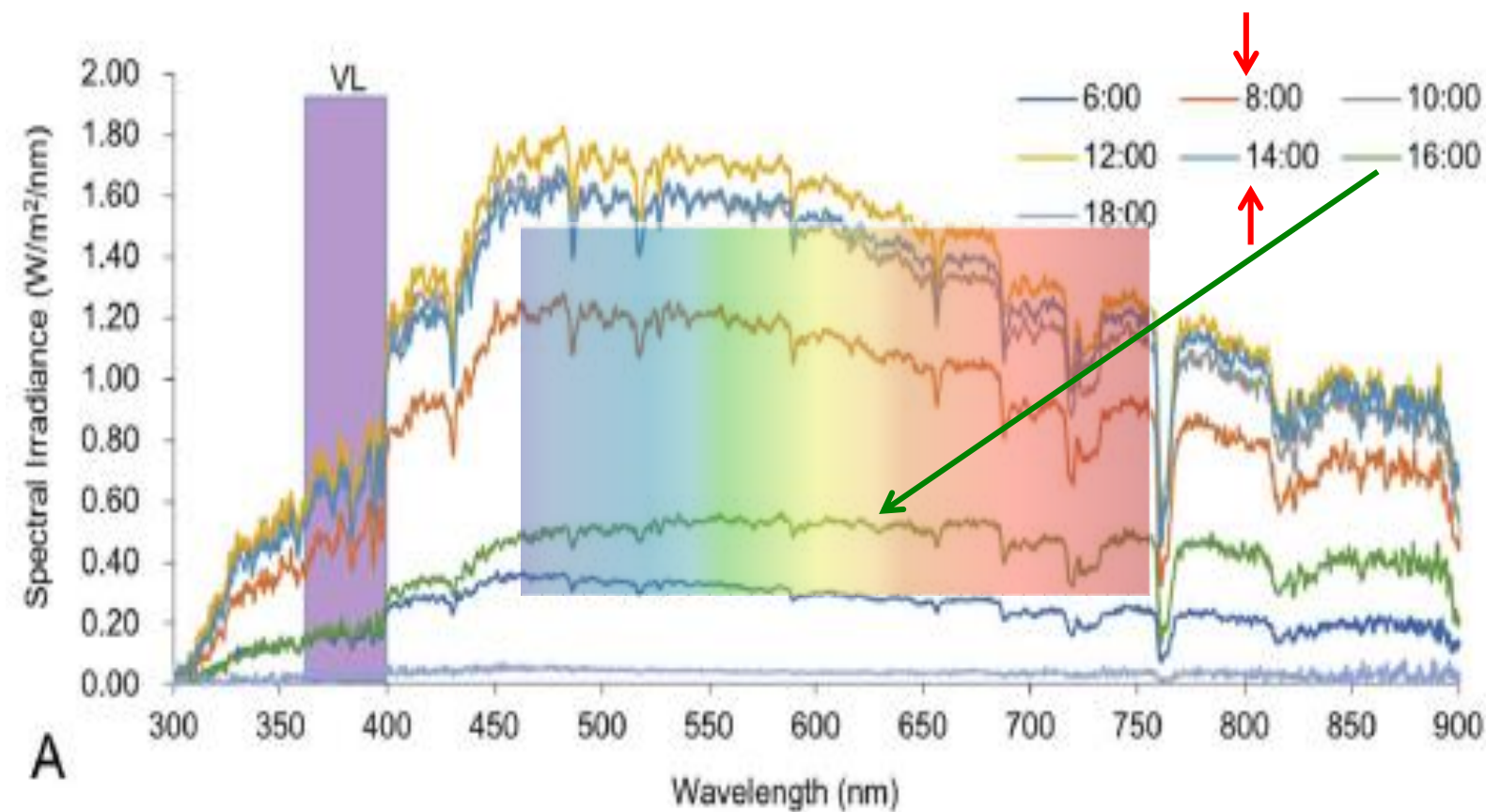
Table 1. Summary of Intervention Items between Recess Outside Classroom Trial 711 Program and Control Groups

Intervention items	Recess Outside Classroom Trial 711	Control
Recess outside classroom program	Yes	No
Outdoor-oriented school activities	Yes	No
Weekend sun-time passport assignment	Yes	No
Booklet for teacher-parent communication	Yes	No
Outdoor learning assignments in summer vacation	Yes	No
Eye health education for teachers and students, promote outdoor activity and 30/10 rule for myopia prevention.	Yes	Yes
Sport & Health 150: an initiative to promote an additional 150 minutes of exercise per week. This initiative was started during the late period of this study.	Yes	Yes
Tien-Tien 120: an initiative that promotes outdoor activities for 120 minutes daily. Although this initiative was not compulsory, 5% of the elementary schools in Taiwan were selected by the Bureau of Education for monitoring compliance with time outdoors. None of the schools in this study were among the selected schools.	Yes	Yes

30/10 = 30 minutes of near work followed by a 10-minute break.

Progress and Control of Myopia by Light Environments

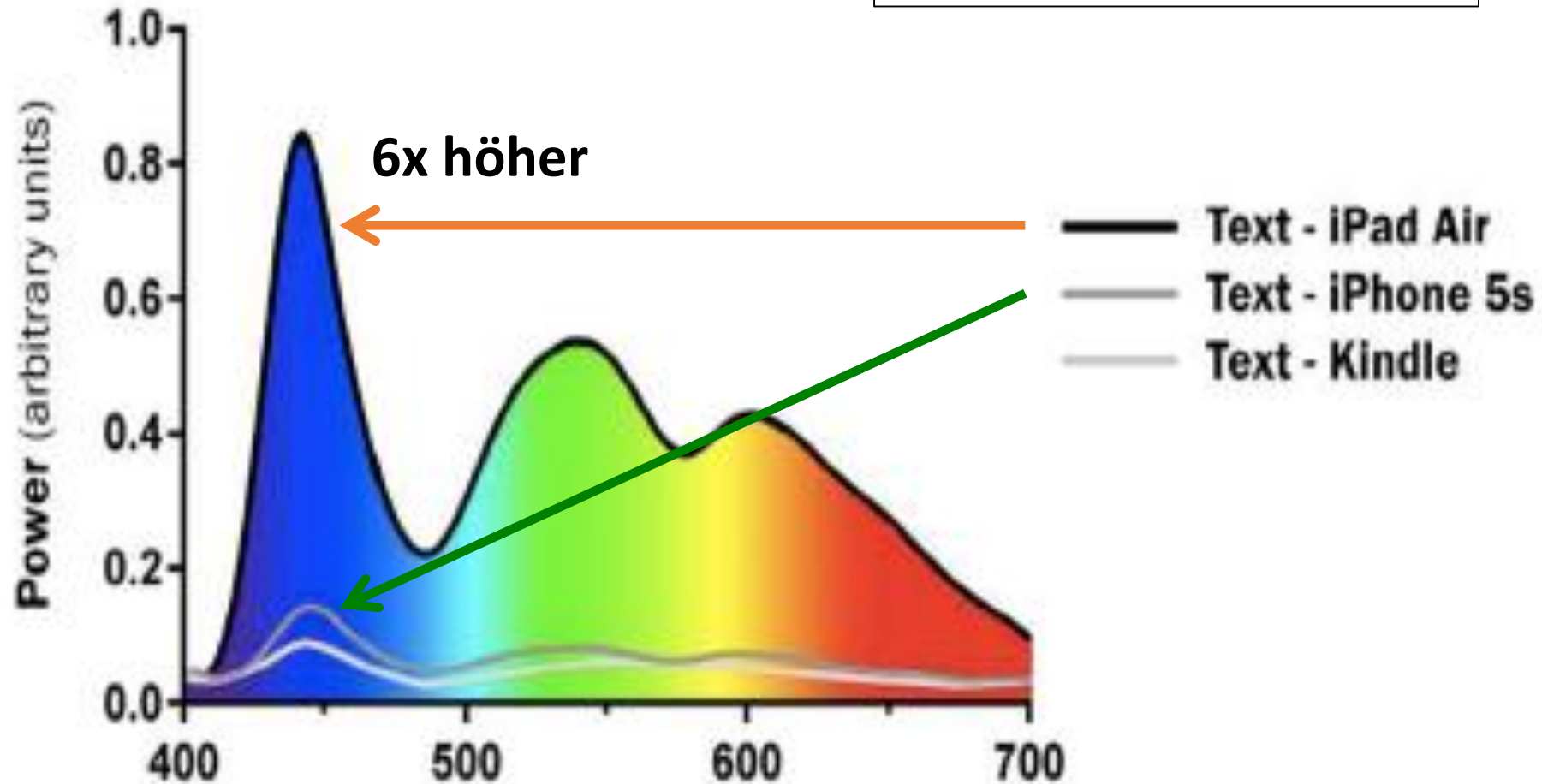
Xiaoyan Jiang, M.D., Toshihide Kurihara, M.D., Ph.D., Hidemasa Torii, M.D., Ph.D., and Kazuo Tsubota, M.D., Ph.D.





Digitale Medien

Tablet vs Smartphone



How bright are electronic devices?

TABLE 2 | Spectral distribution of human retinal photopigment-weighted measures from all light-emitting devices during different display conditions.

Prefix	Sensitivity	α -opic lux						
		Angry Birds ipad	Angry birds phone	Kids sleep Dr	Text ipad	Text ipad glasses	Text kindle	Text phone
Cyanopic	S cone	244.44	63.03	27.68	409.18	59.23	46.95	71.52
Melanopic	Melanopsin	176.25	46.49	31.51	302.33	64.55	34.62	54.54
Rhodopic	Rod	180.07	45.04	39.65	313.43	93.68	35.64	53.92
Chloropic	M cone	174.03	41.96	71.55	314.00	154.16	37.56	52.04
Erythroptic	L cone	162.66	39.72	112.96	306.52	199.93	37.68	50.49
Photopic lux	lux	170.42	40.32	104.95	318.52	201.89	38.67	51.40
Irradiance	μ W/cm ²	60.20	16.40	39.10	110.80	62.30	14.30	19.80
Photon flux	1/cm ² /s	1.61E+14	4.41E+13	1.18E+14	3.66E+14	1.85E+14	3.90E+13	5.55E+13
Peak spectral irradiance	nm	445	450	610	445	605	455	450

The ability of the light devices to stimulate the human photopigments in the eye was assessed and is presented in this table.

