Myopie-Management

Mythen und Fakten

Atropin, Kontaktlinsen, Brille, Outdoor & Digitale Medien

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Wissenschaftliche Vereinigung für Augenoptik und Optometrie
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D i s c l o s u r e

No commercial or financial interest

in any product named in this lecture.

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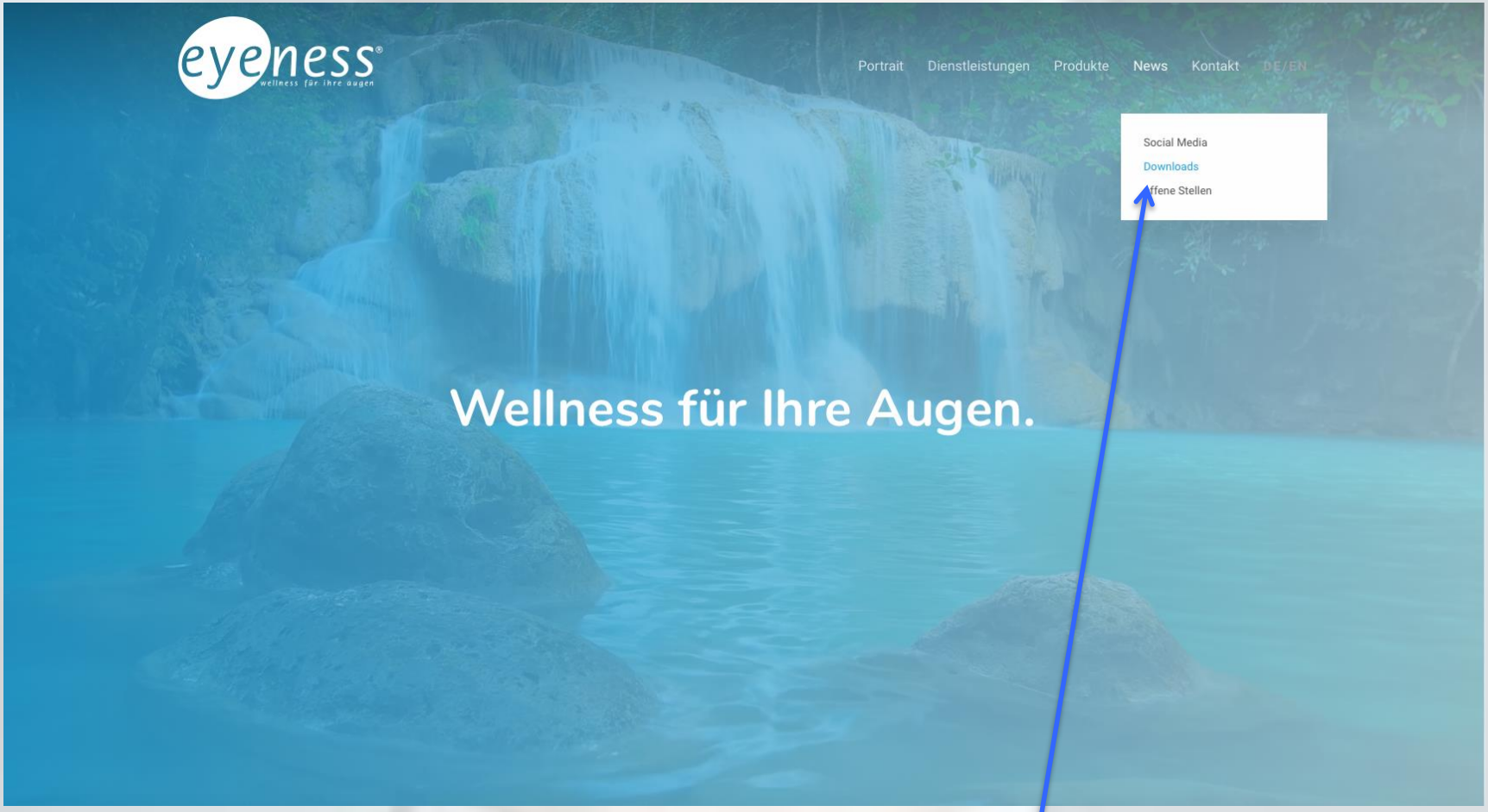

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Effect of Outdoor Activities in Myopia Control: Meta-analysis of Clinical Studies

Li Deng, PhD[1]* and Yi Pang, MD, OD, PhD[2]

SIGNIFICANCE: Our meta-analyses assess the benefit of outdoor activities on myopia onset and myopic shift among school-aged children reported in prospective intervention studies.

PURPOSE: The purpose of this study was to investigate the reduced risk of myopia development, myopic shift, and axial elongation with more outdoor activity time among school-aged children.

METHODS: A literature search was conducted using PubMed, MEDLINE, Scopus, EMBASE, VisionCite, and Cochrane Library. Five clinical trials met our selection criteria. Three outcome variables were used to assess the benefit of intervention: relative risk (RR), difference in myopic shift rate, and difference in axial elongation rate. Meta-analyses were applied to each outcome variable under the random-effects model. Children were grouped according to their initial refractive status: initial myopes, initial nonmyopes, or mixed.

RESULTS: The pooled RR indicates that there is a reduced risk of developing myopia with more hours of outdoor activities per week (RR, 0.66; 95% confidence interval [CI], 0.49 to 0.89). The [illegible] slower in the intervention group compared [illegible] needed to assess its long-term effect and [illegible] initial myopic status.

In summary, our meta-analysis found an overall protective effect against myopic shift and axial elongation with outdoor activities. The

Optom Vis Sci 2019;00:00–00. doi:10.1097/OPX.0000000000001357

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*mnz3@cdc.gov

Abstimmung

Betreiben Sie Myopie Management ?

A. Ja, regelmässig

B. Gelegentlich oder Selten

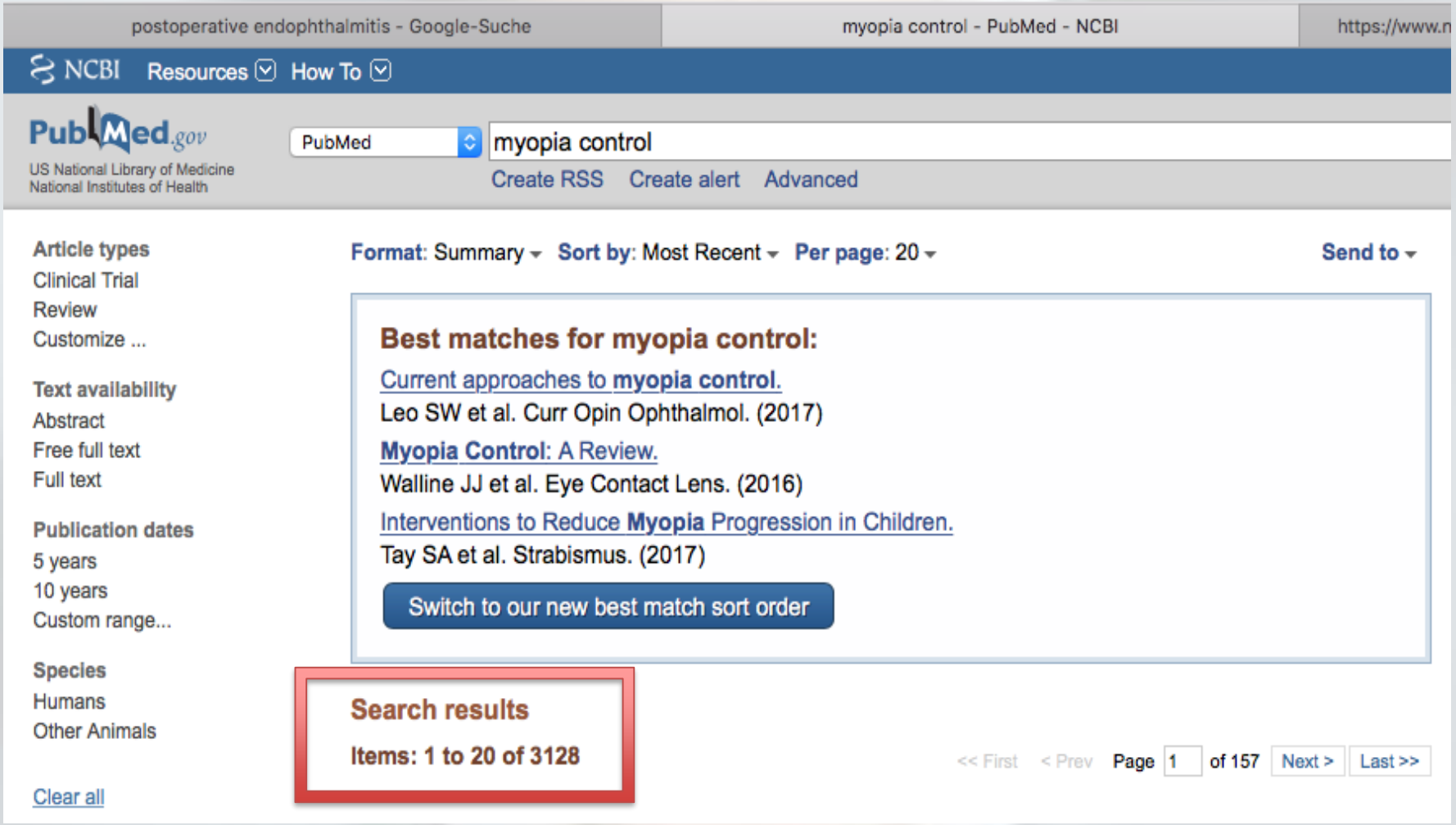
C. Nein

D. Was ist Myopie Management ?

Myopia-Management

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

Publikationen bis Ende February 2019



Globale Epidemiologie

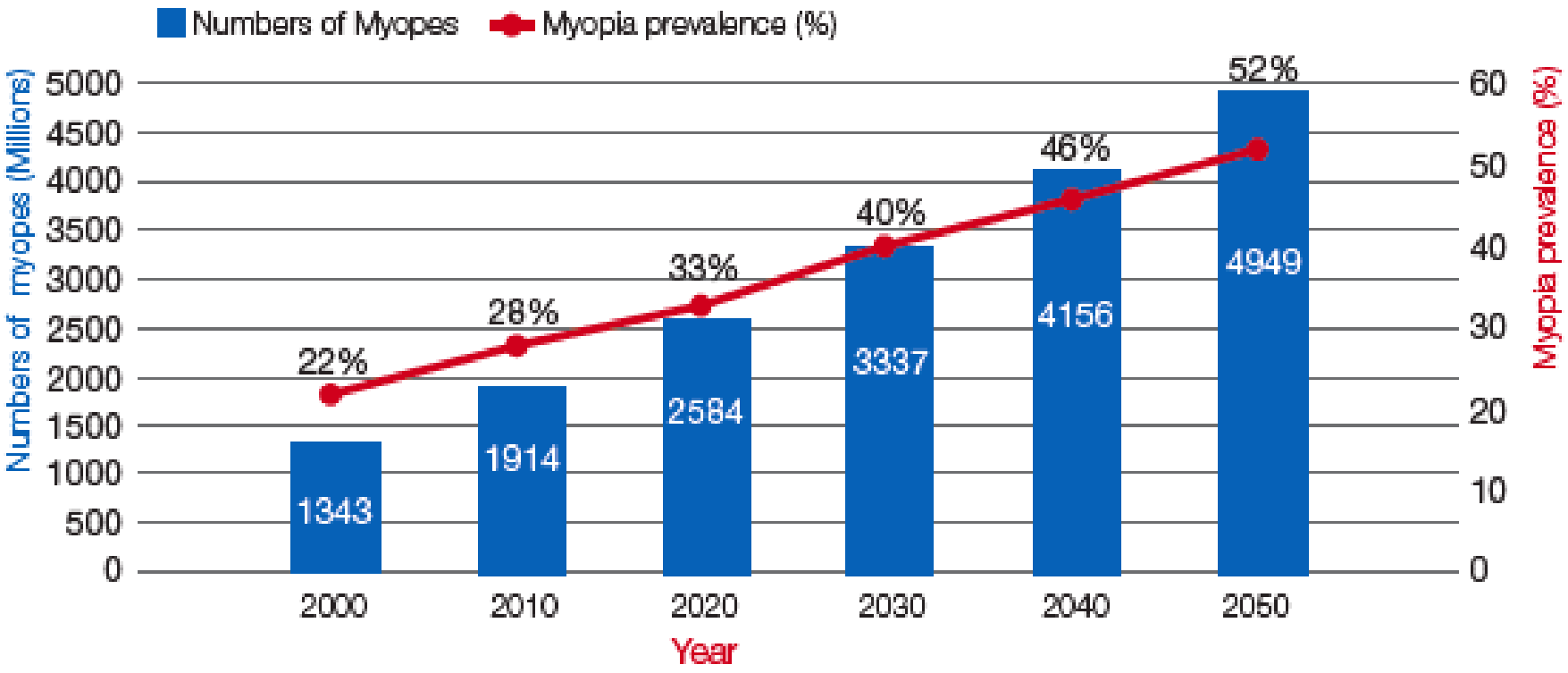
THE IMPACT OF MYOPIA AND HIGH MYOPIA

Report of the Joint World Health Organization–Brien Holden Vision Institute Global Scientific Meeting on Myopia

University of New South Wales, Sydney, Australia
16–18 March 2015

World Health Organization

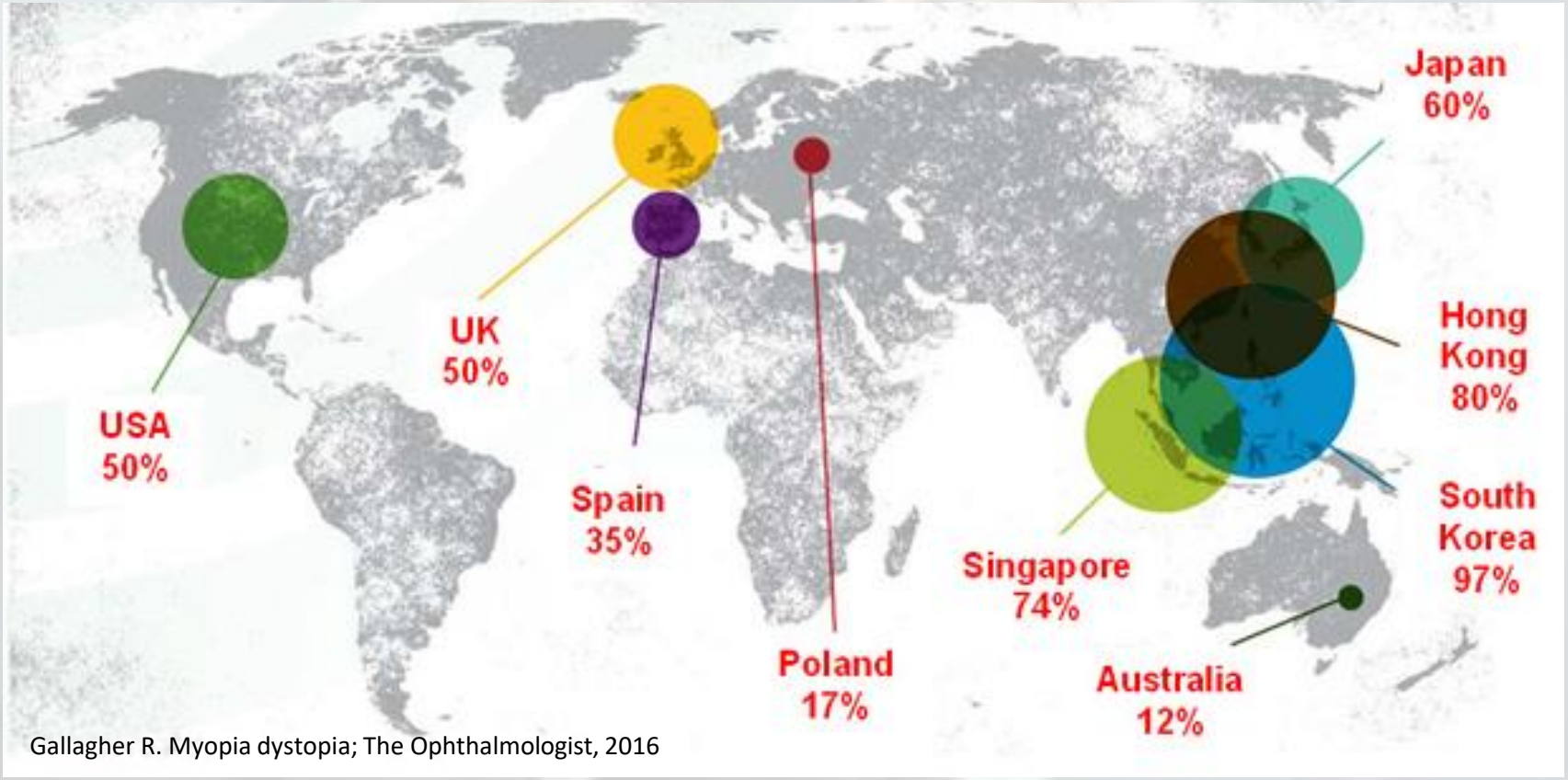
Results: Myopia - Now and in 2050



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

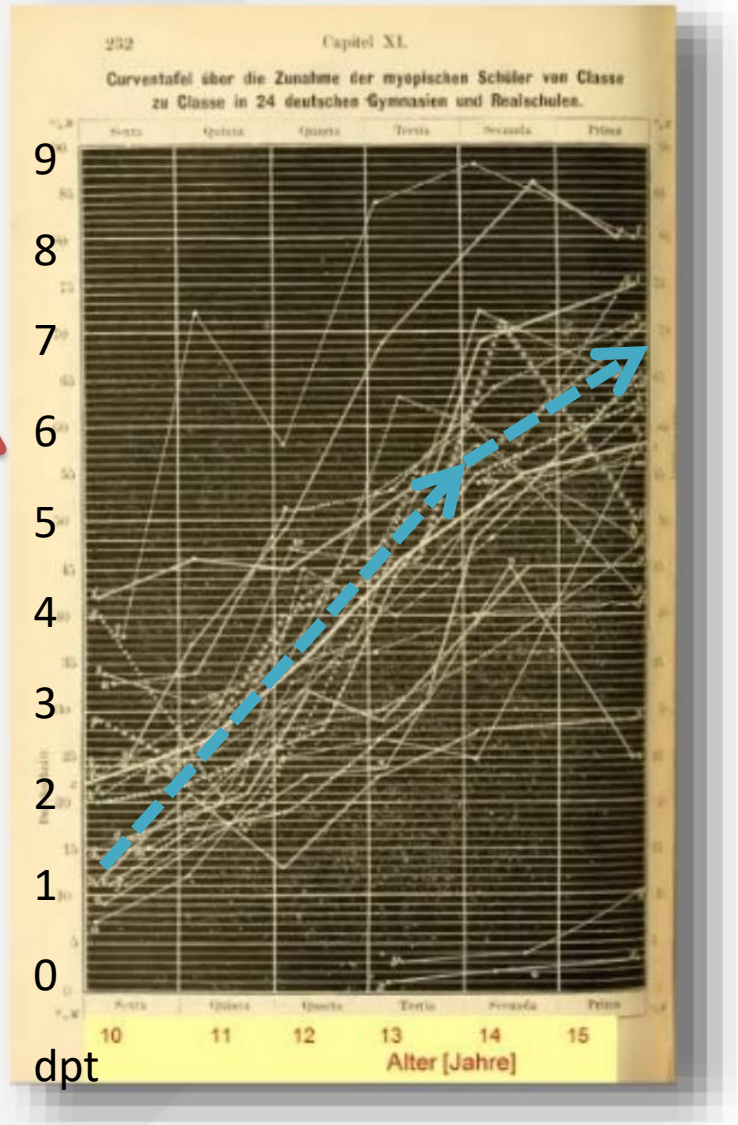


Gallagher R. Myopia dystopia; The Ophthalmologist, 2016

Myopie Progression 1867

Dr. med. Hermann Cohn, Breslau 1838-1906

Aus Vortrag Dr. Hakan Kaymak, DOC 2017



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

Klinische Evidenz

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.