The potential ability of each light source to stimulate the S-cone (cyanopic), M-cone (chloropic), L-cone (erythroptic), rods (rhodopic), and melanopsin (melanopic) photopigments, corrected for pre-receptor filtering, was evaluated (16). The S-, M-, and L-cones make up the trichromatic visual system and melanopsin is the blue light sensitive irradiance detecting photopigment that is the primary contributor to the non-visual responses to light.

Light intensity irradiance is measured in microwatt per square centimeter. Photon flux is the number of photons that get delivered by the device per square centimeter per second.

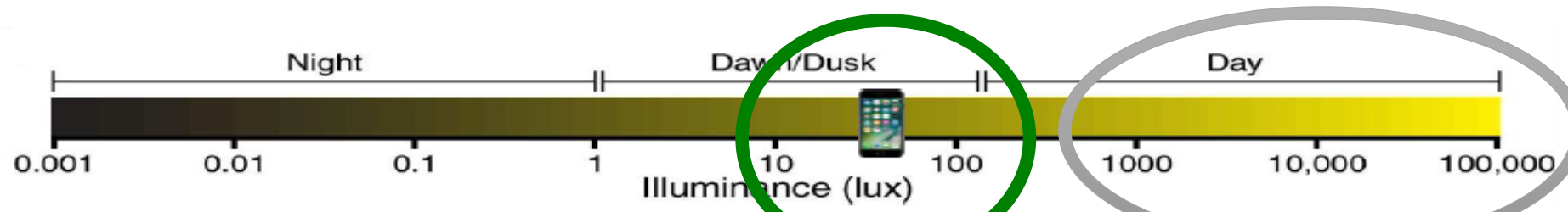
Peak spectral irradiance is the wavelength (nanometer) of the peak where the irradiance is highest.

Gringras P, Middleton B, Skene DJ, Revell VL. Bigger, Brighter, Bluer-Better? Current Light-Emitting Devices - Adverse Sleep Properties and Preventative Strategies. Front Public Health. 2015;3:233.

Electronic devices are dim compared to outside lighting

Ungesund ?!

Gesund !



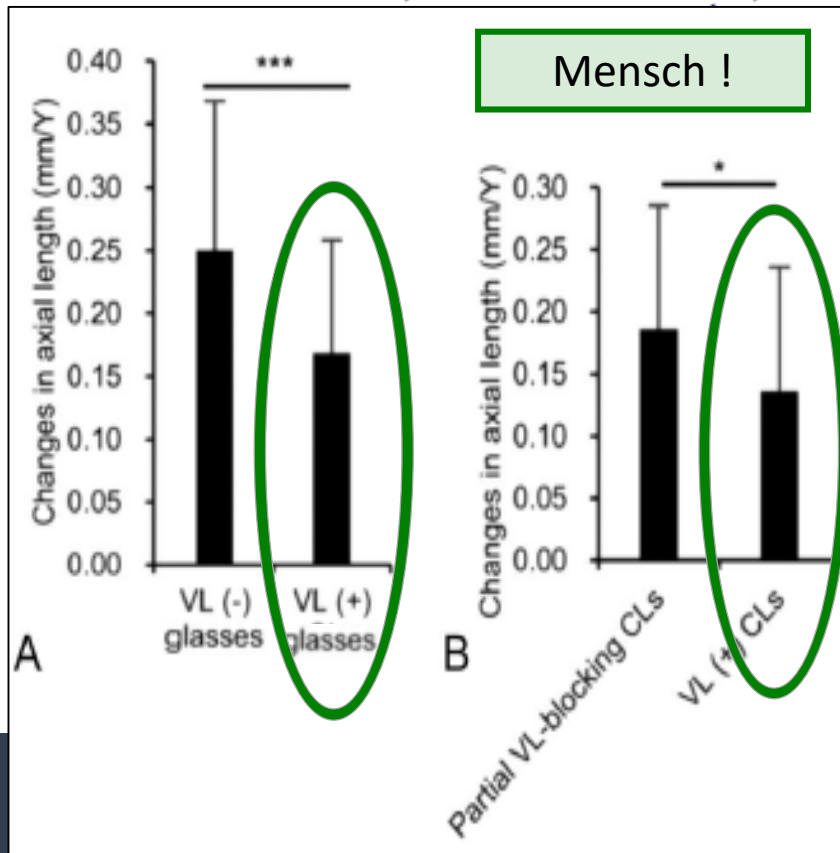


Research Paper

Violet Light Exposure Can Be a Preventive Strategy Against Myopia Progression



Hidemasa Torii ^{a,b}, Toshihide Kurihara ^{a,b}, Yuko Seko ^c, Kazuno Negishi ^a, Kazuhiko Ohnuma ^d, Takaaki Inaba ^{a,e}, Hiro Kondo ^a, Maki Miyauchi ^{a,b}, Yukihiro Miwa ^{a,b}, Kinuya Tsubota ^{b,g}, Hiroshi Goto ^g, Mayumi Oda ^h,



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^c Research Institute, National Rehabilitation Center for Persons with Disabilities, Tokorozawa-shi, Saitama 359-8555, Japan

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^e 8916-16 Takayama-cho, Ikoma-shi, Nara 630-0101, Japan

^f 81-3627, Japan

^g Shinjuku-ku, Tokyo 160-0023, Japan

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ⁱ 75, Japan

protein 1 (EGR-1) in the chick retina, which showed that VL might prevent myopia through pathways independent to other wavelengths. The mechanism behind VL for myopia control must not be simple, and more works still need to be performed. Recently, we

Fakten Check Umwelt

Acta Ophthalmologica

ACTA OPHTHALMOLOGICA 2017

Review Article

Time spent in outdoor activities in relation to myopia prevention and control: a meta-analysis and systematic review

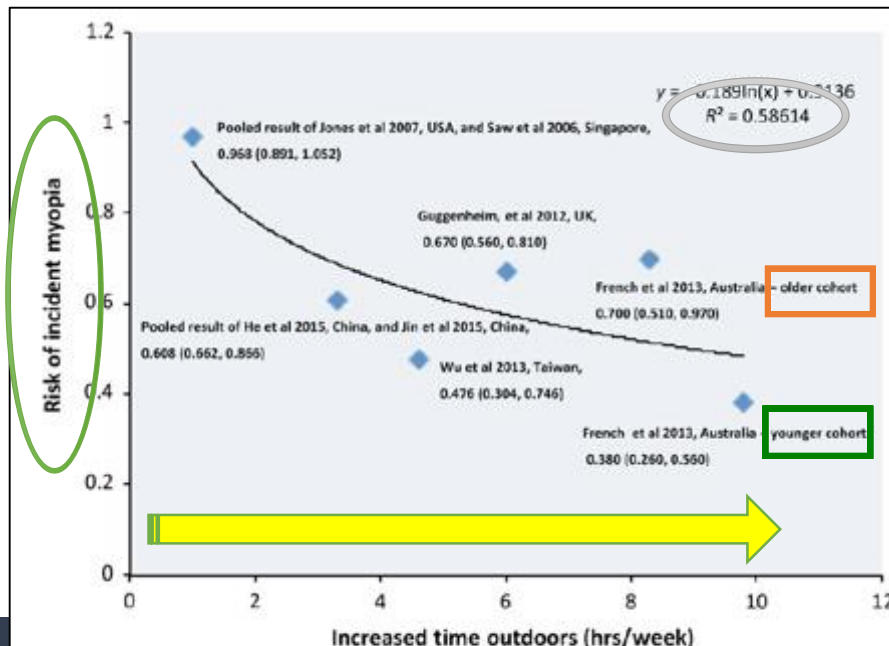


Fig. 3. Dose-response analysis of the time spent outdoors and the risk of myopia (y : risk ratio; and x : increased time spent outdoors).

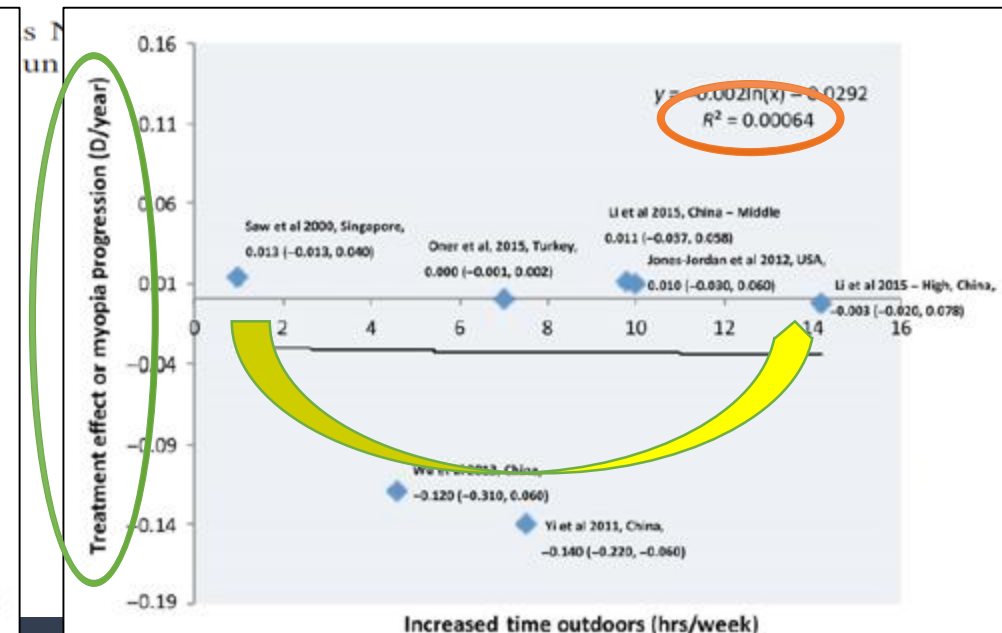
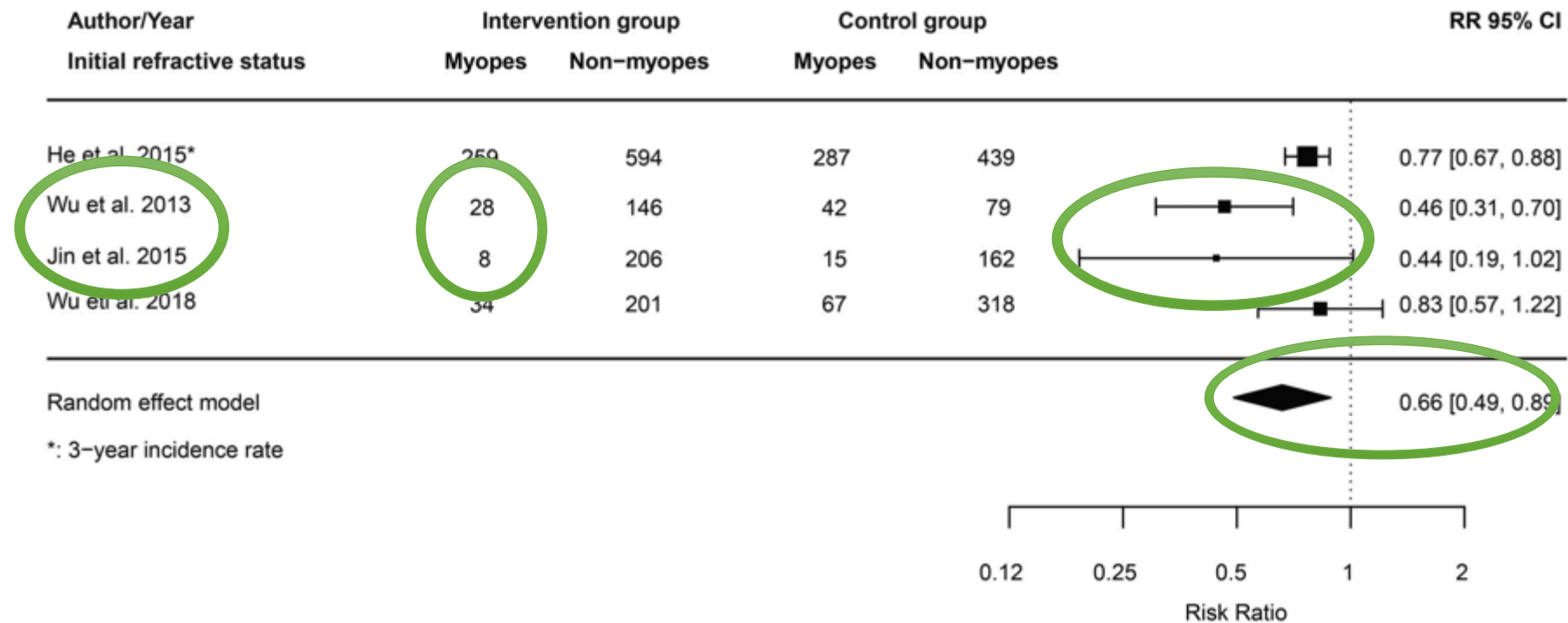


Fig. 6. Dose-response analysis of the time spent outdoors and myopic progression rate (y : treatment effect or annual myopic progression, and x : increased time spent outdoors).

Effect of Outdoor Activities in Myopia Control: Meta-analysis of Clinical Studies

Li Deng, PhD^{1*} and Yi Pang, MD, OD, PhD²

Optom Vis Sci 2019;00:00-00. doi:10.1097/OPX.0000000000001357
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Effect of Outdoor Activities in Myopia Control: Meta-analysis of Clinical Studies

Li Deng, PhD^{1*} and Yi Pang, MD, OD, PhD²

Optom Vis Sci 2019;00:00-00. doi:10.1097/OPX.0000000000001357
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TABLE 1. Characteristics of studies included in the meta-analysis

recess = Pause

Study name	Study region	Race	Age (y)	Comparative groups	Randomized	Study duration (y)	Incidence	Myopic shift	Axial length elongation
He et al. 2015 ³⁴	Guangzhou	Chinese	6–7	Intervention: 40-min extra outdoor activity during school days	Yes	3*	Yes	Yes	Yes
Wu et al. 2013 ³¹	Gaoxiong	Chinese	7–11	Intervention: recess time outside classroom	Not stated	1	Yes	Yes	No
Wu et al. 2018 ³⁰	Taiwan	Chinese	6–7	Intervention: recess time outside classroom	Yes	1	Yes	Yes	Yes
Lin et al. 2015 ³³	Shenyang	Chinese	6–11	Intervention: 40-min extra recess time during school day	Yes	1	Yes	Yes	Yes
Yi and Li 2011 ³²	Changsha	Chinese	7–11	Intervention: <30 h/wk near- or middle-vision work and >14 h/wk outdoor activities	Yes	2*	No	Yes	No

*Both mean difference and its confidence interval width were standardized to 1-year myopic shift/elongation rate.

In summary, our meta-analysis found an overall protective effect against myopic shift and axial elongation with outdoor activities. The overall treatment sizes for both myopic shift (0.13 diopter/y) and axial elongation (0.03 mm/y) were small and clinically nonsignificant.

Der Mensch und die Umwelt

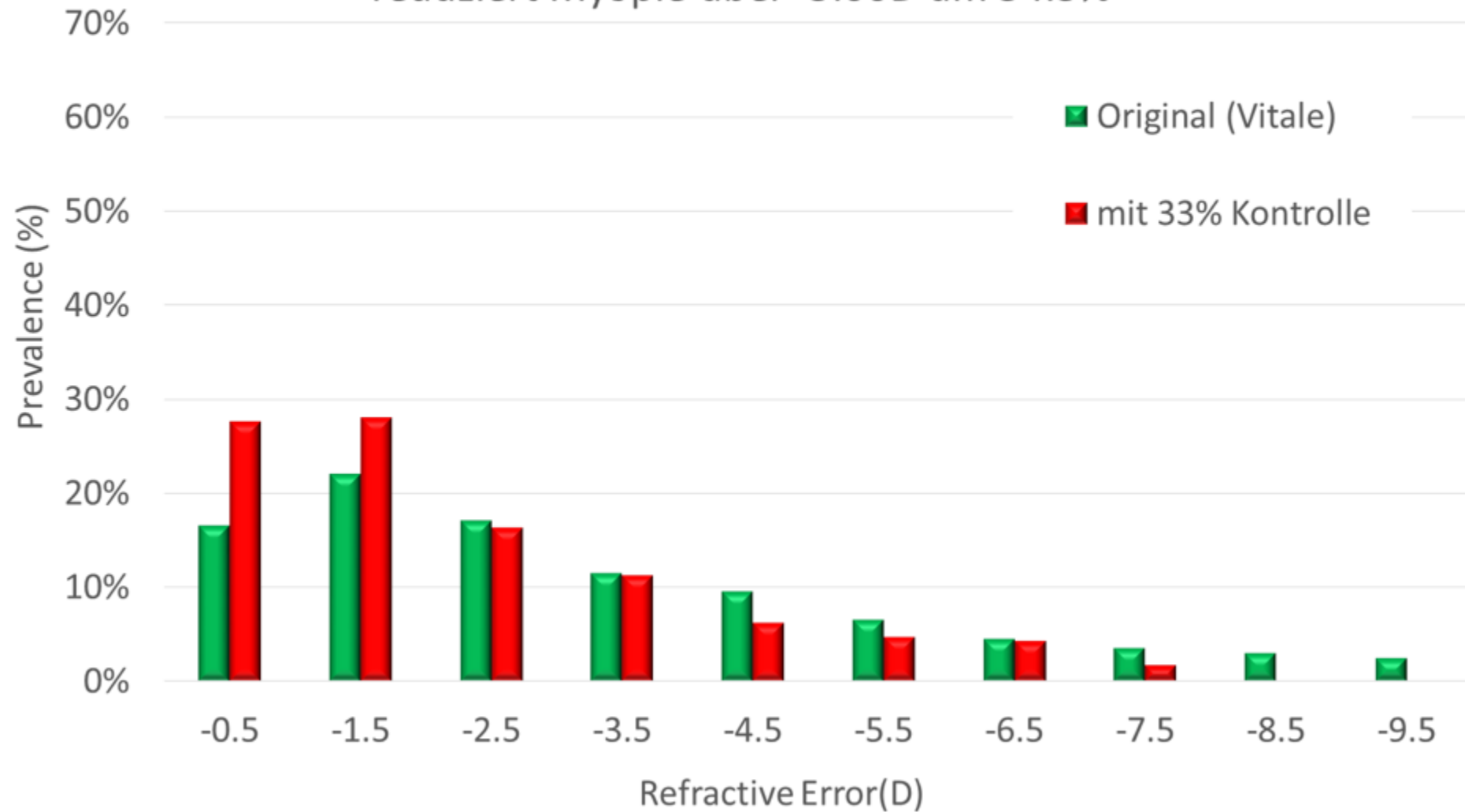
“Increased time outdoors is effective in preventing the onset of myopia as well as in slowing down the myopic shift in refractive error. But paradoxically, outdoor time was not effective in slowing progression in eyes that were **already myopic.**”

(Xiong et al.: Meta-Analyse/Review, Acta Ophthalmologica 2017)