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

Risiko (Odds) Ratio

AMERICAN ACADEMY OF OPHTHALMOLOGY
Eye & Contact Lens • Volume 44, Number 4, July 2018
REVIEW ARTICLE
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A Review of Current Concepts of the Etiology and Treatment of Myopia

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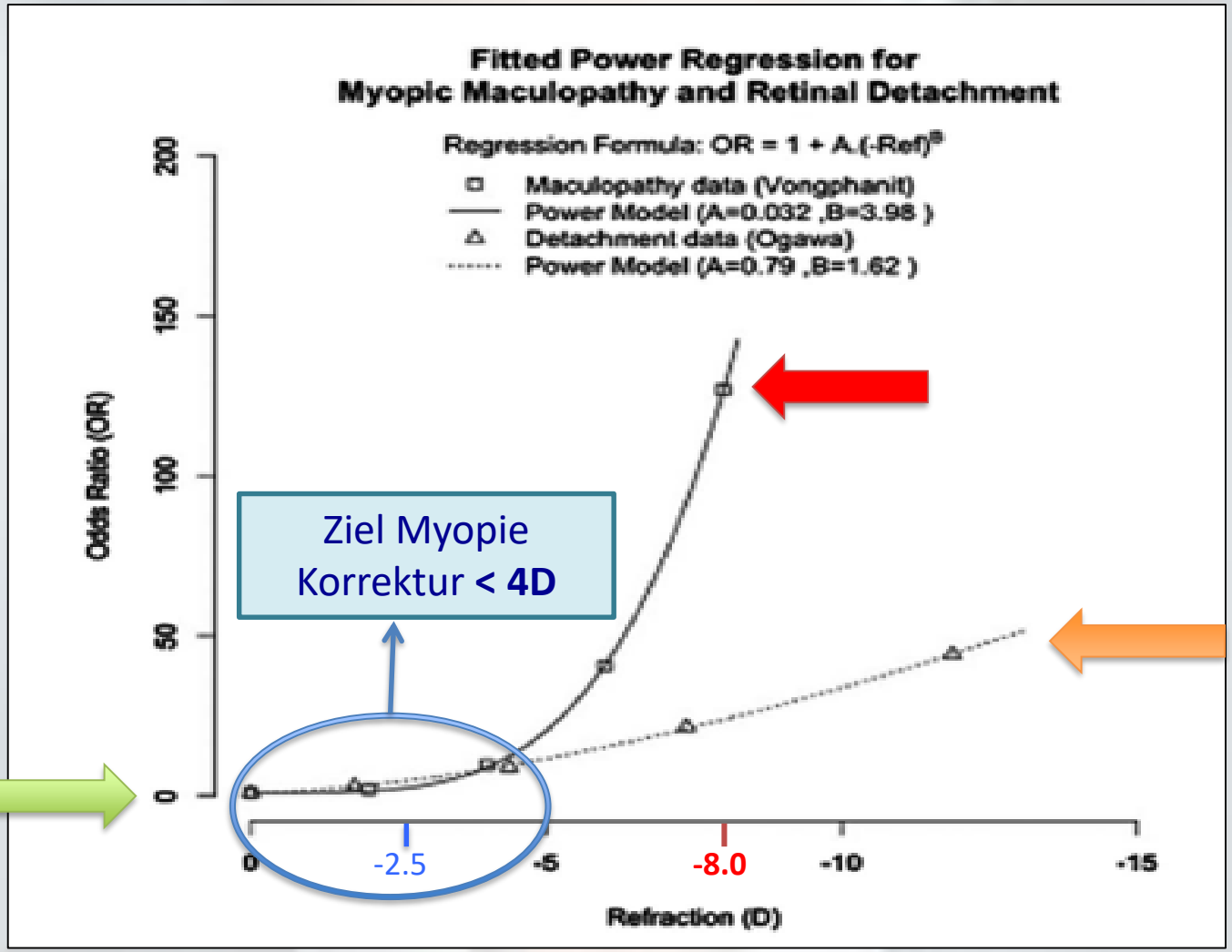
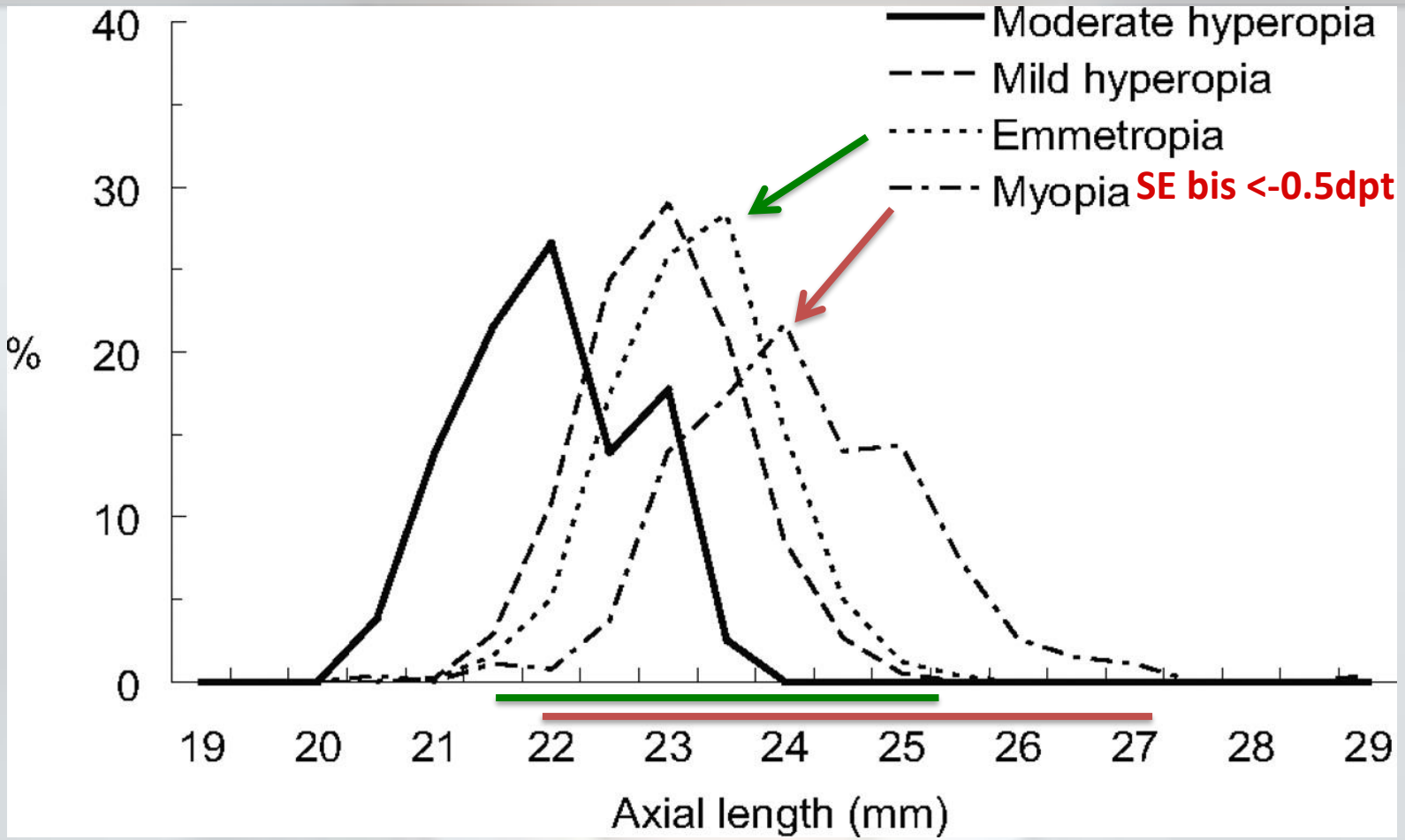


Risiko Achsenlänge

From: Variation of the Contribution from Axial Length and Other Oculometric Parameters to Refraction by Age and Ethnicity

Invest. Ophthalmol. Vis. Sci.. 2007;48(10):4846-4853. doi:10.1167/iovs.07-0101



Distribution of AL in 12-year-old children with moderate hyperopia (SER ≥ +2.00 D) mild hyperopia (+0.50 D ≤ SER < +2.00 D), emmetropia (−0.50 D < SER < +0.50 D), and myopia (SER ≤ −0.50 D).

Bulbus-Achsenlängen nach Alter, Rasse und Fehlsichtigkeit

Bulbus-Achsenlänge (in mm) nach Alter bei Emmetropie und Myopie

Gruppe	Geburt	1 Jahr	2	3	4	5	6	7	8	10	12	14	16	20	27	60	80 Jahre
Asiatisch emmetrop						22.5	22.8	23.1	23.5							23.6	
Asiatisch myop				21.7			23.4			23.9	24.5	24.7	25.0			29.2	
Kaukasisch EU emmetrop							22.6			23.1	23.2		23.4	23.7			
Kaukasisch USA emmetrop	16.8	20.0	20.5	21.0	21.5	22.0	22.4	22.6	22.8					23.2	23.8	23.9	23.4
Kaukasisch AUS emmetrop							22.6	22.7									
COMET myop stabil							22.8			23.2	23.3	23.4	23.5	23.6			
COMET & Mallen & Burfield myop								23.9		24.2	24.7	24.9	25.0	25.3	25.3		

MEAN Achsenlängen (in mm)	Geburt	1	2	3	4	5	6	7	8	10	12	14	16	20	27	60	80	Jahre
Emmetrop asiatisch						22.5	22.8	23.1	23.5									
Emmetrop kaukasisch	16.8	20.0	20.5	21.0	21.5	22.0	22.5	22.7	22.8	23.1	23.2		23.4	23.5	23.8	23.75	23.4	mm
Myop kaukasisch & asiatisch				21.7			23.4	23.9		24.1	24.6	24.8	25.0	25.3	25.3	29.2		mm

Referenzen:

Lu T.L. · et al.: Axial Length and Associated Factors in Children: The Shandong Children Eye Study, Ophthalmologica 2016;235: 78-86
Hussain R.N. et al.: Axial Lenght in Apparently Normal Pediatric Eyes, EJoO 2014; 24(1): 120-3
Hou W. et al.: Axial Elongation in Myopic Children and its Association With Myopia Progression in the Correction of Myopia Evaluation Trial 2018 Jul;44(4): 248-259
Ahn Y.J. et al.: Changes in Axial Lenght in Accommodative Esotropia Patients with minimal Hyperopic Correction.PLoS ONE 2019; 14(1)
Mutti D.O. et al.: Axial growth and changes in lenticular and corneal power during emmetropization in infants. Invest Ophthalmol Vis Sci 2005; 46(9): 3047-80
Ip J. et al.: Variation of the Contribution from Axial Length and Other Oculometric Parameters to Refraction by Age and Ethnicity. Invers Ophthalmol Vis Sci 2007; 48(10): 4846-53
Huang Y. et al.: Corneal biomechanics, refractive error, and axial length in Chinese primary school children.Invest Ophthalmol Vis Sci 2011;52(7): 4923-8
Mallen E. et al.: Transient Axial Length Change during the Accommodation Response in Young Adults. Invest Ophthalmol Vis Sci 2006;47(3): 1251-4
Burfield H. et al.: Ocular Biometric Diurnal Rythms in Emmetropic and Myopic Adults. Invest Ophthalmol Vis Sci 2018; 59: 5176-87
Foo V. et al.: Axial Length/Corneal Radius of Curvature Ratio and Myopia in 3-year old Children, TVST 2016;5(1): 1-6
Tideman W.: Axial lenght growth curves and the risk of myopia in European children and adults. ARVO 2017
Lee K.: Ten-year changes in axial length in the Beaver Dam Eye Study. ARVO 2017

Alle Daten wurden gemittelt auf Basis der vorhandenen publizierten Daten Stand März 2019. Ergänzungen/Präzisierungen sind jederzeit möglich.

Korrespondenz und Ergänzungen bitte an : Michael Bärtschi, Eyeness AG, Bern/Schweiz: mbaertschi@eyeness.ch

Merke:

- **Asiaten > Kaukasier**
- **Knaben > Mädchen**
- **Wachstum vor 20 J**
- **Ausnahmen gibt es**

Erstellt von Dr. Michael Bärtschi 02.04.19

Ophthalmology

AMERICAN ACADEMY OF OPHTHALMOLOGY
Protecting Sight. Empowering Lives.

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,*]*

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

Ophthalmology, 2018

Table 1 The crude and age-standardised all-ages prevalence of visual impairment (VI) and blindness associated with myopic macular degeneration (MMD) estimated for each Global Burden of Disease region between 2000 and 2050

Region	2000	2010	2020	2030	2040	2050
Crude all-ages prevalence (%) of VI associated with MMD in each decade						
Asia (Central)	0.08	0.13	0.19	0.30	0.44	0.63
Asia (East)	0.08	0.16	0.25	0.39	0.56	0.77
Asia (South)	0.10	0.16	0.25	0.41	0.67	1.07
Asia (Southeast)	0.13	0.19	0.29	0.45	0.69	1.02
Asia-Pacific High Income	0.04	0.07	0.10	0.14	0.19	0.24
Australasia	0.02	0.03	0.04	0.05	0.07	0.10
Oceania	0.01	0.02	0.03	0.05	0.08	0.12
Caribbean	0.03	0.05	0.07	0.10	0.15	0.21
Latin America (Andean)	0.03	0.05	0.07	0.11	0.16	0.22
Latin America (Central)	0.03	0.06	0.09	0.13	0.20	0.29
Latin America (Southern)	0.04	0.06	0.09	0.13	0.18	0.26
Latin America (Tropical)	0.03	0.05	0.08	0.12	0.17	0.23
North America High Income	0.03	0.04	0.05	0.07	0.10	0.14
Europe (Central)	0.06	0.09	0.13	0.19	0.26	0.34
Europe (Eastern)	0.07	0.10	0.14	0.21	0.27	0.35
Europe (Western)	0.02	0.03	0.04	0.05	0.07	0.09
North Africa and Middle East	0.05	0.07	0.12	0.19	0.28	0.41
Sub-Saharan Africa (Central)	0.03	0.05	0.07	0.10	0.15	0.23
Sub-Saharan Africa (Eastern)	0.01	0.02	0.03	0.05	0.07	0.11
Sub-Saharan Africa (Southern)	0.01	0.02	0.03	0.05	0.07	0.11
Sub-Saharan Africa (Western)	0.04	0.05	0.07	0.10	0.15	0.24
Global	**0.07**	**0.11**	**0.17**	**0.26**	**0.39**	**0.58**

Prevalenz der **Sehbehinderung und Erblindung** durch **Myopie bedingte Makulopathie**:

2000 -> 0.06% der CH Bevölkerung = **5‘040** Personen

2010 -> 0.09% der CH Bevölkerung = **7‘560** Personen => 50% Zunahme !

2020 -> 0.13% der CH Bevölkerung = **10‘920** Personen => 100% Zunahme !!