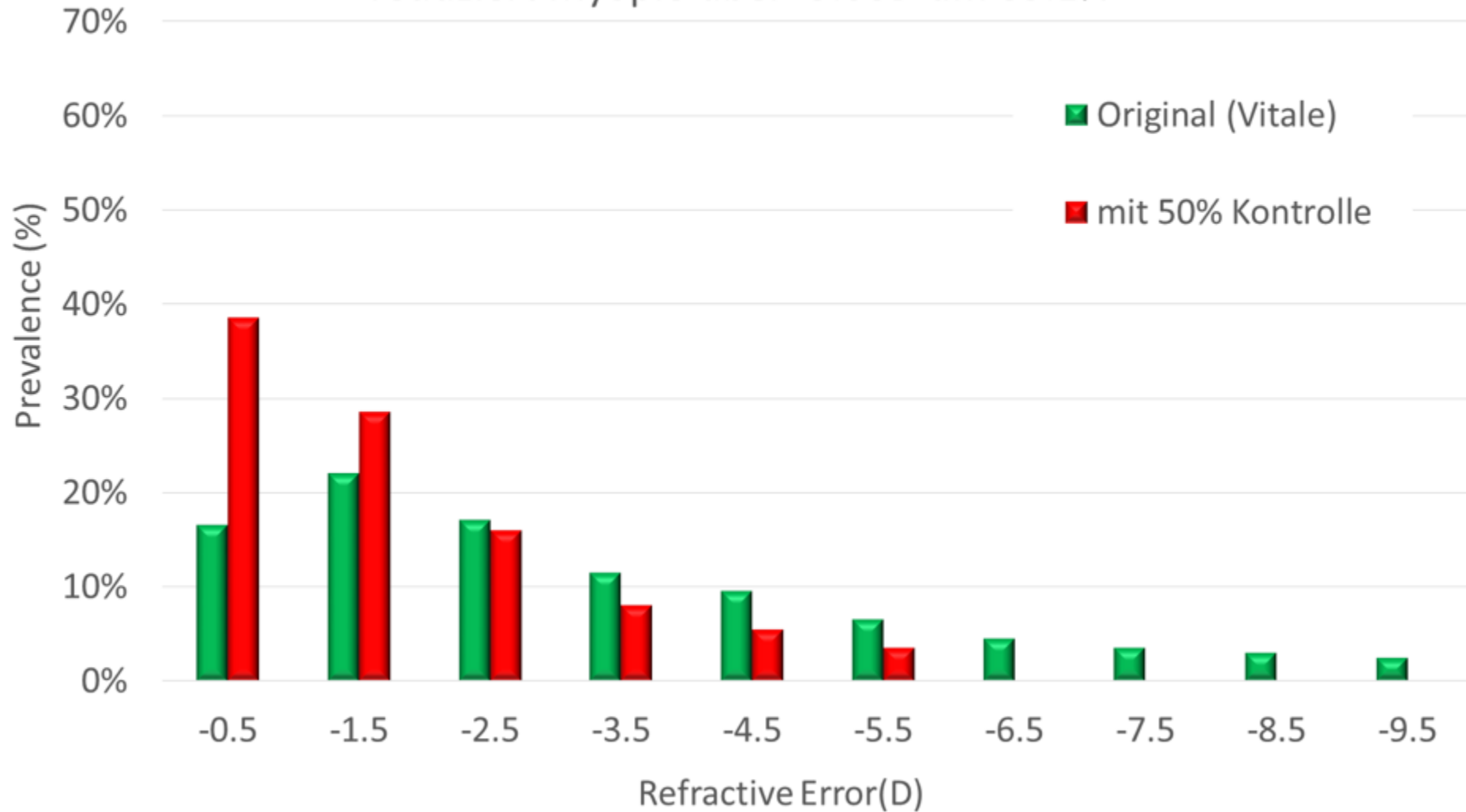


Was bringt's ?

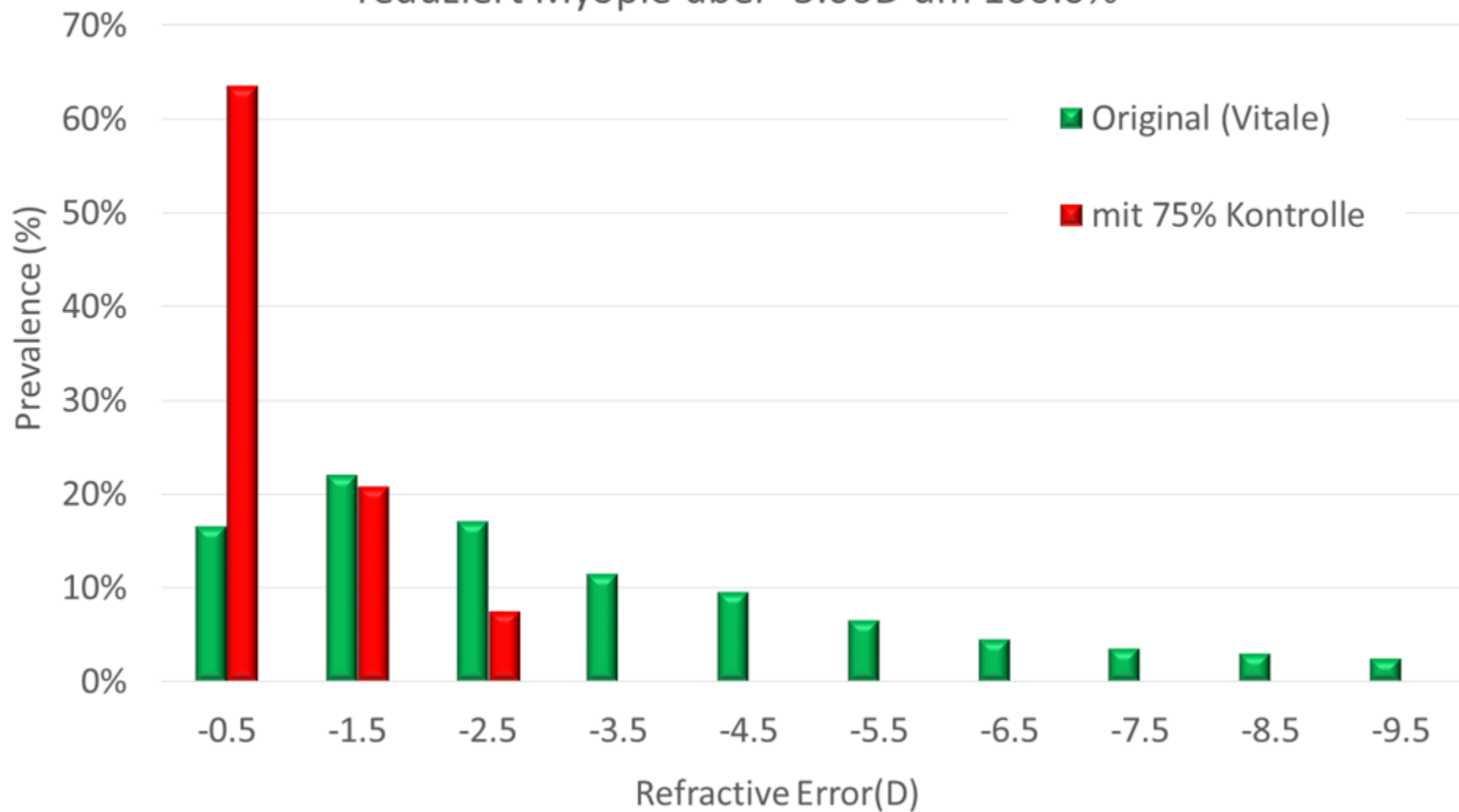
Einer Verlangsamung der Myopieprogression um 33% ->
reduziert Myopie über -5.00D um 54.3%



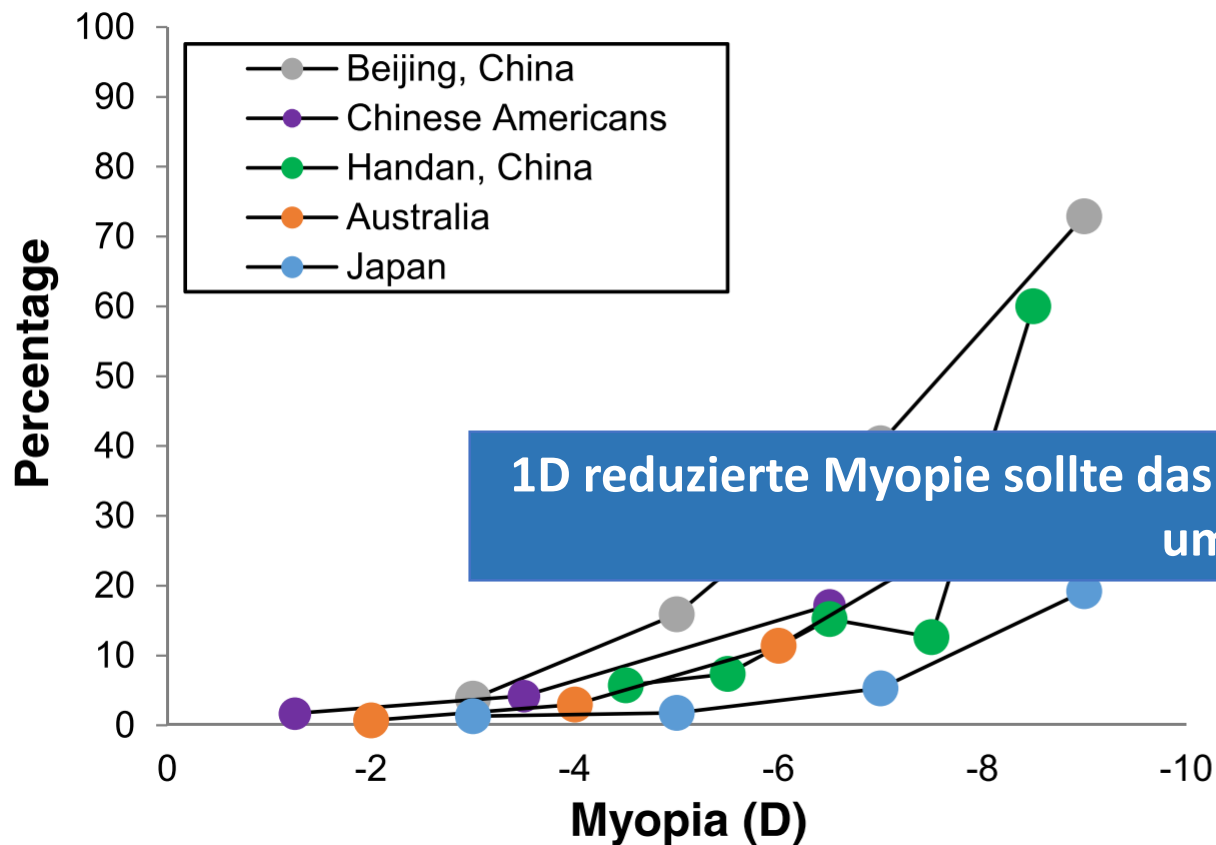
Einer Verlangsamung der Myopieprogression um 50% ->
reduziert Myopie über -5.00D um 85.1%



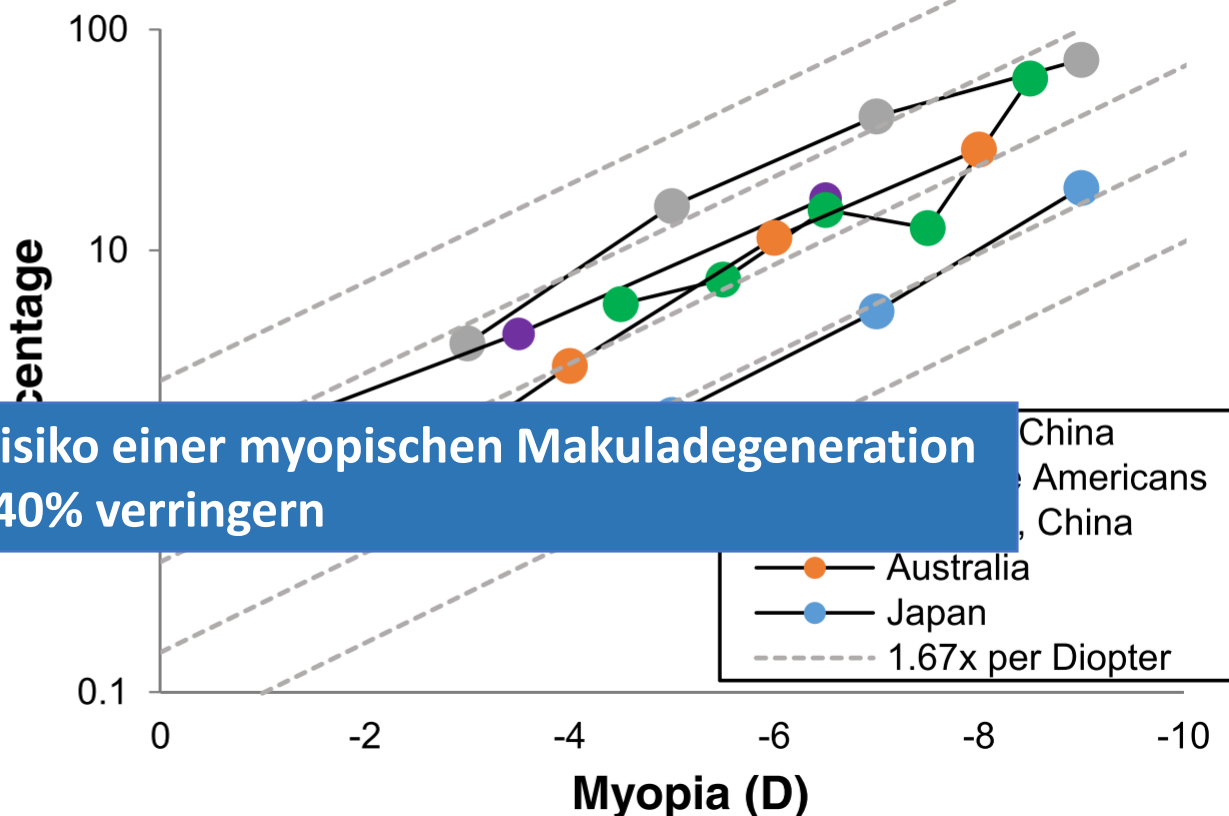
Einer Verlangsamung der Myopieprogression um 75% ->
reduziert Myopie über -5.00D um 100.0%



Prevalence of Myopic Maculopathy



Prevalence of Myopic Maculopathy



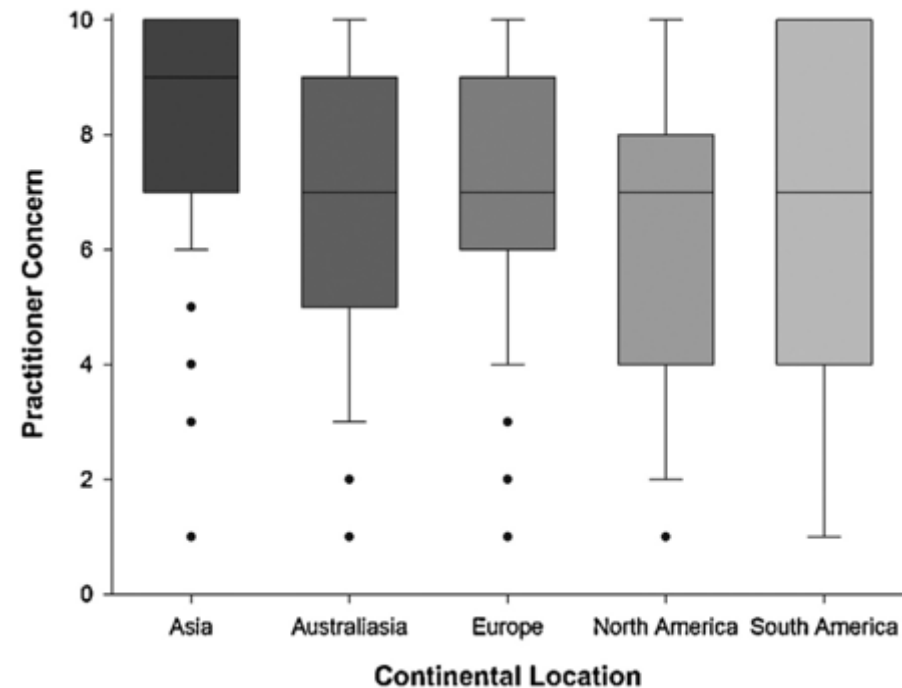
1D reduzierte Myopie sollte das Risiko einer myopischen Makuladegeneration um 40% verringern

China
Americans
China

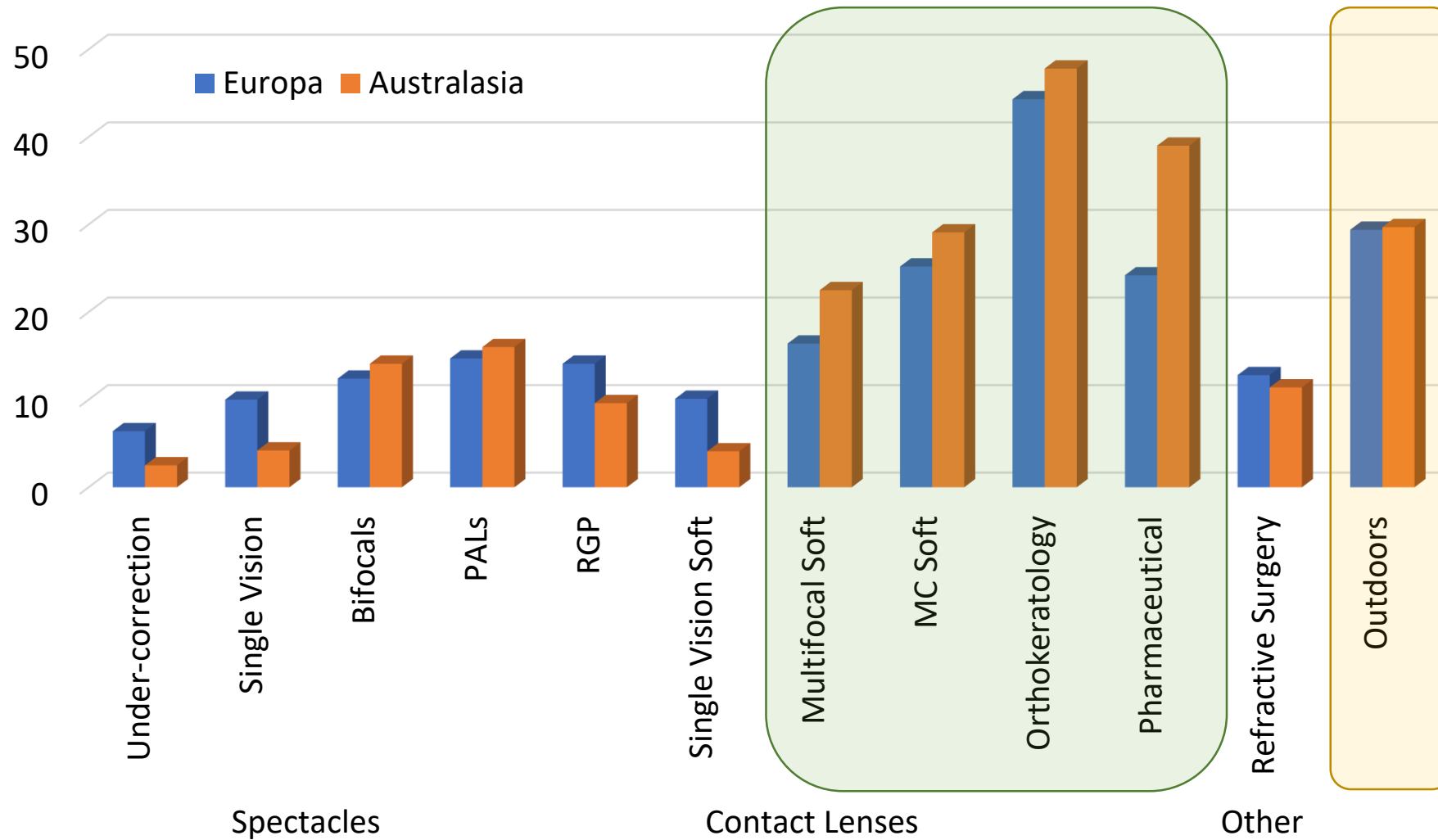
Integration in die tägliche Praxis

Ein Thema in der Praxis ?