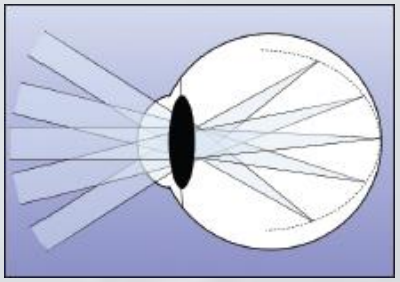
Kausalität

Multifaktoriell

Viele Theorien, häufig kontroverse Resultate !

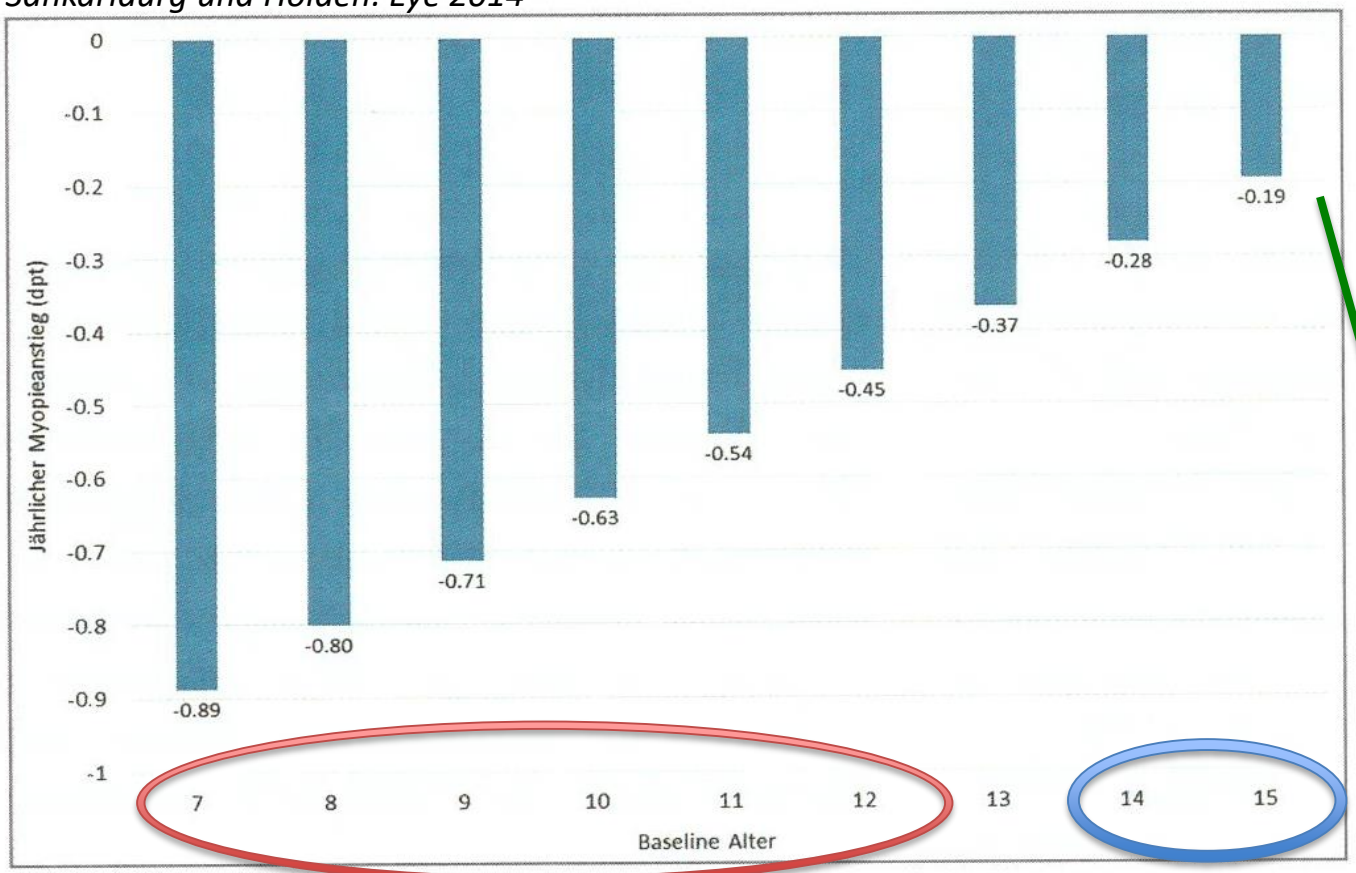
- Genetik (Wu und Edwards 1999, Morgan und Rose 2005, Foster und Jiang 2014)
- Umwelt / Dopamin (Feldkämper und Schäffel 2003, Jones et al 2007, Rose und Morgan 2008, Pan, Chen et al. 2015, Xiong et al 2017)
- Emmetropisierung (Xiang et al 2012, Zadnik et al 2015)
- Naharbeit/ Digitalisierung (McBrian 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)



Alters abhängige Myopie Progression

Sankaridurg und Holden: Eye 2014



Therapie STOP !?

„In most of our participants, Axial Lenght (AL) increases rapidly at younger ages and then slowed down and stabilized."

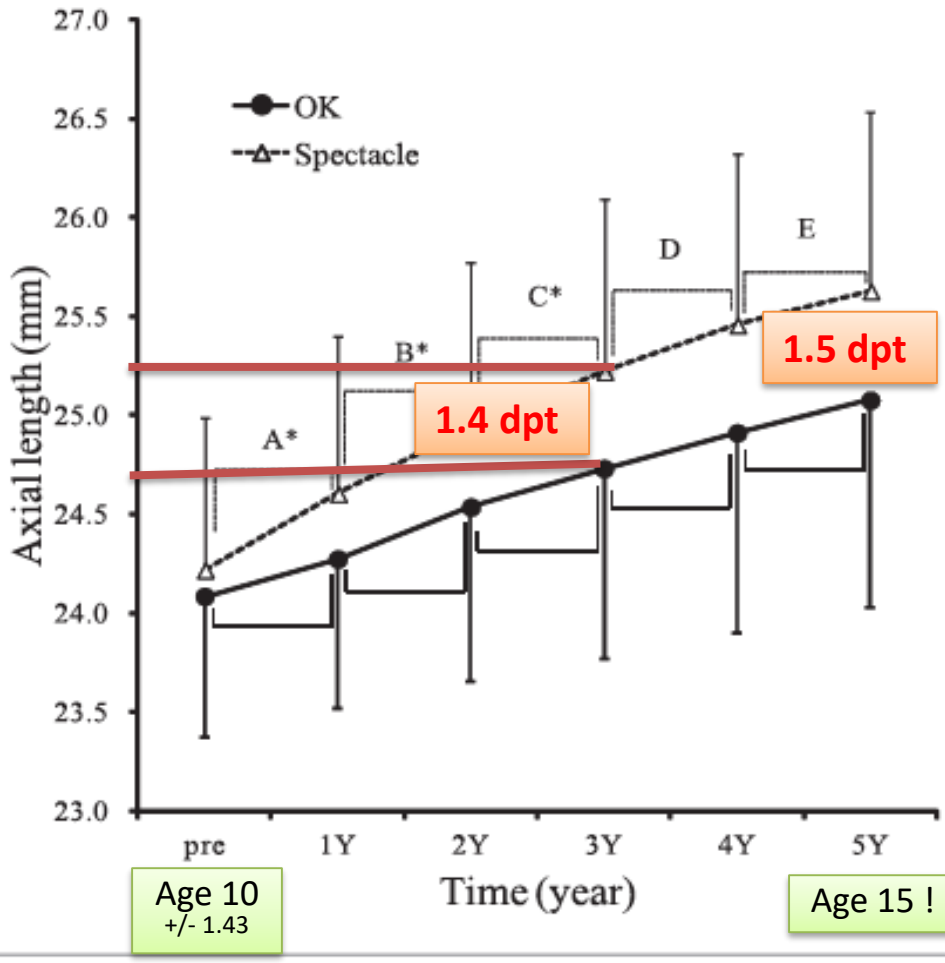
Hou W. et al (COMET Group). Eye & Contact Lens: July 2018; Vol. 44/4, p.248-59

Clinical and Epidemiologic Research

IOVS 2012

Long-Term Effect of Overnight Orthokeratology on Axial Length Elongation in Childhood Myopia: A 5-Year Follow-Up Study

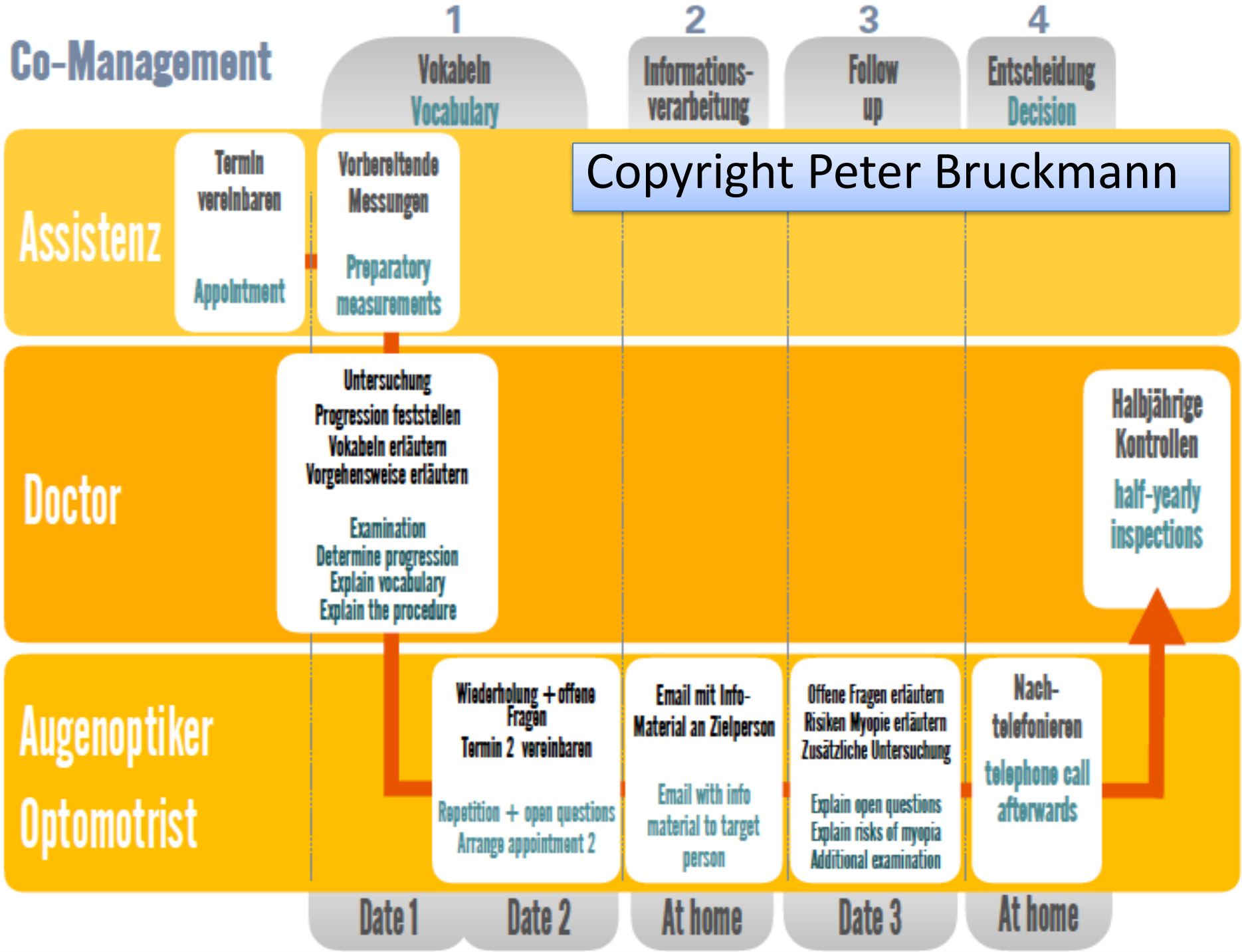
Takahiro Hiraoka,[1] Tetsuhiko Kakita,[2] Fumiki Okamoto,[1] Hideto Takahashi,[3] and Tetsuro Oshika[1]



annual increase	Spectacle (mm) (mean±SD)	OK (mm) (mean±SD)	P value
A	0.38 ±0.20	0.19 ±0.09	0.0002*
B	0.33 ±0.18	0.26 ±0.13	0.0476*
C	0.29 ±0.16	0.19 ±0.15	0.0385*
D	0.24 ±0.18	0.18 ±0.17	0.0938
E	0.17 ±0.14	0.16±0.13	0.8633

Kommunikation und Information

Klar verständlich und Kind gerecht


Co-Management
1
Vokabeln
Vocabulary
2
Informations-
verarbeitung
3
Follow
up
4
Entscheidung
Decision
Assistenz
Termin
vereinbaren
Appointment
Vorbereitende
Messungen
Preparatory
measurements
Copyright Peter Bruckmann
Doctor
Untersuchung
Progression feststellen
Vokabeln erläutern
Vorgehensweise erläutern
Examination
Determine progression
Explain vocabulary
Explain the procedure
Halbjährige
Kontrollen
half-yearly
inspections
Augenoptiker
Optomotrist
Wiederholung + offene
Fragen
Termin 2 vereinbaren
Repetition + open questions
Arrange appointment 2
Email mit Info-
Material an Zielperson
Email with info
material to target
person
Offene Fragen erläutern
Risiken Myopie erläutern
Zusätzliche Untersuchung
Explain open questions
Explain risks of myopia
Additional examination
Nach-
telefonieren
telephone call
afterwards
Date 1
Date 2
At home
Date 3
At home

Informationen zur Myopie-Prophylaxe bei Kindern

So sieht ein kurzsichtiges Kind in der Schule: Tafel und Gestik des Lehrers sind unscharf und es kann dem Unterricht nur mühsam folgen.

Kurzsichtigkeit und was sie bedeutet

Nachtlinsen und wie sie Kindern helfen können

Orthokeratologie und wie das Verfahren funktioniert

Freies Sehen

Diese Broschüre ist ein Informationsangebot der Fachgruppe Orthokeratologie
Wissenschaftliche Vereinigung für Augenoptik und Optometrie WVAO

Entscheidungshilfe

(Bsp. Brien Holden Vision Institute: Myopia Calculator)

Brien Holden VISION INSTITUTE

Ethnicity: Caucasian

Child's Age (Years): 6

Refractive Error (D): -1.00

Myopia Management Option: Peripheral defocus spectacles

Control Rate (%): 17 (14 – 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

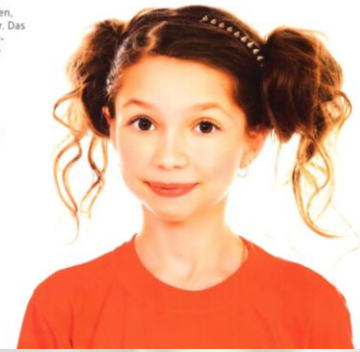
Myopie-Management Abonnement

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 der Augen, stellt langfristig ein erhöhtes Gesundheitsrisiko dar. Das Risiko einer Netzhautablösung, als Beispiel, vervierfacht sich bereits bei 3 Dioptrien und liegt bei über 6 Dioptrien gar 16x höher.

GESUNDHEITSRISIKO NACH KORREKTUR

Fehlsichtigkeit	Grauer Star (Cataract)	Grüner Star (Glaukom)	Netzhautablösung
-1.0 bis -3.0	2x	4x	4x
-3.0 bis -6.0	3x	4x	10x
-6.0 oder höher	5x	4x	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 vereinigt. 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	bereits 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	Unteraktiv
Tiefes Risiko	Mittleres Risiko	Hohes Risiko

GEWOHNHEITEN > Outdoor Aktivitäten / Tag

2.7h oder mehr	1.6h bis 2.7h	weniger als 1.6h
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 (2–3x)

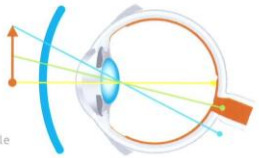
KANN MAN EINE MYOPIE-ENTWICKLUNG STOPPEN?