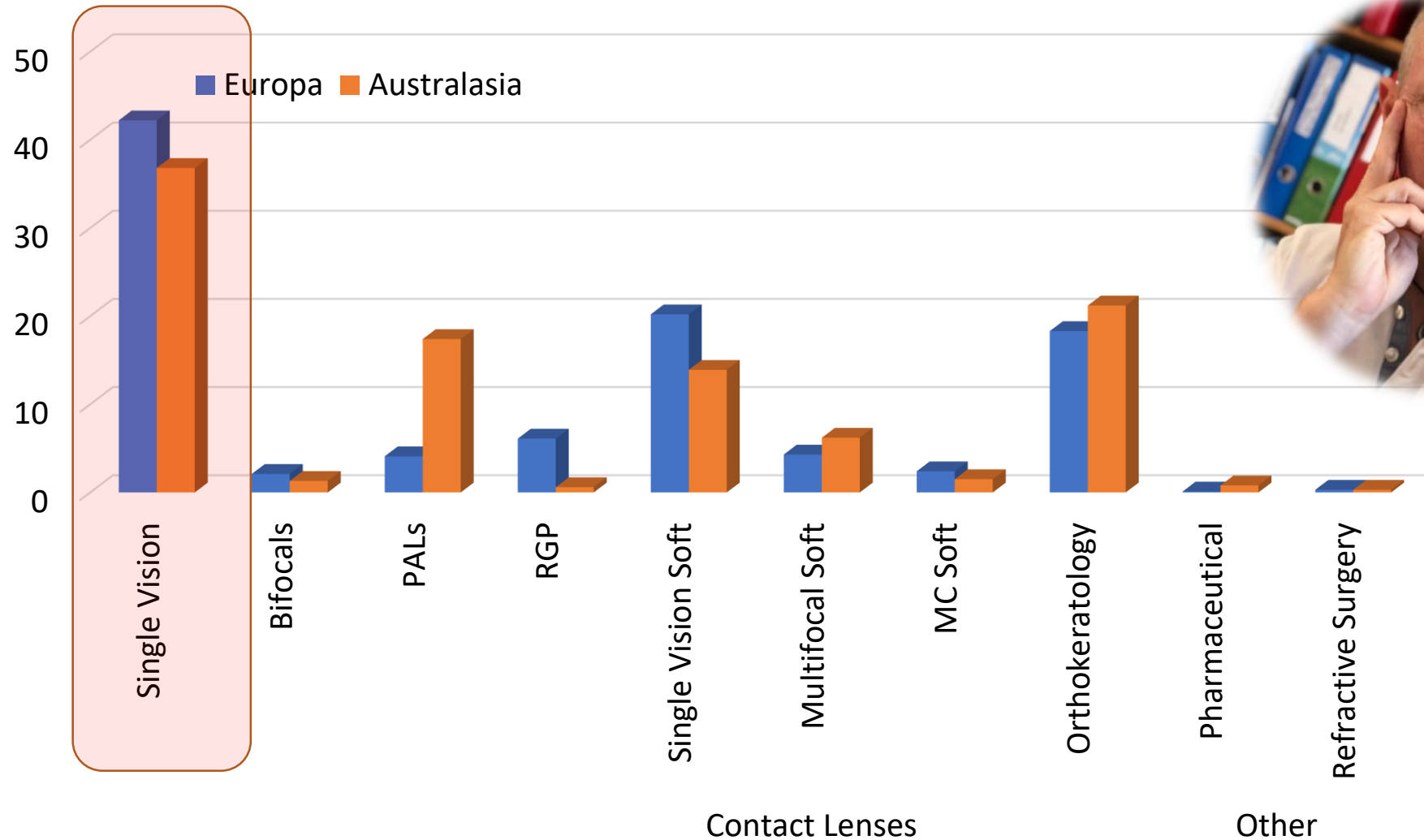
Wie besorgt sind die Optometristen über die wahrgenommene höhere Prävalenz der Myopie in Kindern? n = 964



Erwartete Effektivität



Tatsächliche Anwendung



Öffentlicher Informationszugang (Bsp. Myopia Care)



The screenshot shows the top section of the Myopia Care website. The header is a solid blue bar. On the left is the Myopia Care logo, which consists of a red circle with a white stylized 'M' inside, followed by the text 'Myopia Care' in red. To the right of the logo are four links in white text: 'JETZT TESTEN', 'Spezialist finden', 'Das Team hinter Myopia Care', and a language selector showing a German flag and the word 'Deutsch'. In the top right corner of the header, the text 'FÜR AUGENSPEZIALISTEN' is written in white. Below the header is a large blue rectangular area. On the left side of this area, the text 'Testen Sie das Risiko einer hohen Kurzsichtigkeit im Erwachsenenalter' is written in white. Below this text is a white rectangular button with the text 'JETZT KOSTENLOS TESTEN' in blue. On the right side of the blue area is a cartoon illustration of a woman with orange hair, looking thoughtful with her hand on her chin. Above her head is a thought bubble containing a smaller cartoon of a girl with pigtails and red glasses, with a question mark above her head.

FÜR AUGENSPEZIALISTEN

Myopia Care

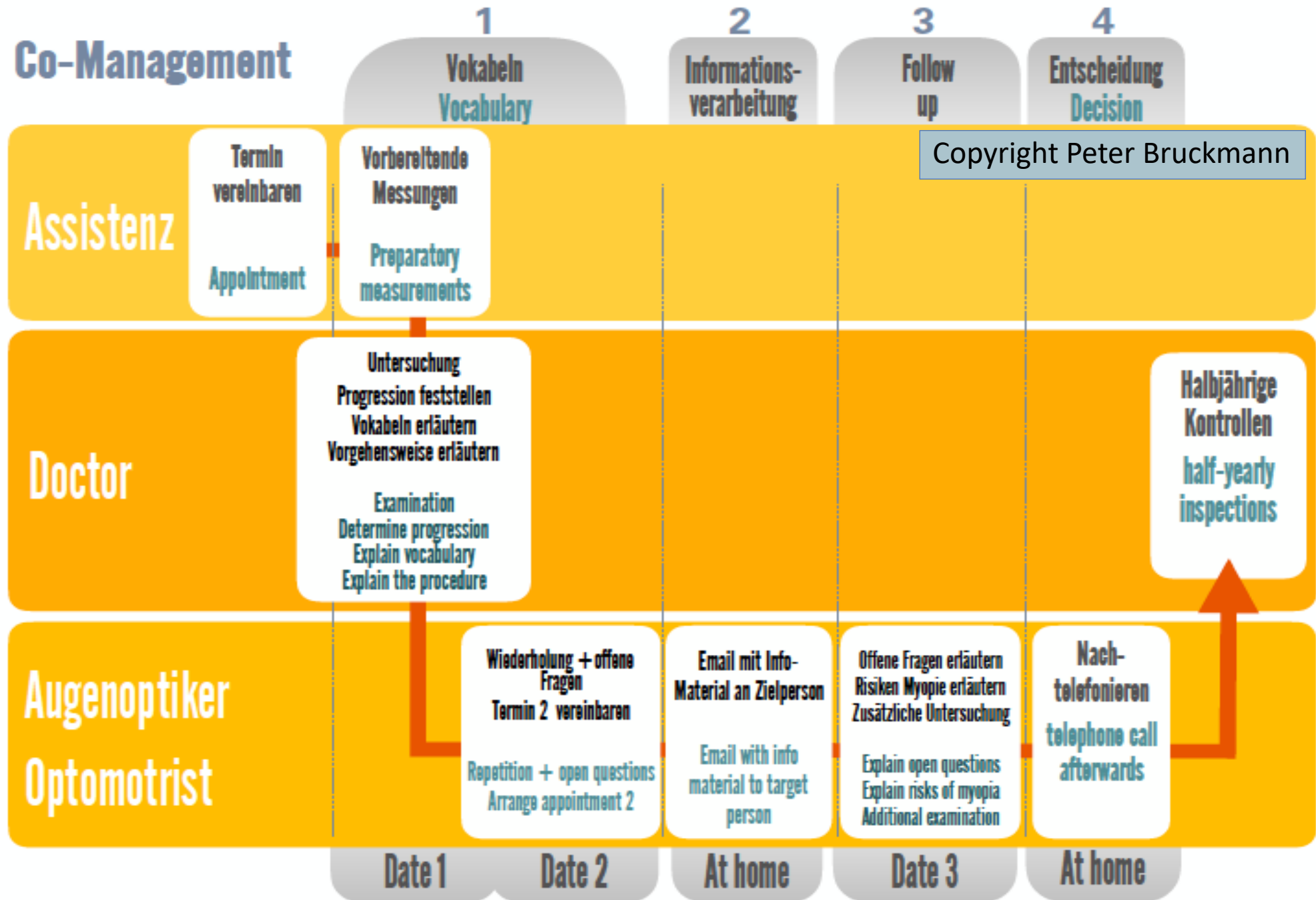
JETZT TESTEN Spezialist finden Das Team hinter Myopia Care Deutsch

Testen Sie das Risiko einer hohen Kurzsichtigkeit im Erwachsenenalter

JETZT KOSTENLOS TESTEN

Warum ist es wichtig die potenzielle Entwicklung der Kurzsichtigkeit zu analysieren?

Co-Management



Entscheidungshilfe

(Bsp. Review of Myopia Management)

Myopia Increases the Risk of Serious, Sight Threatening Complications

Eye Disease	-2.00 D	-4.00 D	-6.00 D	-8.00 D
Myopic Maculopathy ²	2.2 X higher	9.7 X higher	40.6 X higher	126.8 X higher
Retinal Detachment ³	3.1 X higher	9.0 X higher	21.5 X higher	44.2 X higher
PSC Cataract ⁴	1.6 X higher	3.2 X higher	5.4 X higher	12.3 X higher
Glaucoma ⁵	1.7 X higher	2.5 X higher	2.5 X higher	N/A

Odds Ratio of Ocular Disease as a Function of Myopia Relative to Emmetropia¹

Review of MYOPIA MANAGEMENT

Created by
Dwight Akerman, OD, MBA, FAAO, FBCLA
Chief Medical Editor
www.reviewofmm.com

References

- ¹ Piliorz, D. I. (2012). The complex interactions of retinal, optical and environmental factors in myopia aetiology. *Progress in retinal and eye research*, 31(5), 622-660.
- ² Vongphient, J., Mitchell, P., & Wang, J. J. (2002). Prevalence and progression of myopic retinopathy in an older population. *Ophthalmology*, 109(4), 704-711.
- ³ Ogawa, A., & Tanaka, H. (1999). The relationship between refractive errors and retinal detachment—analysis of 1365 retinal detachment cases. *Japanese journal of ophthalmology*, 32(3), 300-305.
- ⁴ Cheng, H. A., Congdon, N. G., Rykova, I., Hunt, B., & West, S. K. (2005). The association between myopia and various subtypes of lens opacity. *Salisbury Eye Evaluation project. Ophthalmology*, 112(5), 1335-1403.
- ⁵ Marcus, M. W., de Vries, M. H., Monboldo, P. G. J., & Jansons, H. M. (2003). Myopia as a risk factor for open-angle glaucoma: a systematic review and meta-analysis. *Ophthalmology*, 110(5), 1929-1934.

Online Only
reviewofmm.com



Entscheidungshilfe

(Bsp. Brien Holden Vision Institute: Myopia Calculator)



Ethnicity
Caucasian

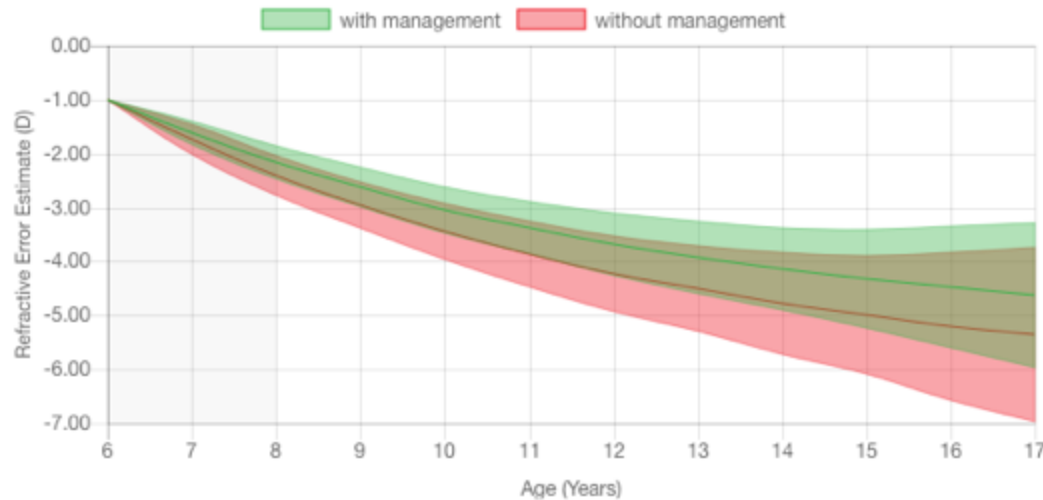
Child's Age (Years)
6

Refractive Error (D)
-1.00

Myopia Management Option
Peripheral defocus spectacles

Control Rate (%)
14 17 20

Peer Reviewed
☒



Myopia Management Option:

Peripheral defocus spectacles

Percentage reduction in progression of myopia compared to standard correction e.g. single vision spectacles.

17%

If treated with **Peripheral defocus spectacles** that provides 17% control, then the level of myopia at 17 may be:

-4.63D

If myopia control treatment is not commenced immediately, the final level of your child's myopia at 17 may be:

-5.37D

Myopie-Management Abonnement



MYOPIE KONTROLLE



WARUM MYOPIE-KONTROLLE?

Die Anzahl Menschen mit einer Kurzsichtigkeit (Myopie) hat in den letzten Jahren massiv zugenommen, insbesondere in Asien. Eine Myopie kann sich bereits im Schulalter bemerkbar machen und sich in der Folge stetig verstärken. Dieses Längenwachstum des Auges stellt langfristig ein erhöhtes Gesundheitsrisiko dar. Das Risiko einer Netzhautablösung, als Beispiel, vervielfacht sich bereits bei 3 Dioptrien und liegt bei über 6 Dioptrien gar 26x höher.

GESUNDHEITSRISIKO NACH KORREKTUR			
Sehschwäche	Grav. Vor. (Kontaktl.)	Grav. Vor. (Brille)	Netzhaut. Risiko
1.0 bis -3.0	2x	xx	xx
-3.0 bis -6.0	3x	xx	10x
-6.0 oder höher	5x	xx	16x



WIE ENTSTEHT EINE MYOPIE?

Ein Auge ist kurzsichtig, wenn es zu lang gebaut ist und dadurch die Lichtstrahlen beim Blick in die Ferne schon vor der Netzhaut zu einem Bild vereinen. Dadurch sieht man entfernte Gegenstände verschwommen.

Ein eigentlicher Auslöser oder Grund für dieses Längenwachstum ist bis dato noch nicht bekannt. Folgende Faktoren sind aber an einer Myopie-Entwicklung beteiligt. Damit erarbeiten wir mit Ihnen zusammen Ihr persönliches Risikoprofil:

GENETIK > Familiengeschichte

Eltern nicht Myop.	1 Elternteil ist Myop.	Beide Eltern Myop.
Tiefes Risiko	Mittleres Risiko (3x)	Hohes Risiko (6x)

VISUELLE EIGENSCHAFTEN > Korrektur

Altersgerecht	< als Altersgerecht	beretta Myop.
Tiefes Risiko	Mittleres Risiko	Hohes Risiko

VISUELLE EIGENSCHAFTEN > Augen Zusammenspiel, Esophorie

Normal	Borderline	Überaktiv
Tiefes Risiko	Mittleres Risiko	Hohes Risiko

VISUELLE EIGENSCHAFTEN > Augen Zusammenspiel, Akkommodation

Normal	Borderline	Überaktiv
Tiefes Risiko	Mittleres Risiko	Hohes Risiko

GEWOHNHEITEN > Outdoor Aktivitäten / Tag

2.7h oder mehr	1.4h bis 2.7h	weniger als 1.4h
Tiefes Risiko	Mittleres Risiko	Hohes Risiko

GEWOHNHEITEN > Naharbeiten / Tag, ausserhalb der Schulzeiten

unter 2h	2h bis 3h	mehr als 3h
Tiefes Risiko	Mittleres Risiko (2x)	Hohes Risiko (3x-5x)

KANN MAN EINE MYOPIE-ENTWICKLUNG STOPPEN?

Ja, man kann!!! Seit Jahren werden umfangreiche Studien im Bereich der Myopie-Kontrolle durchgeführt. Neben den oben aufgeführten Faktoren ist es bei Kurzsichtigen so, dass die Umwelt nicht über die gesamte Netzhaut gleich scharf abgebildet wird. Es entsteht um den Brennpunkt des Auges ein unscharfer Ring, welcher mitverantwortlich für das Längenwachstum des Auges ist. Diesen Ring korrigiert man mit speziellen Kontaktlinsen so, dass die gesamte Netzhaut ein scharfes Bild erhält.

Bei frühzeitigen Gegenmassnahmen ist es also möglich, die negative Entwicklung deutlich zu verlangsamen.

Die folgende Tabelle zeigt eine Zusammenfassung der Verfahren zur Myopie-Kontrolle und deren Effektivität aus über 30 wissenschaftlichen Arbeiten:

VERFAHREN	VERLÄNGSAMUNG DER MYOPIE-ENTWICKLUNG IN %
Brillengläser und Standard Kontaktlinsen	0 - 5%
Multifokale / Bifokale Brillengläser	12 - 55%
Myovision (Spezial Brillengläser)	0 - 30%
Multifokale Kontaktlinsen	29 - 45%
Orthokeratologie / multifokale Orthokeratologie	32 - 100%
Atropin Augentropfen	30 - 77% (starke Nebenwirkungen)



UNSER ANGEBOT

INBEGRIFFENE LEISTUNGEN

- Die professionelle Anpassung – Erstkonsultation (30min) inklusive Anamnese, subjektive Refraktion, digitale Mikroskopie des vorderen Augenabschnittes, Topographie der Hornhaut, Hornhautdicke-messung, Augendruckmessung, Untersuchung der zentralen Netzhaut mittels Laser – Funduskamera und Computertomographie – Verträglichkeitstests (30min) nach 1 Woche und 1 Monat oder nach Bedarf
- Co-Management Augenarzt – regelmäßige Messung und Überprüfung der Augenlänge
- Komplettes Pflegemittelsystem und Zubehör
- Alle 6 Monate wird der Sitz der Kontaktlinsen und die Gesundheit der Augen genau kontrolliert
- Regelmässiger Austausch der Kontaktlinsen

PREISE

Erstanpassung (einmalig):	
• Orthokeratologie	1060
• Multifokale weiche Monatslinse	660
Monatliche Belastungen nach der Anpassung:	
• Myopie (Kurzsichtigkeit)	75
• Astigmatismus (Hornhautverkrümmung)	90

BEDINGUNGEN

Das Abo läuft mindestens 24 Monate (danach ist eine Kündigung des Abos halbjährlich möglich). Die Beiträge werden monatlich mittels Lastschriftverfahren gebucht. Einfach und unkompliziert.