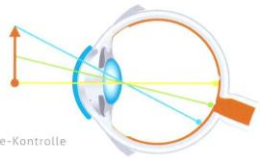
Ja, man kann!!! Seit Jahren werden umfangreiche Studien im Bereich der Myopie-Kontrolle durchgeführt. Neben den oben aufgeführten Faktoren ist es bei Kurzsichtigen so, dass die Umwelt nicht über die gesamte Netzhaut gleich scharf abgebildet wird. Es entsteht um den Brennpunkt des Auges ein unscharfer 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	VERLANGSAMUNG 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)


VOR Myopie-Kontrolle


NACH Myopie-Kontrolle

UNSER ANGEBOT

INBEGRIFFENE LEISTUNGEN

- Die professionelle Anpassung – Erstkonsultation (90min) inklusive Anamnese, subjektive Refraktion, digitale Mikroskopie des vorderen Augenabschnittes, Topographie der Hornhaut, Hornhautdickenmessung, 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 Beträge werden monatlich mittels Lastschriftverfahren gebucht. Einfach und unkompliziert.

powered by kontaktlinsenstudio bärtschi

eyeness ag
Hirschengraben 11
Postfach
3001 Bern

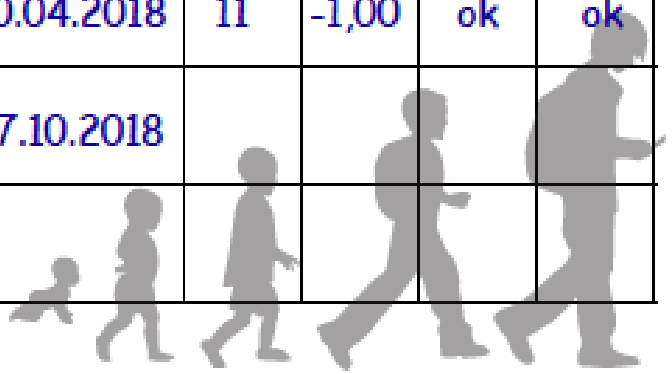
Telefon 031 311 07 66
info@eyeness.ch
www.eyeness.ch

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

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 Teste
wurden durchgeführt

☐ mit Brille
☐ mit Kontaktlinsen
☐ ohne Sehhilfe

am: _____

Detail-Sehen	
Stereo-Sehen	
Farben-Sehen	

_____
Unterschrift Augenoptiker

Aktuell am intensivsten studierte und angewandte Therapien

- Outdoor time **Update 2019**

  (Geplant und beworben, **Digitale Medien**)

- Brillengläser

  (prismatisch, bi-/multifokal, **PDF, DIMS**)

- Kontaktlinsen

  (bi-/multifokal, PDF, **Ortho-Keratology**)

- Pharmazeutikas

  (**Atropine LAMP**, Pirenzepin)

Efficacy of actual therapies

AMERICAN ACADEMY™ OF OPHTHALMOLOGY

Ophthalmology 2016

CrossMark

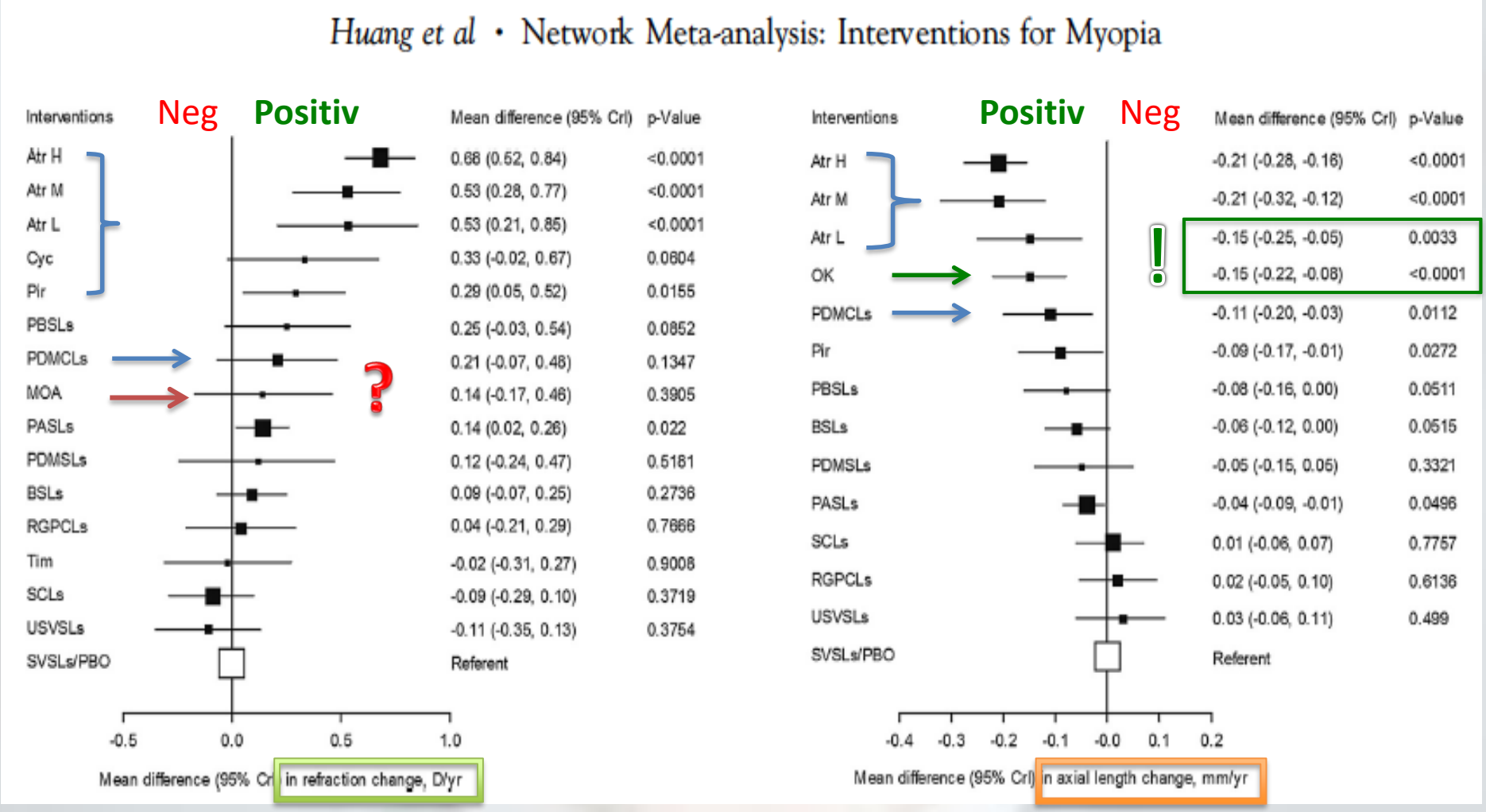
Efficacy Comparison of 16 Interventions for Myopia Control in Children

A Network Meta-analysis

change: −0.04 [−0.09 to −0.01]) showed slight effects.

Conclusions: This network analysis indicates that a range of interventions can significantly reduce myopia progression when compared with single vision spectacle lenses or placebo. In terms of refraction, atropine, pirenzepine, and progressive addition spectacle lenses were effective. In terms of axial length, atropine, orthokeratology, peripheral defocus modifying contact lenses, pirenzepine, and progressive addition spectacle lenses were effective. The most effective interventions were pharmacologic, that is, muscarinic antagonists such as atropine and pirenzepine. Certain specially designed contact lenses, including orthokeratology and peripheral defocus modifying contact lenses, had moderate effects, whereas specially designed spectacle lenses showed minimal effect. *Ophthalmology 2016;123:697-708*

Efficacy of actual therapies



Atr . atropine; Atr H . high-dose atropine (1% or 0.5%); Atr L . low-dose atropine (0.01%); Atr M . moderate-dose atropine (0.1%); BSLs . bifocal spectacle lenses; CrI . credible interval; Cyc . cyclopentolate; MOA . more outdoor activities (14e15 hrs/wk); OK . orthokeratology; PASLs . progressive addition spectacle lenses; PBO . Placebo; PBSLs . prismatic bifocal spectacle lenses; PDMCLs . peripheral defocus modifying contact lenses; PDMSLs . peripheral defocus modifying spectacle lenses; Pir . pirenzepine; RGPCLs . rigid gas-permeable contact lenses; SCLs . soft contact lenses; SVSLs . single vision spectacle lenses; Tim . Timolol; USVSLs . undercorrected single vision spectacle lenses.

Ophthalmology
AMERICAN ACADEMY OF OPHTHALMOLOGY
Protecting Sight. Empowering Lives.

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)
- Interesante 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

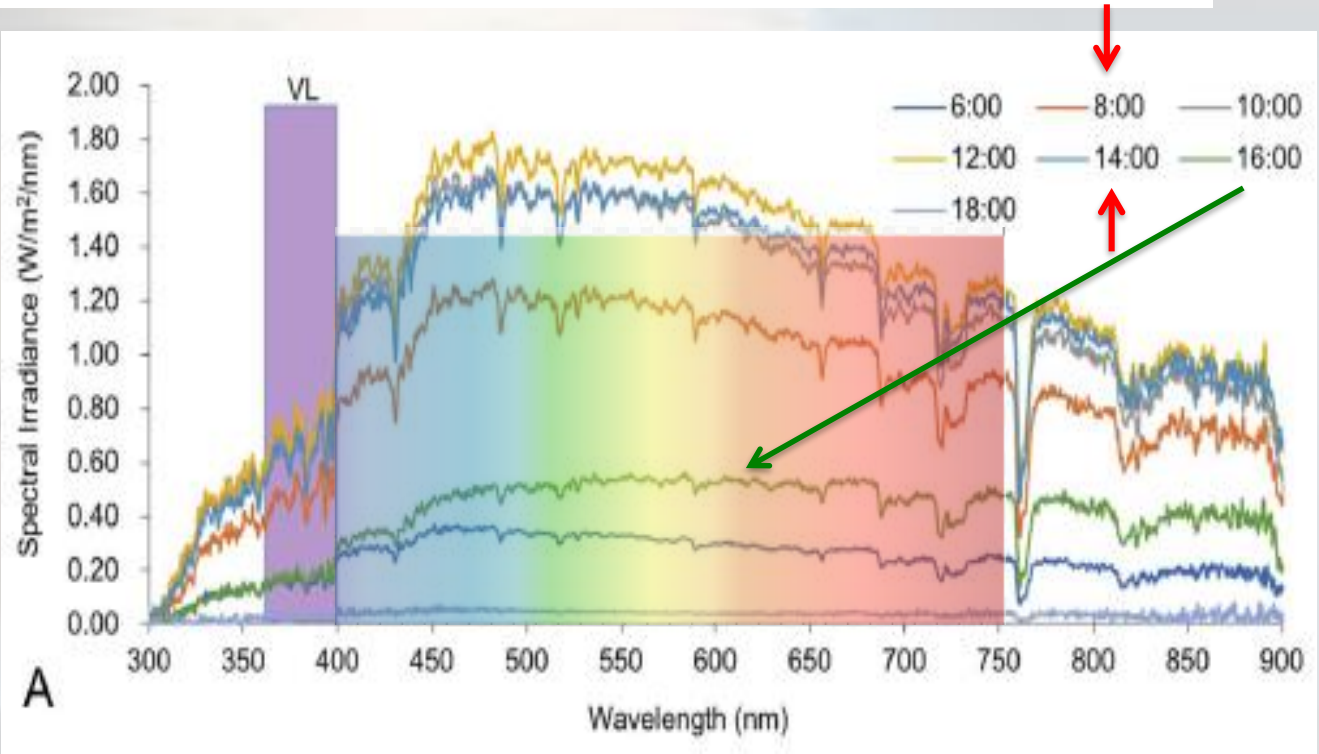
30/10 = 30 minutes of near work followed by a 10-minute break.

Eye & Contact Lens
SCIENCE AND CLINICAL PRACTICE

REVIEW ARTICLE (*Eye & Contact Lens* 2018;44: 273–278)

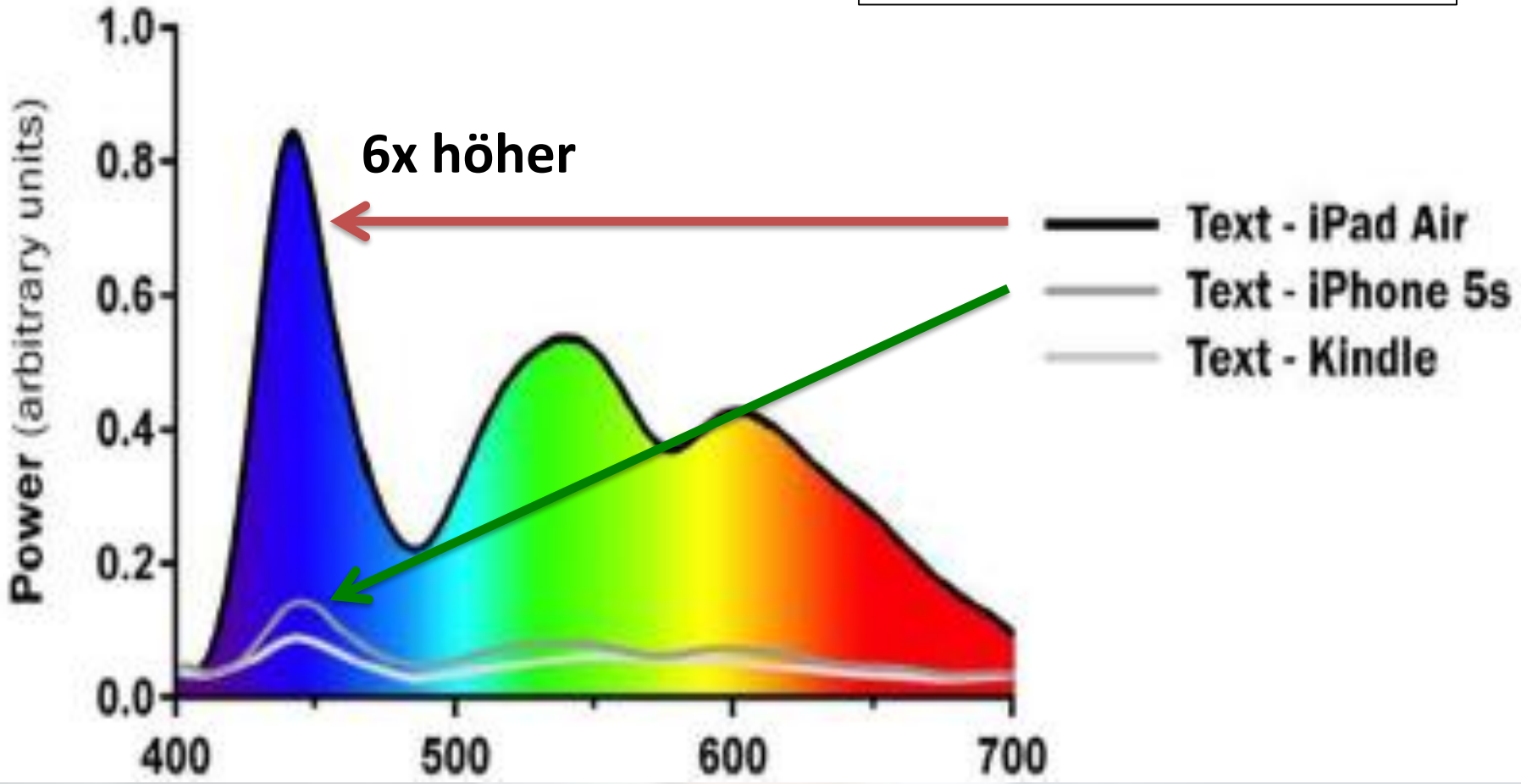
Progress and Control of Myopia by Light Environments

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



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.

How bright are electronic devices?

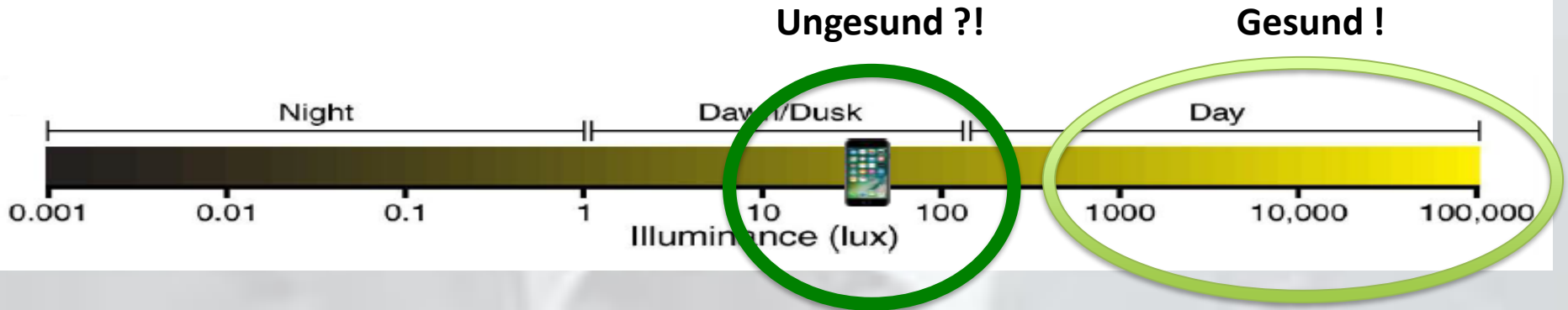
TABLE 2 | Spectral distribution of human retinal photopigment-weighted measures from all light-emitting devices during different display conditions.