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info@eyeness.ch
www.eyeness.ch

Egal welches Verfahren zum Zuge kommt, wir arbeiten eng mit Ihrem Augenarzt zusammen und lassen die Augenlänge regelmässig nachmessen.

Atropine und Contact Lenses

	Wirkungs- weise	Effekt nachge- wiesen	Einfachheit der Anwendung	Kosten	Medika- mentöse Neben- wirkungen	Optische Neben- wirkungen	Rebound Effekt nach Absetzen	Zulassung (zur chron. Anwendung)	Risiko	Eltern
Atropin 0.01% - 1%	Muscarin- antagonist	+ bis +/- Atropin 0.01% bis 0.05% ++ Atropin 0.5% bis 1%	++	+	+ ohne KS +/- mit KS (BAC oder Thiomersal)	+/- Atropin 0.01% bis 0.05% - bis - - Atropin 0.5% bis 1%	+ Atropin 0.01% - bis - - Atropin 0.5% bis 1%	- (++) FDA evt. 2020 ?	++ ohne KS	Chronische Medikamentengabe Unverträglichkeit
Kontakt- linsen	Korrektur des zentralen und peripheren Defokus	+ Ortho-K (+/-) MiSight +/- PDMCL	+ Ortho-K ++ MiSight + PDMCL	+/- Ortho-K + MiSight + PDMCL	++ Ortho-K (Peroxid) ++ MiSight ++ PDMCL (Peroxid)	+ Ortho-K + MiSight + PDMCL	- (14 jährig) + > 16 jährig	+ Ortho-K ++ MiSight - +/-PDMCL	+ Ortho- K ++ MiSight + PDMCL	Handhabung Kontaktlinse Sicherheit Kosten

Empfohlene klinische Tests – Myopie-Management

- Normale optometrische Tests
- Zusätzlich:
 - Akkommodation und Binokularsehen
 - Refraktion in Zykloplegie
 - Netzhaut
 - Augenlänge (Biometrie) !
- Atropin
 - Pupillen-Funktion
 - Augeninnendruck
- Orthokeratologie
 - Topografie

Review schedule

Atropine

- 4-7 days
- 1 month
- 3 months
- then 6 monthly

Orthokeratology

- 1 day
- 4-7 days
- 1 month
- 3 months
- then 6 monthly

Multifocal SCLs

- 4-7 days
- 1 month
- then 6 monthly

PAL/Bifocal Specs

- 1 month
- then 6 monthly

Special Issue

IMI – Clinical Management Guidelines Report

Kate L. Gifford,¹ Kathryn Richdale,² Pauline Kang,³ Thomas A. Aller,⁴ Carly S. Lam,⁵ Y. Maria Liu,⁶ Langis Michaud,⁷ Jeroen Mulder,⁸ Janis B. Orr,⁹ Kathryn A. Rose,¹⁰ Kathryn J. Saunders,¹¹ Dirk Seidel,¹² J. Willem L. Tideman,¹³ and Padmaja Sankaridurg¹⁴

Nachbetreuung sichern

Copyright Peter Bruckmann

Kinder werden älter - die Augen verändern sich.
Regelmäßige Sehteste geben Sicherheit!

Routine Check-Up



Datum	Alter	Detail-Sehen	Stereo-Sehen	Farben-Sehen
10.05.2016	9	0,00	ok	ok
05.05.2017	10	0,00	ok	ok
01.11.2017	10	-0,50	ok	ok
30.04.2018	11	-1,00	ok	ok
27.10.2018				



Die Tests
wurden durchgeführt

am: _____

- ☐ mit Brille
- ☐ mit Kontaktlinsen
- ☐ ohne Sehhilfe



Detail-
Sehen



Stereo-
Sehen

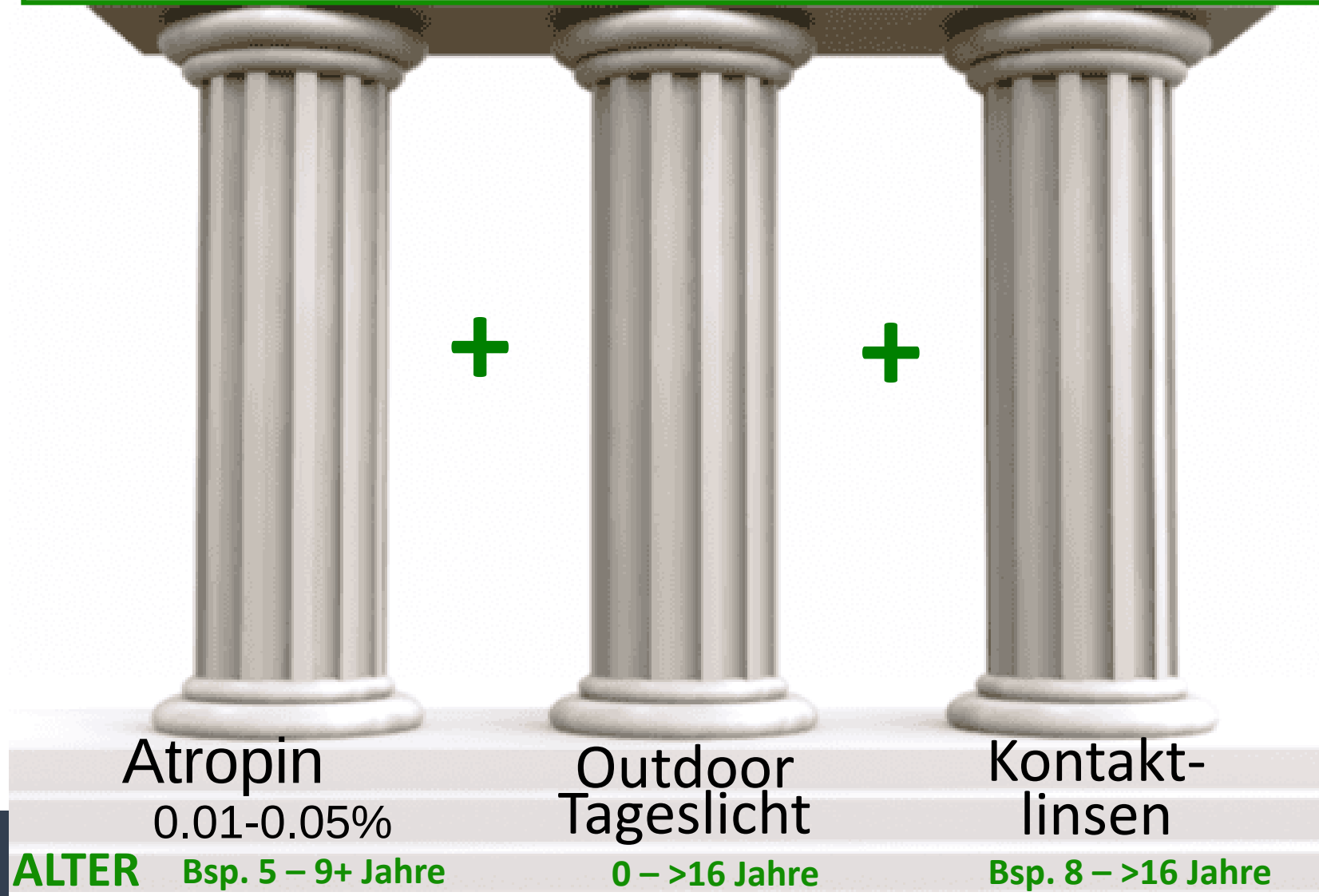


Farben-
Sehen

Unterschrift Augenoptiker

Das Schutz-Prinzip des Myopie Managements

Konsequente Nachbetreuung und Kooperation



Zusammenfassung und Diskussion

Was haben wir bisher gelernt ?

Myopie Progression ist:

- 
- Multifaktoriell und stark altersabhängig
 - Potentiell pathologisch mit höherem Risiko bei höherer Myopie
 - Evidence based and klinisch erprobte effektive Strategien/Therapien sind verfügbar
 - Große Variationen bei den Ergebnissen
 - Sonnenlicht hilft vor allem während der Emmetropisierungs-Phase, sehr schwache/keine Korrelation zur Hemmung bei bereits bestehender Myopie
 - **Kombination von schwach dosiertem Atropin und KL / Orthokeratologie zeigen bisher die besten Studienresultate**



Zusammenfassung / Take Home

- Starte früh / jung und konsequent!
 - Myopie lässt sich (noch) nicht umkehren
- Informiere Kind und Eltern neutral und Evidenz basiert
- Wähle die richtige Therapie abhängig vom Alter, der aktuellen Myopie, der Progressionsrate und den Fähigkeiten und Wünschen der Eltern und des Kindes
- **Passe und kombiniere die Therapiestrategien über die Zeit an ! Kontinuierliche Begleitung!**
- Kooperation von OphthalmologIn und OptometristIn ist wichtig
- Gebiet welches sich schnell weiterentwickelt, daher laufende Fortbildung zu empfehlen:
 - Neue Produkte
 - spezielle OK
 - spezialisierte Instrumente
 - Licht oder doch nicht?



MiSight
Banner