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
Erythropic	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/cm²	60.20	16.40	39.10	110.80	62.30	14.30	19.80
Photon flux	1/cm²/s	[illegible]	[illegible]	1.18E+14	[illegible]	1.85E+14	3.90E+13	[illegible]
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 (erythopic), rods (rhodopic), and melanopsin (melanopic) photopigments, corrected for pre-receptoral 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



Contents lists available at ScienceDirect

EBioMedicine

journal homepage: www.ebiomedicine.com

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], iro Kondo [a], Maki Miyauchi [a,b], Yukihiro Miwa [a,b], [f], Kinya Tsubota [b,g], Hiroshi Goto [g], Mayumi Oda [h],

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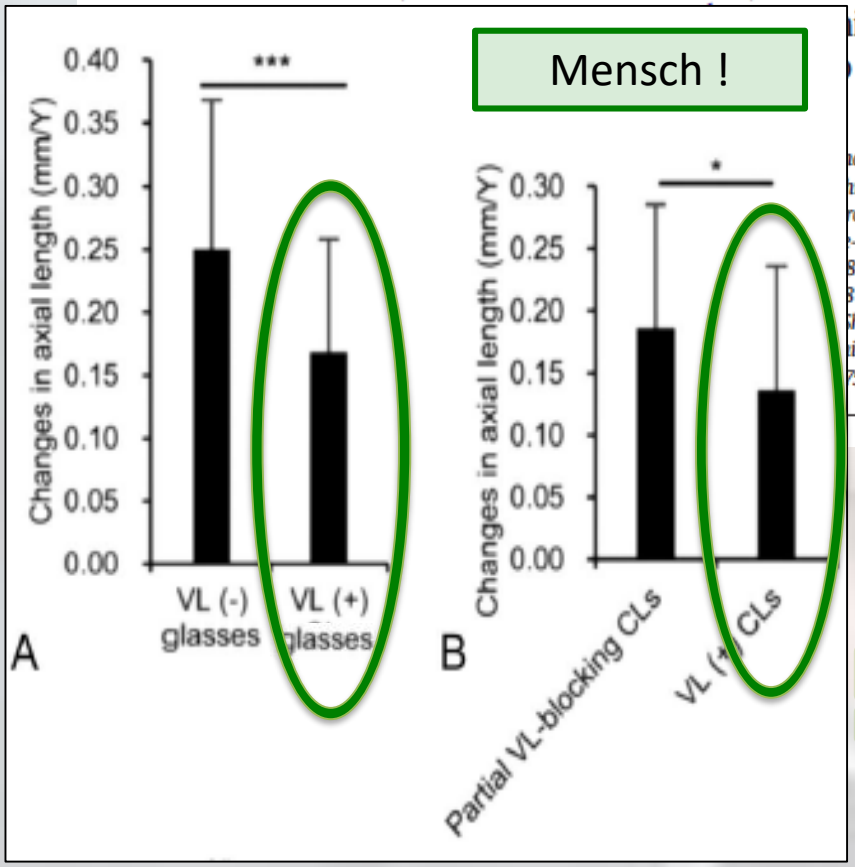
-ku, Chiba 263-8522, Japan
8916-16 Takayama-cho, Ikoma-shi, Nara 630-0101, Japan
81-3627, Japan
hinjuku-ku, Tokyo 160-0023, Japan
iversity School of Medicine, 35 Shinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan
75, Japan



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

Jiang X. et al, Sci Rep 2018;8:2026

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)

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

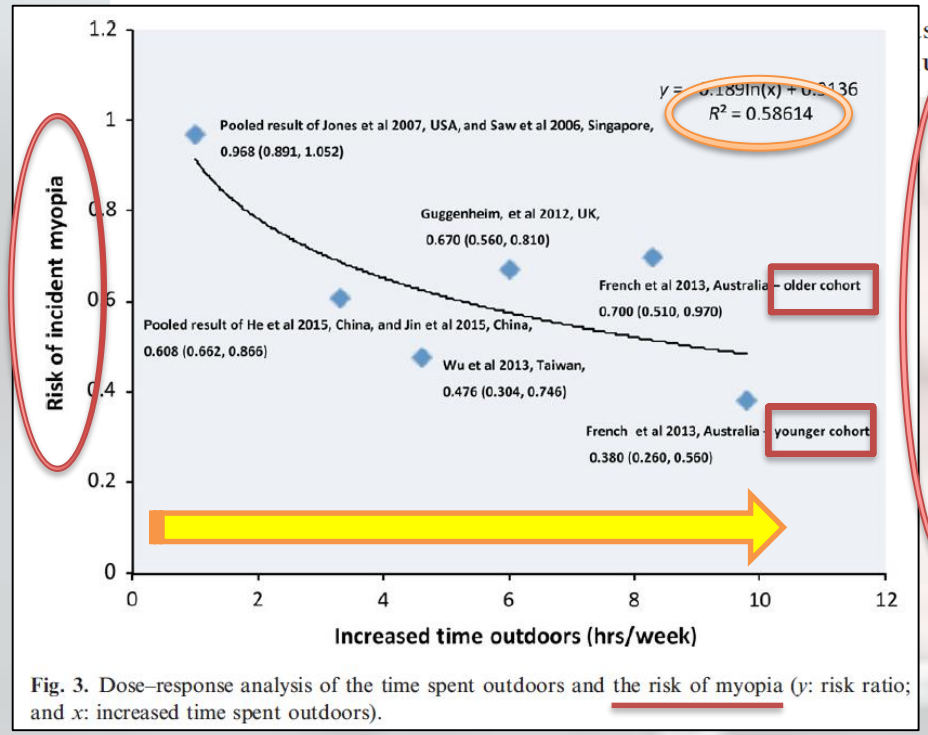


Fig. 3. Dose–response analysis of the time spent outdoors and the risk of myopia (*y*: risk ratio; and *x*: increased time spent outdoors).

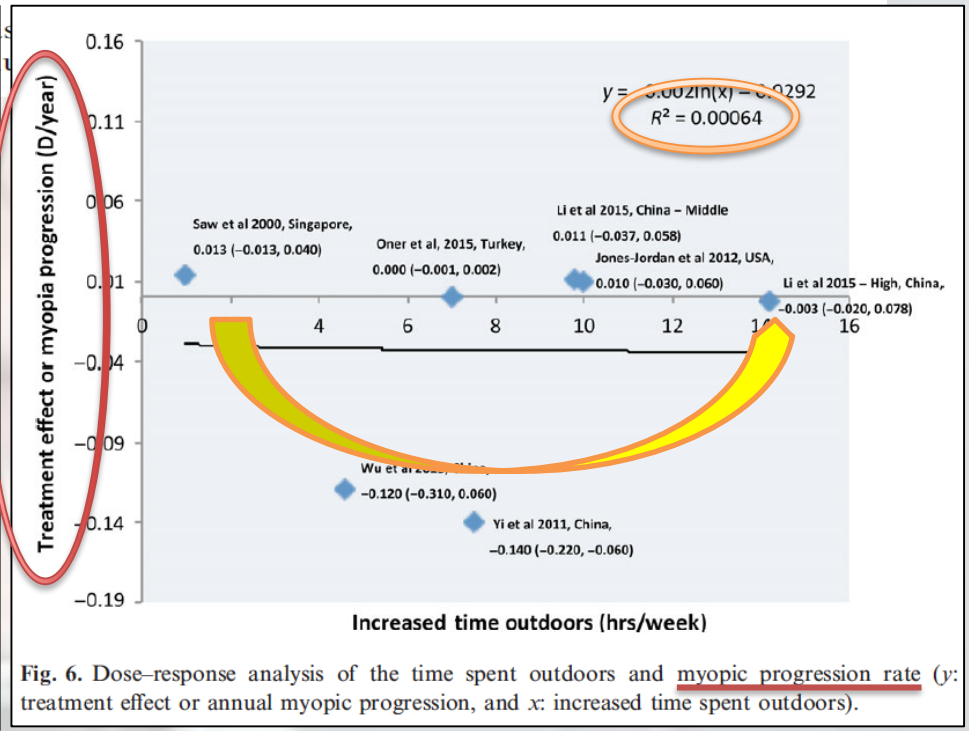


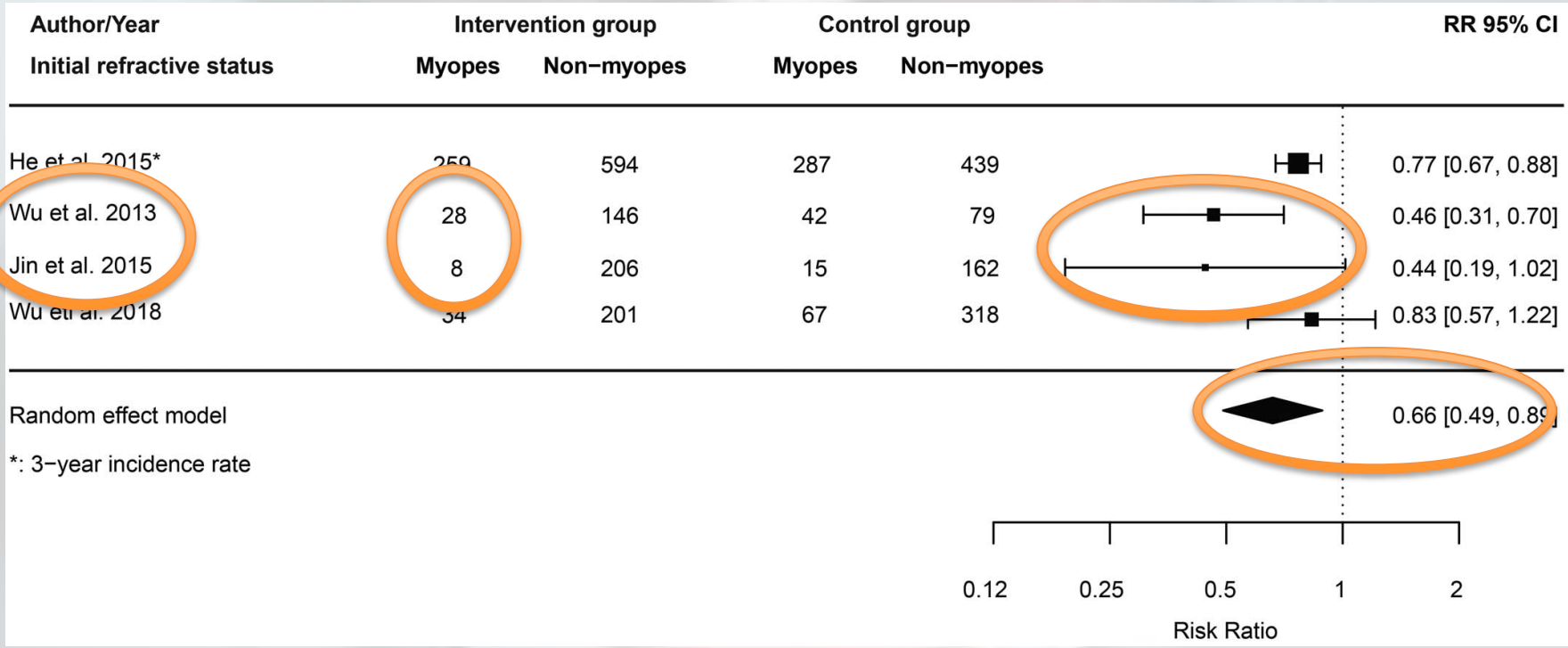
Fig. 6. Dose–response analysis of the time spent outdoors and myopic progression rate (*y*: treatment effect or annual myopic progression, and *x*: increased time spent outdoors).

ORIGINAL INVESTIGATION

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

Li Deng, PhD[1]* and Yi Pang, MD, OD, PhD[2]

Optom Vis Sci 2019;00:00–00. doi:10.1097/OPX.0000000000001357



ORIGINAL INVESTIGATION

Optom Vis Sci 2019; Vol 00(00)

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

Li Deng, PhD[1]* and Yi Pang, MD, OD, PhD[2]

Optom Vis Sci 2019;00:00–00. doi:10.1097/OPX.0000000000001357

TABLE 1. Characteristics of studies included in the meta-analysis

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
Jin 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.

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, MBChB, 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, DPhil[1]

Age (yrs)	8.45	1.81	8.54	1.71	8.23	1.83	8.42	1.72	0.62
Spherical equivalent (D)	−3.98	1.69	−3.71	1.85	−3.77	1.85	−3.85	1.95	0.72

> 14 h / week !

Outdoor activity (hours per day)*	2.28	0.89	2.04	0.81	2.20	0.92	2.30	1.04	0.15
Nearwork (dioptic hours per day)††	15.65	3.94	15.22	4.34	16.13	5.94	14.96	4.95	0.30

> 15 h / day !

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

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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, MBChB, 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, DPhil[1]

Atropine 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

Was heisst “Less side effects” ?

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

	Re-t		Untreated Children			
	Atropine 0.01% (N = 17)	*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)	0.872	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	(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	(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	(4.01)					
36 mos	(2.49)					
48 mos	11.37 (3.21)	0.059	0.03 (0.06)	0.02 (0.07)	0.02 (0.06)	0.440
60 mos	11.01 (3.20)	<0.001	0.01 (0.07)	0.07 (0.12)	0.27 (0.22)	<0.001
Final visit	(2.48)	0.434	−0.02 (0.05)	−0.02 (0.06)	−0.02 (0.06)	0.676
		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

6 D

(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

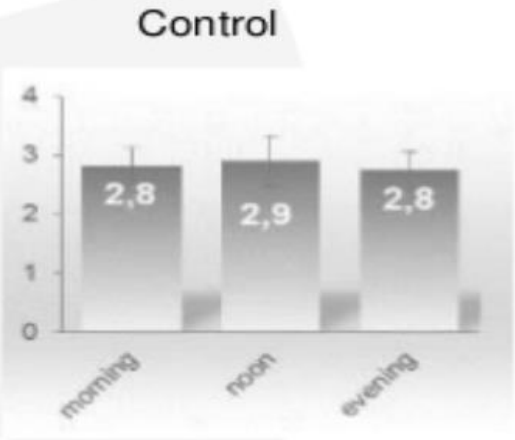
D = diopters; logMAR = logarithm of the minimum angle of resolution; SD = standard deviation.

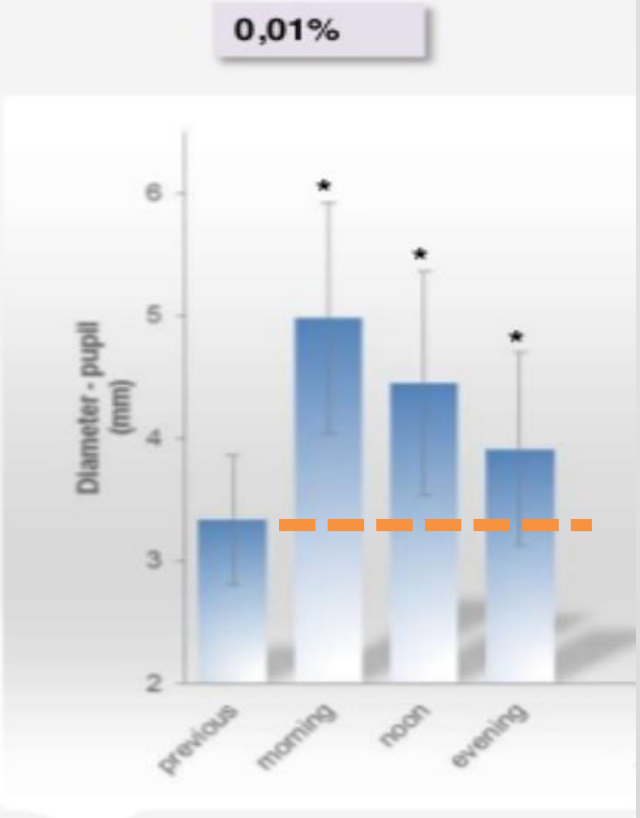
Was heisst “Less side effects” ?

Atropin – kurzfristige Veränderungen (1)

Pupillenweite

photopic





3.2mm -> 4.5mm = 40% grösser

10.24mm² -> 20.25mm² = 98% grösser

Lecture Dr. Hakan Kaymak, DOC 2017

Article

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

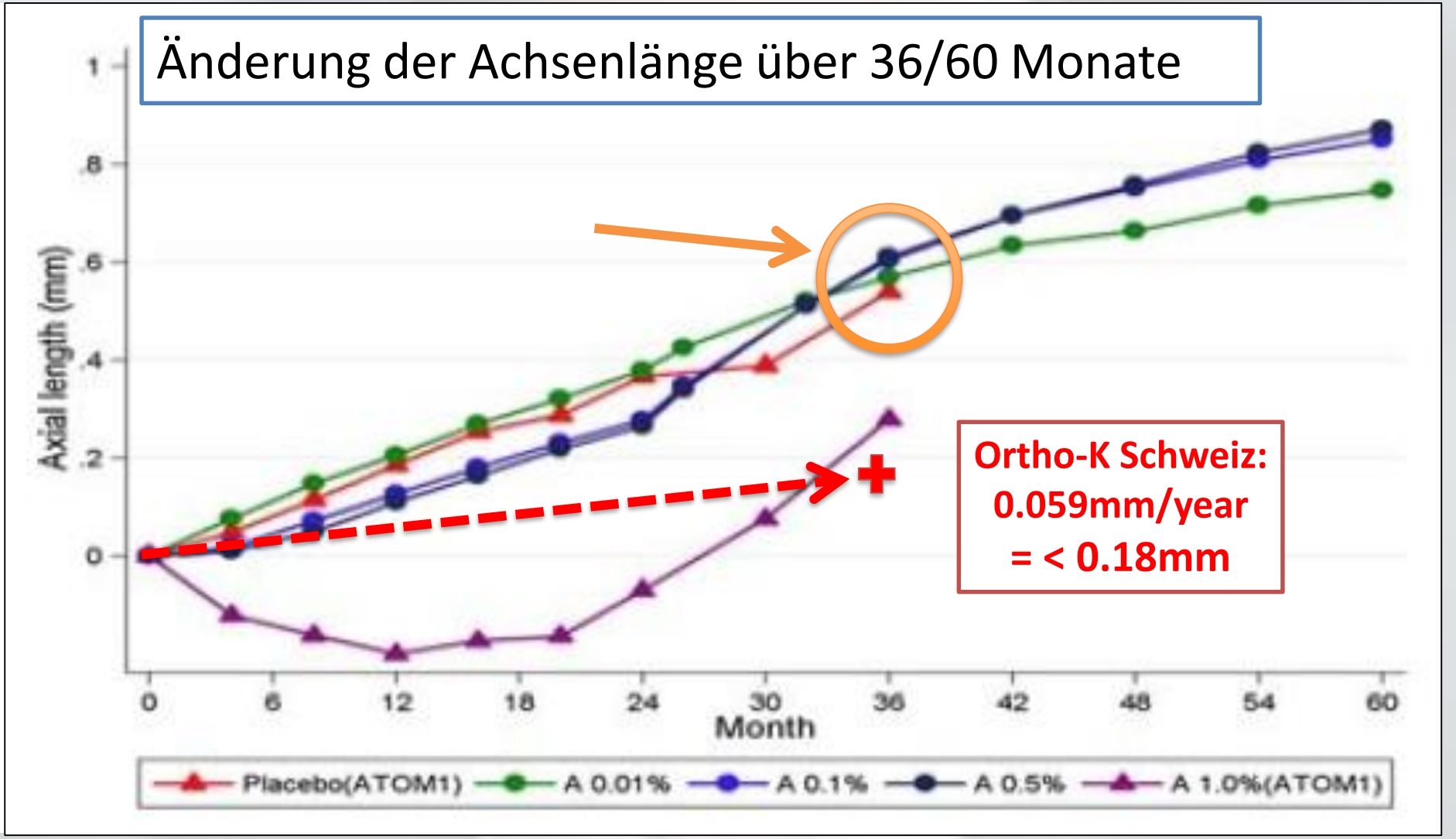
Table 2. The effect o 0.125% and 0.025% atropine on orthokeratology (OK)-treated patients with spherical equivalent ≥6 D.

	Atropine (0.125%)			Atropine (0.025%)		
	Yes (OA3) (*N* = 24)	No (OK3) (*N* = 29)	*p*-Value	Yes (OA4) (*N* = 20)	No (OK4) (*N* = 20)	*p*-Value
Age	11.0 ± 1.8	10.8 ± 1.8	>0.05	10.8 ± 1.2	10.9 ± 1.3	>0.05
Female: male #	1:1	1.07:1		1:1	1:1	
Axial length (mm)						
Baseline	25.21 ± 1.35	25.29 ± 1.78	>0.05	25.28 ± 1.53	25.65 ± 1.67	>0.05
2 years	25.78 ± 1.46	25.93 ± 1.94	0.021	25.86 ± 1.21	26.05 ± 1.57	0.011
Difference in axial length	0.57 ± 0.17	0.64 ± 0.14	0.015	0.58 ± 0.08	0.4 ± 0.15	0.023
Spherical equivalent (D)						
Baseline	6.75 ± 1.5	6.75 ± 1.5	>0.05	6.63 ± 1.56	6.67 ± 1.73	>0.05
2 years	7.0 ± 0.5	7.2 ± 0.75	0.028	7.12 ± 1.83	7.32 ± 1.87	0.027
Photopic pupil diameter						
Baseline	3.9 ± 0.5	3.8 ± 0.7	>0.05	3.8 ± 0.57	3.6 ± 0.63	>0.05
2 years	6.6 ± 0.4	3.5 ± 0.6	<0.001	6.0 ± 0.7	3.7 ± 0.5	<0.001
Mesopic pupil diameter						
Baseline	4.8 ± 0.6	4.5 ± 0.7	>0.05	4.8 ± 0.5	4.7 ± 0.6	>0.05
2 years	6.9 ± 0.6	4.5 ± 0.8	<0.001	6.8 ± 0.6	4.8 ± 0.5	<0.001

- Signifikante Pupillenvergrösserung mit Atropin: 206% to 286%

Atropin (1% vs 0.5% vs 0.1% vs 0.01%)

ATOM 2 Study



Chia et al.: Ophthalmology 2016

Atropin (1% vs 0.5% vs 0.1% vs 0.01%)

ATOM 2 Study

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.

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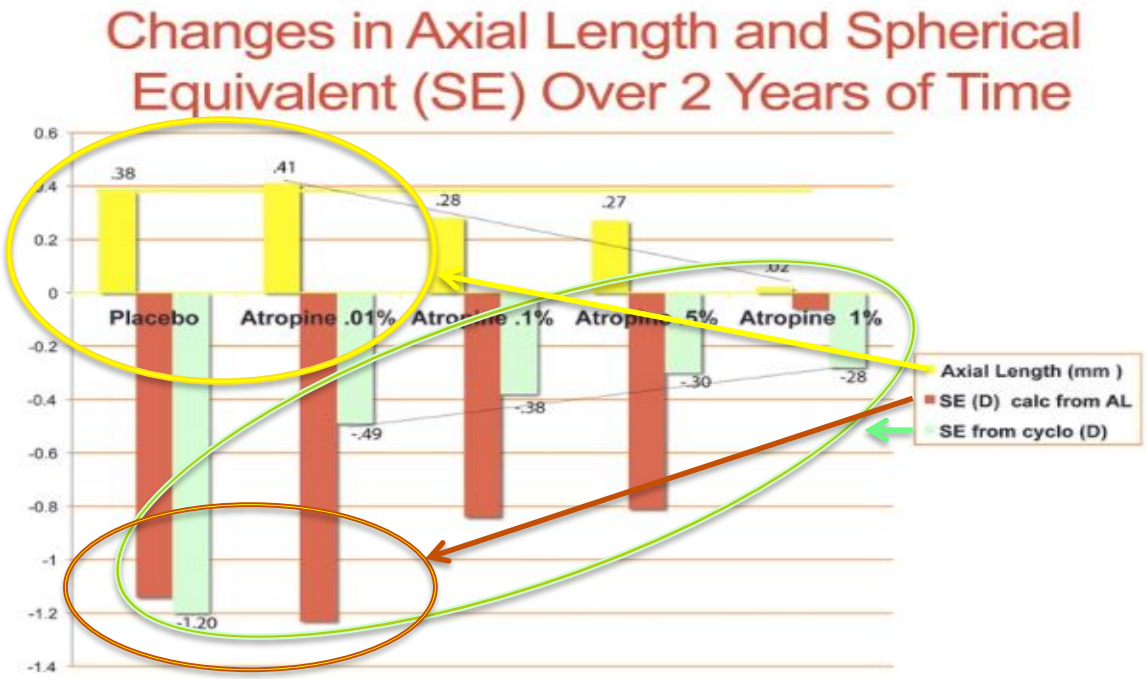
FIG. 10.



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)

$\neq$

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] Antony K.P. Law, MSc,[1] Joyce J. Chan, MRCSEd(Ophth),[1] Emily Wong, MBChB, 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, DPhil[1]

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

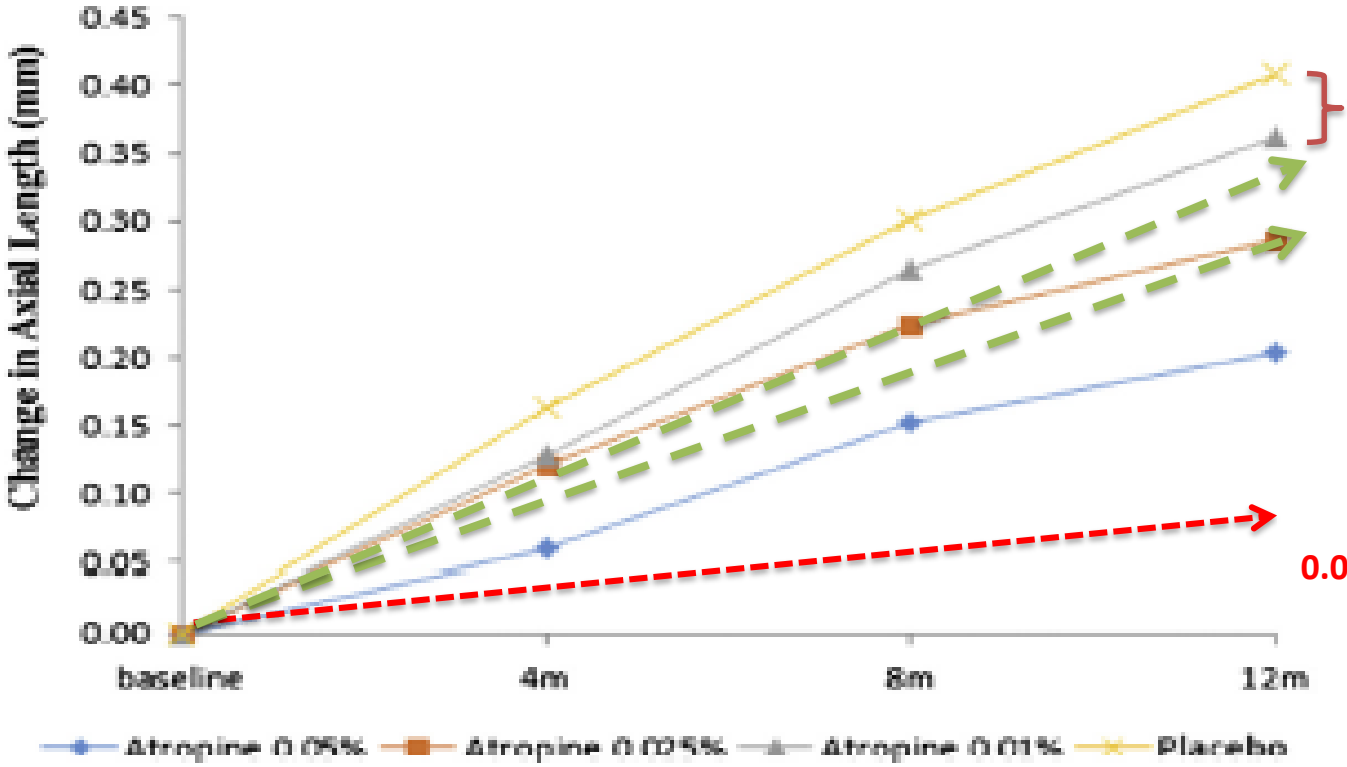


Figure 3. Change in axial length (AL) in treatment groups across time. m = month.

Wu et al: 0.28-0.33mm/year

Ortho-K Schweiz: 0.059mm/year

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%

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

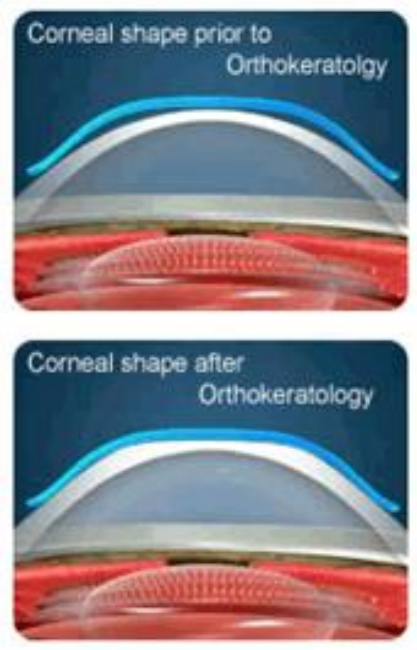
Am J Ophthalmol. 2013 Dec;156(6):1076-1081.e1. doi: 10.1016/j.ajo.2013.04.039.

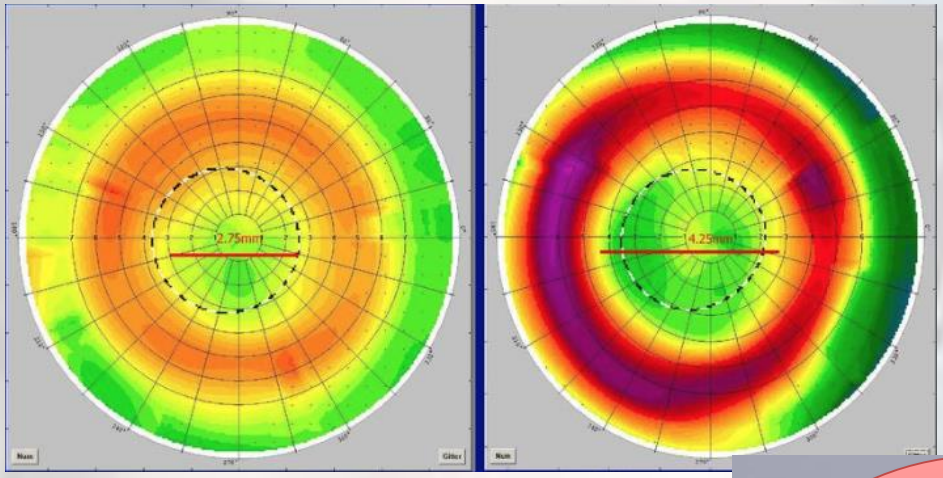
Conclusions

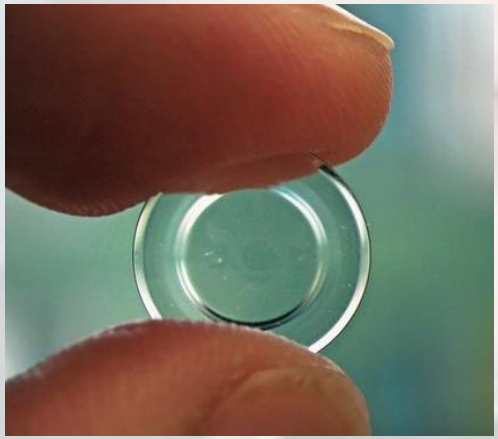
Studies show that the use of orthokeratology is a safe and efficacious nonsurgical treatment for myopia and that it is capable of slowing axial elongation, making it an effective myopic treatment for children.

Ortho-Keratologie

Kontrollierte Verformung der kornealen Topographie zur temporären Korrektur der Ammetropie (z.B. Myopie)







OPO OPHTHALMIC & PHYSIOLOGICAL OPTICS
THE JOURNAL OF THE COLLEGE OF OPTOMETRISTS

Ophthalmic & Physiological Optics ISSN 0275-5408

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

Takahiro Hiraoka[1], Yasuo Sekine[2], Fumiki Okamoto[1], Toshifumi Mihashi[1] and Tetsuro Oshika[1]

[1]Faculty of Medicine, Department of Ophthalmology, University of Tsukuba, Ibaraki, and [2]Kashiwa 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

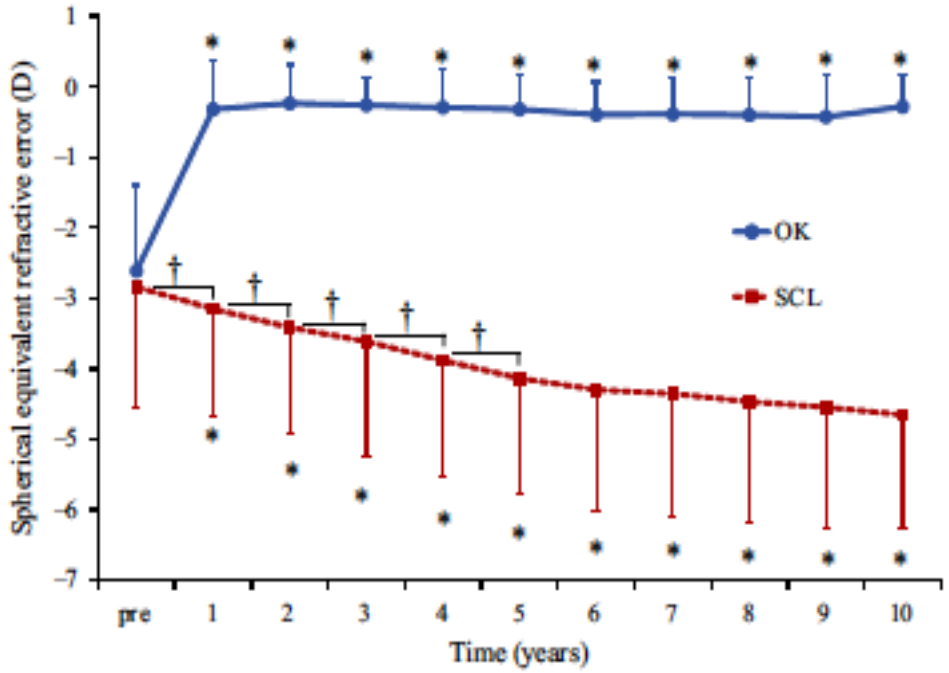


Figure 1. Changes over time in manifest refraction for the OK and SCL groups. OK, orthokeratology; SCL, soft contact lens. *Statistically significant differences compared to the baseline value by the Bonferroni *post-hoc* test. †Statistically significant differences between successive years by the Bonferroni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

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-

Optom Vis Sci. 2019 Jan;96(1):43-47. doi: 10.1097/OPX.0000000000001315.

Effect of Orthokeratology on Axial Length Elongation in Anisomyopic Children.

Zhang Y[1], Chen Y.

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

	More myopic eyes (n = 49)	Less myopic eyes (n = 49)	*P*
Baseline axial length (mm)	25.33 ± 0.87	24.61 ± 0.86	<.0001
1-y axial length (mm)	25.36 ± 0.86	24.73 ± 0.84	<.0001
2-y axial length (mm)	25.42 ± 0.92	24.86 ± 0.89	<.0001
1-y axial elongation (mm)*	0.03	0.10	<.0001
2-y axial elongation (mm)*	0.08	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/$\bar{x}$ ± SD)

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

*Axial elongation data are presented as median values.

Der Ophthalmologe

Published online: 01 March 2019

Leitlinien, Stellungnahmen und Empfehlungen

Ophthalmologe
https://doi.org/10.1007/s00347-019-0874-6

Berufsverband der Augenärzte Deutschlands e. V. (BVA)[1] · Deutsche Ophthalmologische Gesellschaft (DOG)[2]

[1] Berufsverband der Augenärzte Deutschlands e. V., Düsseldorf, Deutschland

[2] Deutsche Ophthalmologische Gesellschaft, München, Deutschland

Empfehlungen bei progredienter Myopie im Kindes- und Jugendalter

Stellungnahme von DOG und BVA. Stand Dezember 2018

tes Atropin in einer Konzentration von 0,01 % die Myopieprogression signifikant mindert. Das Ausmaß der Progressionsminderung liegt bei bis zu 50 %. Das Si-

Vergleichbare progressionsmindernde Effekte von bis zu 50 % werden der Orthokeratologie nachgesagt [28–30].

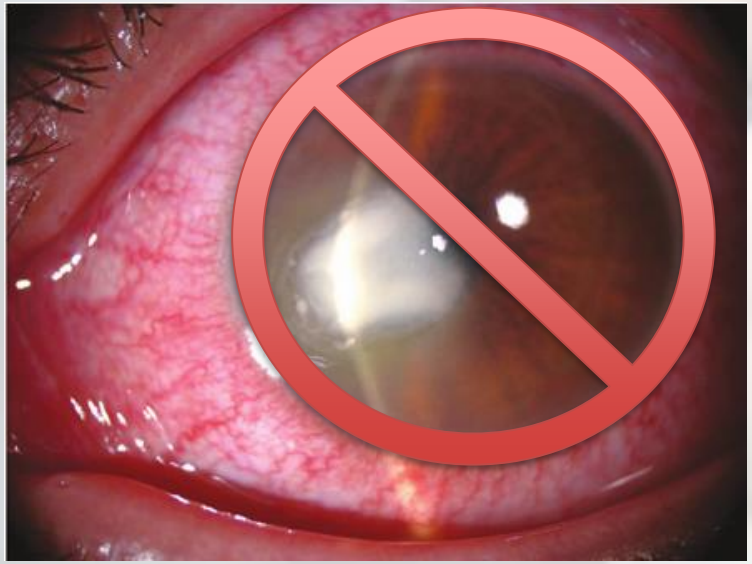
Ortho-Keratologie und MK !

AMERICAN JOURNAL OF OPHTHALMOLOGY®

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.

AMERICAN ACADEMY OF OPHTHALMOLOGY®

(*Eye & Contact Lens* 2018;44: 330–334)

ARTICLE

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.

Spielt die Ortho-K Anpassqualität eine Rolle ?

China, July 2018

OK “fitting rally”, 5 Kliniken in 3 Wochen

150-300 Patienten pro Tag !

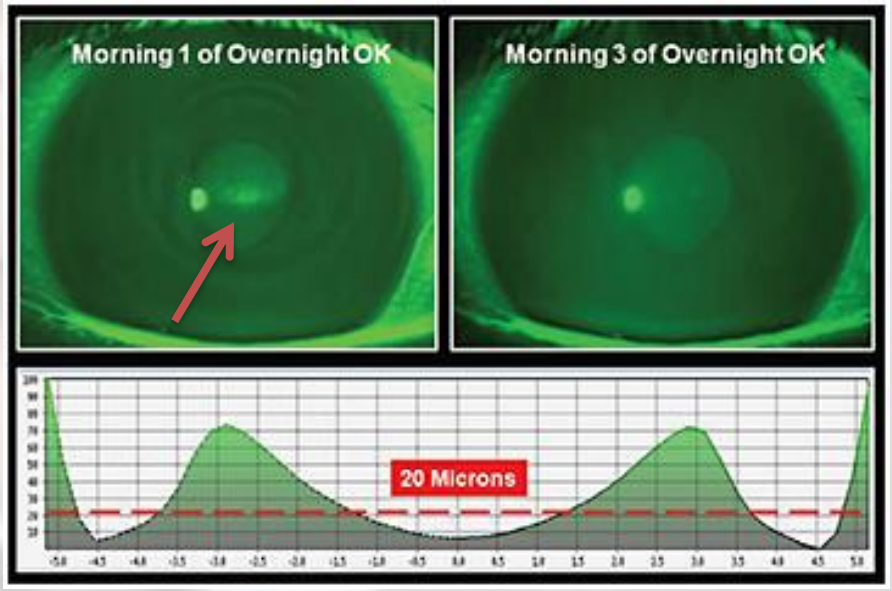
Schlaglicht der Schweizerischen Ophthalmologischen Gesellschaft

Refraktion und Kontaktlinsen

Dr. med. Albert Franceschetti

Präsident der Kontaktlinsenkommission der Schweizerischen Ophthalmologischen Gesellschaft, Meyrin

Myopie ist weltweit ein ernsthaftes Problem. Zwei Behandlungsmethoden gelten als wirksam. Bei weichen Kontaktlinsen gibt es drei Fehler, die es zu vermeiden gilt.



Schlaglicht der Schweizerischen Ophthalmologischen Gesellschaft

Refraktion und Kontaktlinsen

Dr. med. Albert Franceschetti
Präsident der Kontaktlinsenkommission der Schweizerischen Ophthalmologischen Gesellschaft, Meyrin

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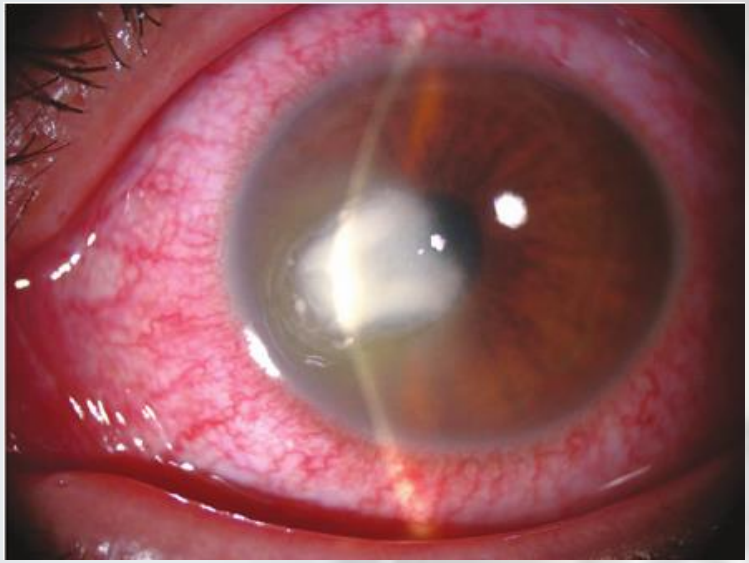
Albert Franceschetti

Orthokeratologie darf nur von Fachleuten durchgeführt werden. Bisher wird sie erst von wenigen Optometristen angewendet und ist kostenintensiv, was ihre Anwendung begrenzt. Darüber hinaus besteht bei dieser Behandlungsform ein Infektionsrisiko. In orientalischen Ländern kam es häufig zu Infektionen, jedoch nur, weil dort die Hygieneregeln nicht korrekt befolgt wurden, und die Methode von Nichtfachleuten unsachgemäss angewendet wurde.

Bei uns hingegen werden die Hygienevorschriften im Allgemeinen beachtet und Anweisungen der Fachleute besser eingehalten. Überdies sind Optometristen, die diese Behandlungsmethode anbieten, seriöse Fachpersonen. Zudem verfügen die heutigen Kontaktlinsen über eine hohe Sauerstoffpermeabilität, wodurch die Hornhaut ausreichend mit Sauerstoff versorgt wird.



„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 MA[1], Sinnott LT, Jones-Jordan LA.

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

„Serious Adverse Events After Cataract Surgery“

42.08 cases / 1‘000 Px

Clinical Ophthalmology

Open Access Full Text Article

Endophthalmitis: state of the art

Kamyar Vaziri
Stephen G Schwartz
Krishna Kishor
Harry W Flynn Jr

Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, USA

This article was published in the following Dove Press journal:
Clinical Ophthalmology
8 January 2015
Number of times this article has been viewed

Published in final edited form as:
Curr Opin Ophthalmol. 2012 May ; 23(3): 219–225. doi:10.1097/ICU.0b013e3283524068.

Serious Adverse Events After Cataract Surgery

Joshua D. Stein, MD, MS
Department of Ophthalmology and Visual Sciences, University of Michigan Medical School

OPO OPHTHALMIC & PHYSIOLOGICAL OPTICS
THE JOURNAL OF THE COLLEGE OF OPTOMETRISTS

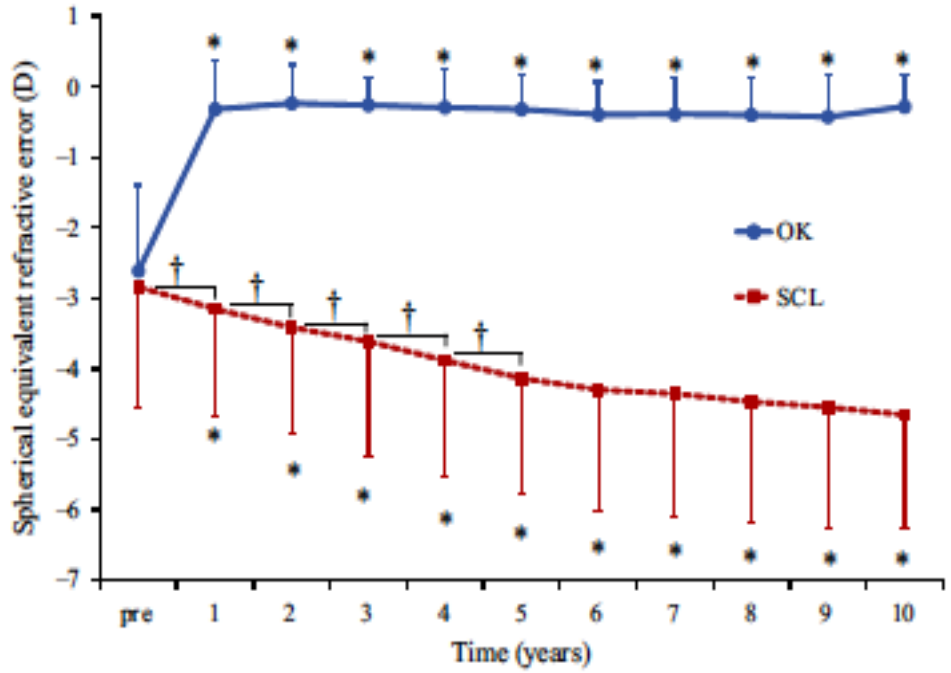
Ophthalmic & Physiological Optics ISSN 0275-5408

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

Takahiro Hiraoka[1], Yasuo Sekine[2], Fumiki Okamoto[1], Toshifumi Mihashi[1] and Tetsuro Oshika[1]

[1]Faculty of Medicine, Department of Ophthalmology, University of Tsukuba, Ibaraki, and [2]Kashiwa 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.

Ortho-Keratologie

fifth ($P = 0.8633$) years. There were no severe complications throughout the study period.

CONCLUSIONS. The current 5-year follow-up study indicated that OK can suppress axial length elongation in childhood myopia. (*Invest Ophthalmol Vis Sci.* 2012;53:3913–3919) DOI: 10.1167/iovs.11-8453

- Sicher und effizient (Hiraoka et al.: IOVS 2012)
- Keine KL oder Brillen tagsüber
- Keine Pupillengrösse, Pupillendynamik oder Akkommodationsveränderungen
- Maximaler Effekt aller KL Therapien auf die Hemmung des Achsenlängenwachstums
- Kinder sind sehr gut für Ortho-K geeignet

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 ± SD (years)	12.3 ± 2.4	12.2 ± 1.9	12.1 ± 1.5
Moderate or high myopic parents (%)	57	86	71
Follow-up mean ± SD (days)	604.5 ± 180.0	744.5 ± 82.6	595.7 ± 154.9
SE refractive error at first visit, mean ± SD (D)	-2.841 ± 1.510	-4.212 ± 1.720	-2.949 ±1.333
Annual change of SE refraction error, mean ± SD (D)	non available	-0.333 ± 0.257	-0.301 ± 0.255
Axial length at first visit, mean ± SD (mm)	24.566 ± 0.997	25.369 ± 0.965	24.381 ± 1.014
Annual change of axial length, mean ± SD (mm)	0.059 ± 0.072	0.175 ± 0.081	0.131 ± 0.094

+ + - -

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

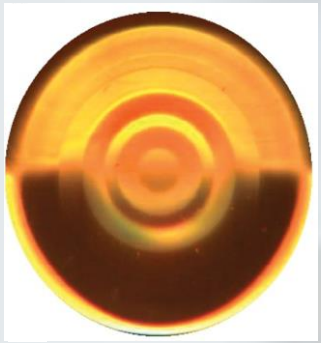
Results

138 eyes of 71 patients between the age of 7 and 18 years, mean 12.9 ± SD 2.1 years, were included, 12 patients (7 females, 5 males) choosing otho-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 availabe 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 ± 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.

Weiche Eintages Kontaktlinsen



MiSight (COOPER Vision) “Dual-Focus Lens”

Lloyd's Register
LRQA

EC CERTIFICATE – FULL QUALITY ASSURANCE SYSTEM

In accordance with the requirements of the Medical Devices Directive 93/42/EEC and the Medical Devices Regulations 2002, UK Statutory Instrument 2002 No. 618

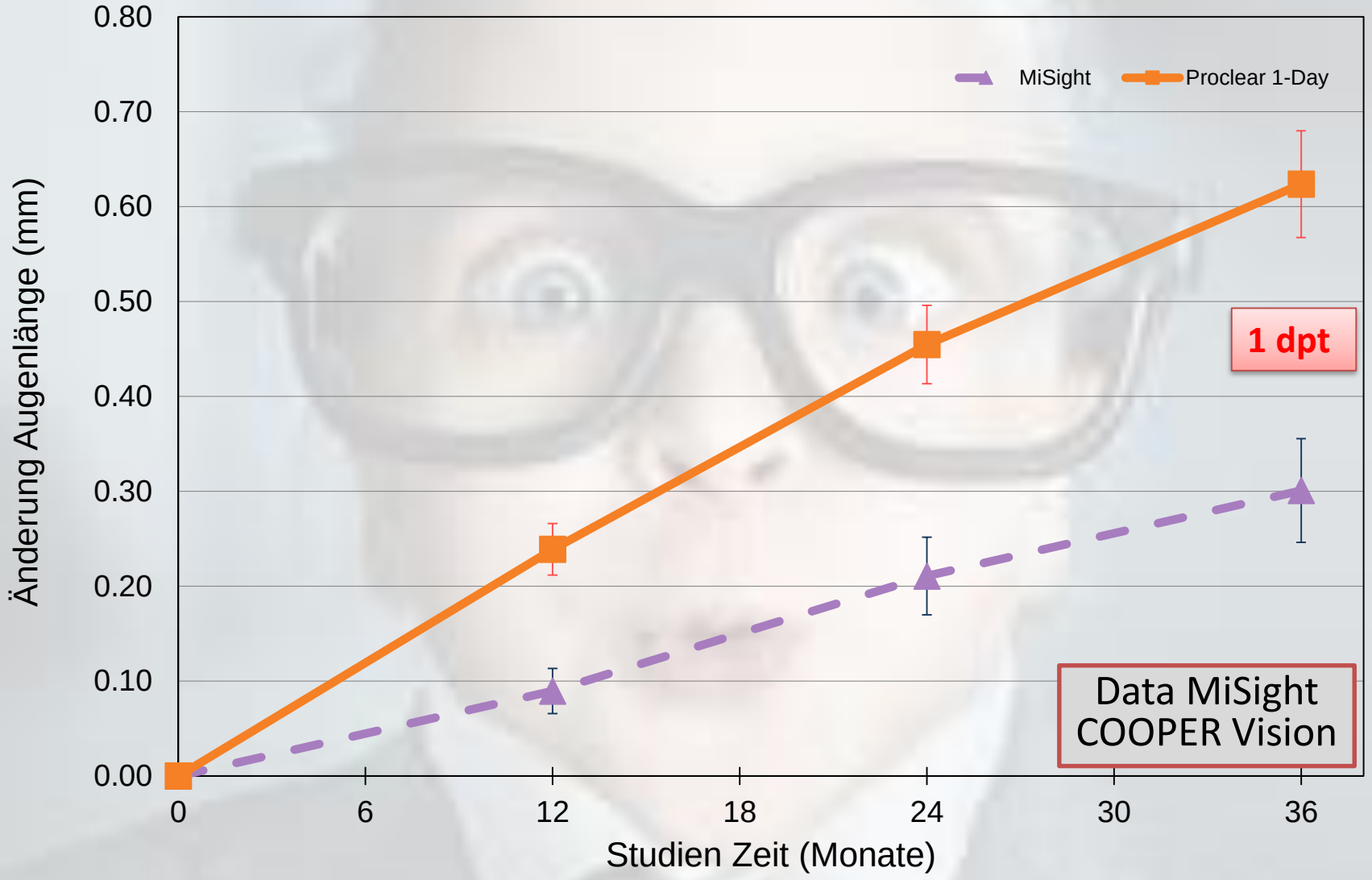
Soft (hydrophilic) contact lens products for the control of myopia:

Omafilcon A soft contact lens products for daily disposable wear

Somofilcon A soft contact lens products for daily disposable wear

3 years longitudinal results

MiSight® 1-Day vs Proclear 1-Day



AMERICAN ACADEMY OF OPHTHALMOLOGY®

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

REVIEW ARTICLE

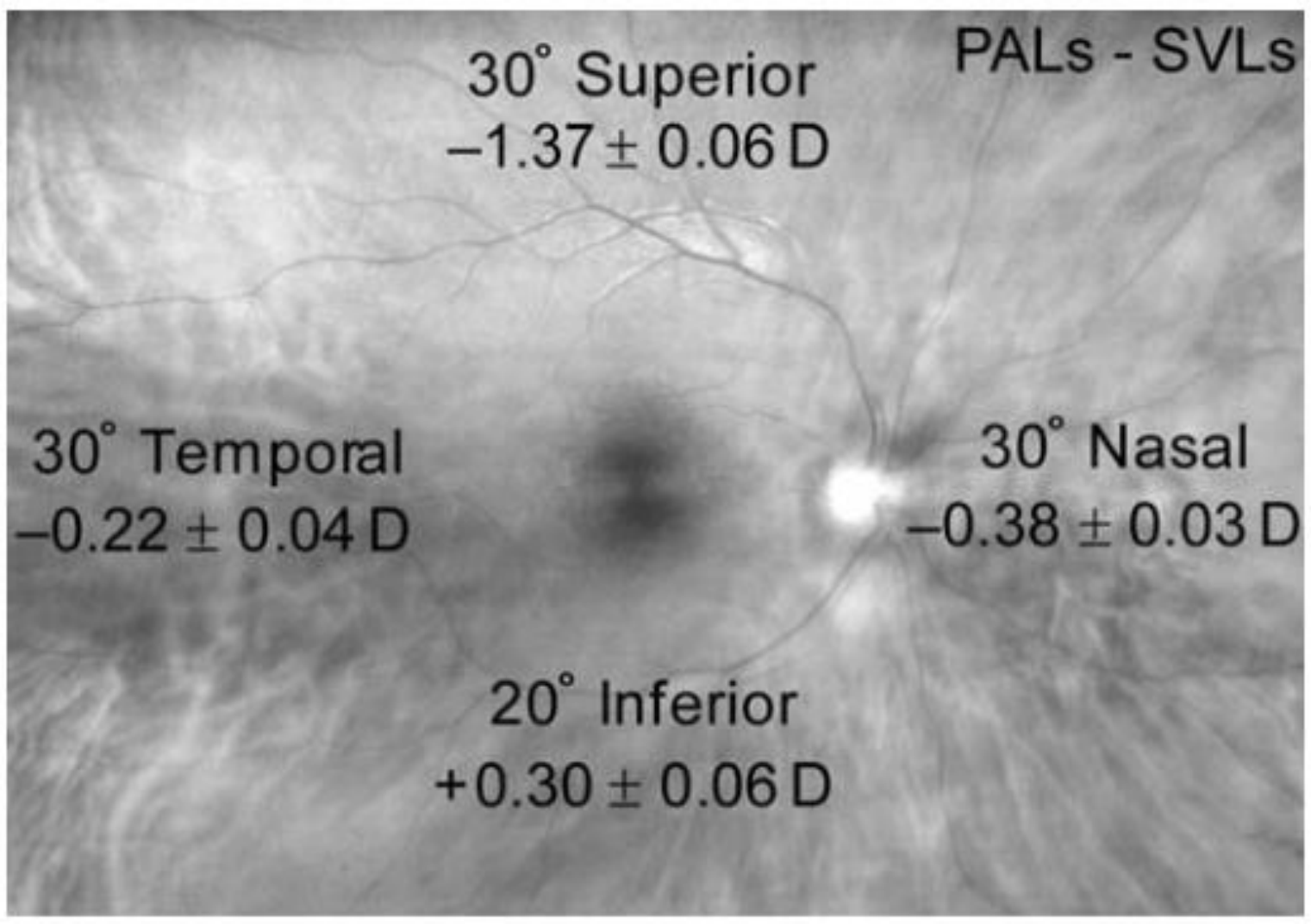
OPEN

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

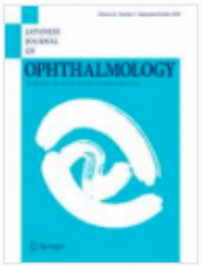
Jeffrey Cooper, M.S., O.D., F.A.A.O. and Andrei V. Tkatchenko, M.D., Ph.D.

Treatment	Meta	Cooper
Atropine high dosage	65%	85%
Atropine moderate dosage	65%	76%
Atropine low dosage	45%	60%
Ortho K	45%	45%
Multifocal soft contact lens	33%	40%
Progressive Lens/Bifocals	12%	16%
Single Vision	0%	0%
Undercorrection	-9%	-8%

Retinaler Defokus mit PAL (Gleitsichtglas)



Berntsen, Barr, Mutti, Zadnik: IOVS 2013



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

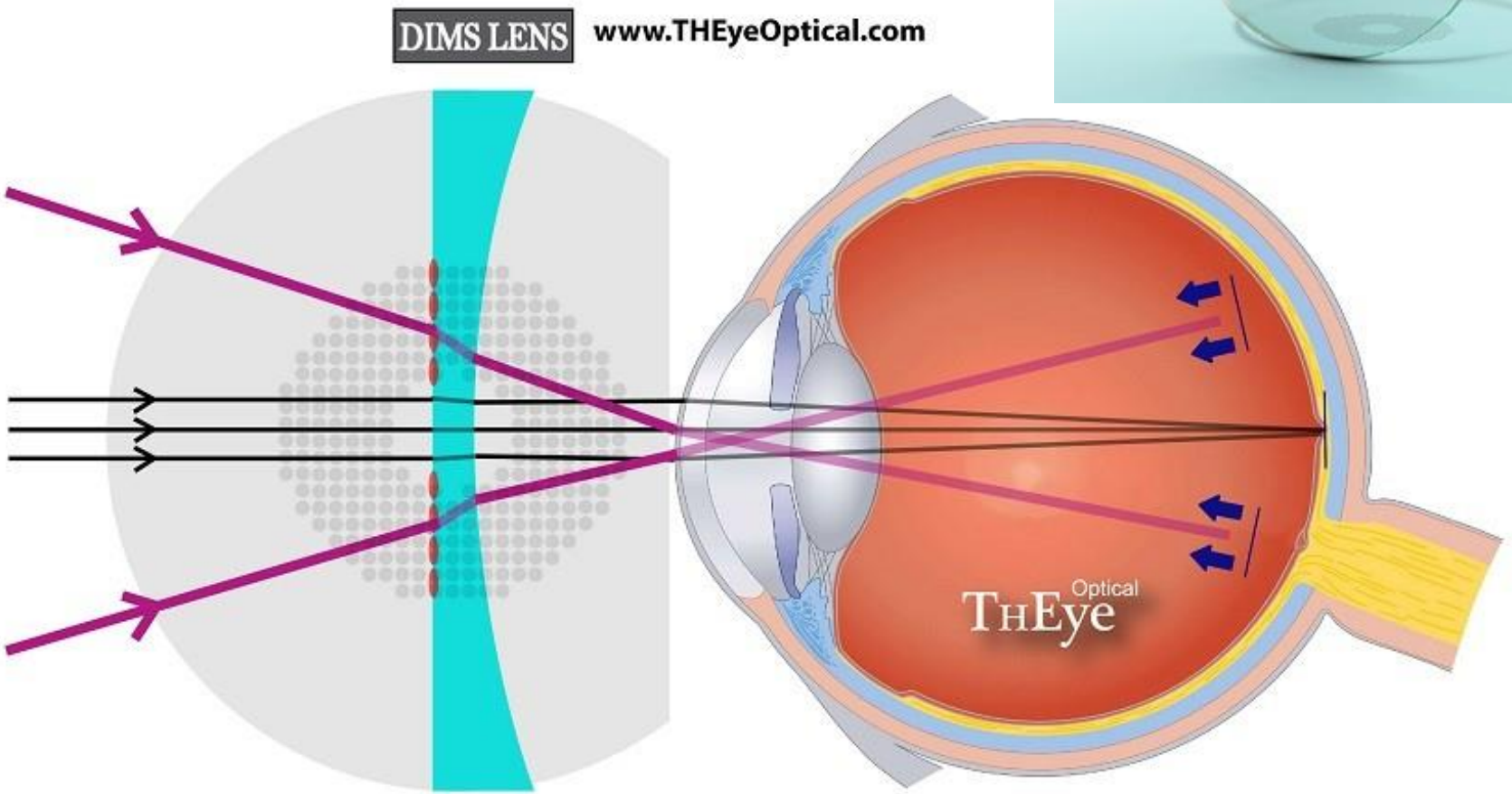
Hiroyuki Kanda, Tetsuro Oshika, Takahiro Hiraoka, Satoshi Hasebe, Kyoko Ohno-Matsui, Satoshi Ishiko, Osamu Hieda, Hidemasa Torii, Saulius R. Varnas, Takashi Fujikado

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.

DIMS LENS【MyoSmart】



Media Releases

2018.04.18

Spectacle lens designed by PolyU slows myopic progression by 60% and stops in 21.5% of children

A specially designed spectacle lens developed by The Hong Kong Polytechnic University (PolyU) was found to have slowed down myopia progress by 60% in participating children, and 21.5% of them had their myopic progression halted completely. This lens will be launched in summer this year, offering a non-contact, spectacle lens solution to myopic children.

The Defocus Incorporated Multiple Segments (DIMS)

Table 1

Changes in Cycloplegic auto-refraction in SER (D)

Mean ± SD	DIMS (n=79)	Control (n=81)	Mean diff ± SE (p value)
6-month	-0.13 ± 0.30	-0.37 ± 0.34	-0.24 ± 0.05 (<0.0001****)
12-month	-0.17 ± 0.47	-0.55 ± 0.38	-0.38 ± 0.07 (<0.0001****)
18-month	-0.31 ± 0.50	-0.72 ± 0.49	-0.42 ± 0.08 (<0.0001****)
24-month	-0.38 ± 0.53	-0.93 ± 0.58	-0.55 ± 0.09 (<0.0001****)

Table 2

Changes in axial length (mm)

Mean ± SD	DIMS (n=79)	Control (n=81)	Mean diff ± SE (p value of unpaired t-test)
6-month	0.03 ± 0.13	0.20 ± 0.10	0.16 ± 0.02 (<0.0001****)
12-month	0.11 ± 0.15	0.32 ± 0.16	0.21 ± 0.02 (<0.0001****)
18-month	0.15 ± 0.18	0.43 ± 0.19	0.27 ± 0.03 (<0.0001****)
24-month	0.21 ± 0.22	0.53 ± 0.24	0.31 ± 0.04 (<0.0001****)

Atropine AND Contact Lenses

	Wirkungsweise	Effekt nachgewiesen	Einfachheit der Anwendung	Kosten	Medikamentöse Nebenwirkungen	Optische Nebenwirkungen	Rebound Effekt nach Absetzten	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 !)	+/- 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 Unverträglich-keit
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

Syngergie: 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.

Syngergie: Atropin **UND** Kontaktlinse

Journal of *Clinical Medicine*

MDPI

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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Syngergie: Atropin **UND** Kontaktlinse

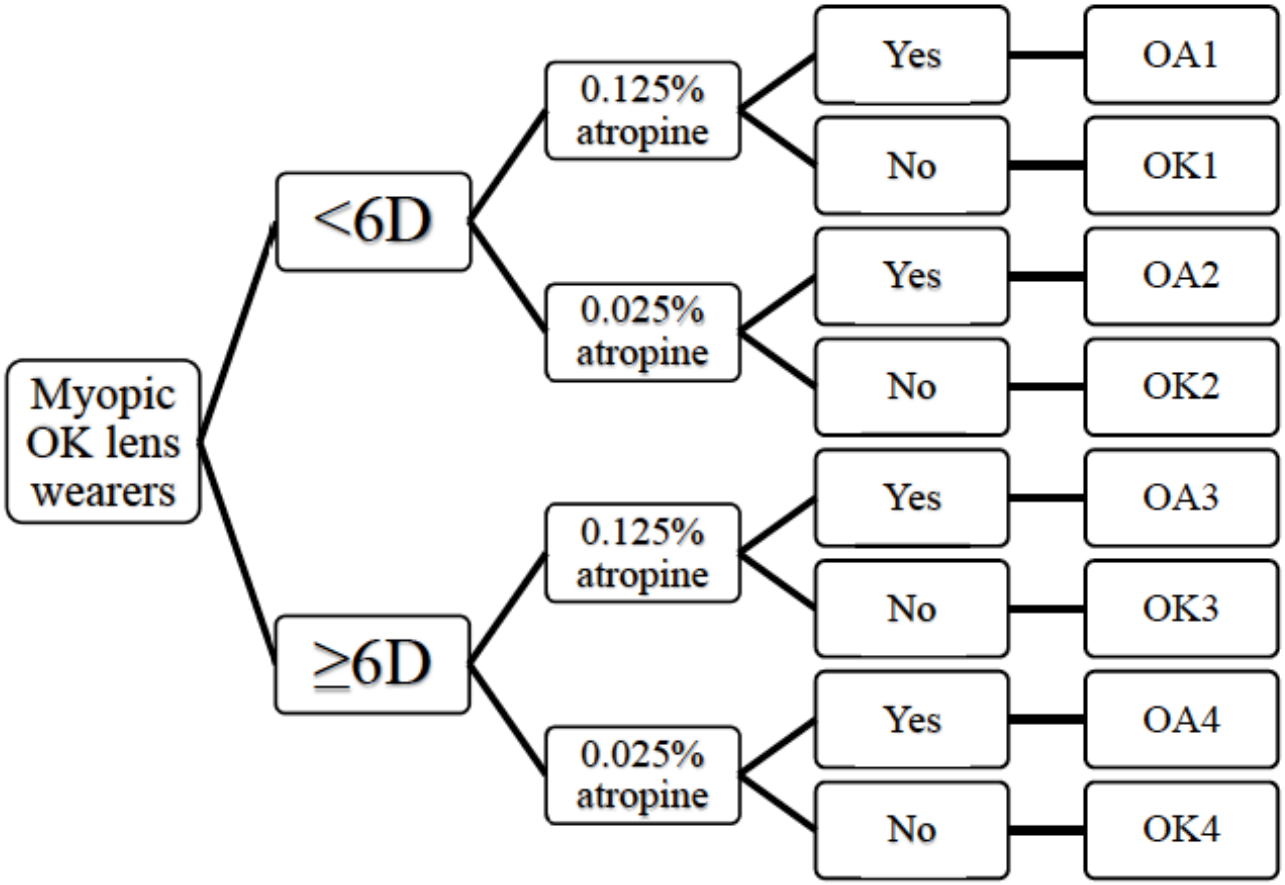


Figure 1. Treatments and groupings of subjects (OK—orthokeratology; OA—orthokeratology + atropine).

Syngergie: Atropin **UND** Kontaktlinse

Table 1. The effect of 0.125% and 0.025% atropine on orthokeratology (OK)-treated patients with spherical equivalent <6 D.

	Atropine (0.125%)			Atropine (0.025%)		
	Yes (OA1) (N = 20)	No (OK1) (N = 26)	p-Value	Yes (OA2) (N = 20)	No (OK2) (N = 20)	p-Value
Age	10.6 ± 1.2	10.2 ± 1.7	>0.05	10.4 ± 1.3	10.3 ± 1.4	>0.05
Female: male #	1:1	1:1		1:1	1:1	
Axial length (mm)						
Baseline	24.12 ± 1.28	24.32 ± 1.53	>0.05	24.08 ± 1.31	24.19 ± 1.24	>0.05
2 years	24.67 ± 1.33	24.9 ± 1.98	0.042	24.73 ± 1.53	25.01 ± 1.26	0.031
Difference in axial length	0.55 ± 0.12	0.58 ± 0.09	0.022	0.65 ± 0.18	0.83 ± 0.16	0.029
Spherical equivalent (D)						
Baseline	4.25 ± 1.75	4.25 ± 1.25	>0.05	4.53 ± 1.23	4.63 ± 1.35	>0.05
2 years	4.75 ± 0.75	4.8 ± 0.5	0.041	4.83 ± 1.12	5.13 ± 1.56	0.039
Accommodation						
Baseline	16.2 ± 3.1	16.7 ± 3.4	>0.05	16.3 ± 3.2	16.5 ± 3.4	>0.05
2 years	4.2 ± 2.7	16.3 ± 3.2	<0.001	4.6 ± 1.56	16.4 ± 3.2	<0.001

- Zusätzlicher positiver Effekt in 3 von 4 Gruppen

Syngergie: Atropin **UND** Kontaktlinse

Table 2. The effect of 0.125% and 0.025% atropine on orthokeratology (OK)-treated patients with spherical equivalent ≥6 D.

	Atropine (0.125%)			Atropine (0.025%)		
	Yes (OA3) (*N* = 24)	No (OK3) (*N* = 29)	*p*-Value	Yes (OA4) (*N* = 20)	No (OK4) (*N* = 20)	*p*-Value
Age	11.0 ± 1.8	10.8 ± 1.8	>0.05	10.8 ± 1.2	10.9 ± 1.3	>0.05
Female: male #	1:1	1.07:1		1:1	1:1	
Axial length (mm)						
Baseline	25.21 ± 1.35	25.29 ± 1.78	>0.05	25.28 ± 1.53	25.65 ± 1.67	>0.05
2 years	[illegible]	[illegible]	0.021	[illegible]	[illegible]	0.011
Difference in axial length	0.57 ± 0.17	0.64 ± 0.14	0.015	0.58 ± 0.08	0.4 ± 0.15	0.023
Spherical equivalent (D)						
Baseline	6.75 ± 1.5	6.75 ± 1.5	>0.05	6.63 ± 1.56	6.67 ± 1.73	>0.05
2 years	7.0 ± 0.5	7.2 ± 0.75	0.028	7.12 ± 1.83	7.32 ± 1.87	0.027
Accommodation						
Baseline	[illegible]	[illegible]	>0.05	[illegible]	[illegible]	>0.05
2 years	3.8 ± 2.9	15.9 ± 3.8	<0.001	3.9 ± 2.01	16.6 ± 2.9	<0.001

- Zusätzlicher positiver Effekt in 3 von 4 Gruppen
- Signifikante Reduktion der Akkommodation von 16D auf 4D

Syngergie: Atropin **UND** Kontaktlinse

Table 2. The effect of 0.125% and 0.025% atropine on orthokeratology (OK)-treated patients with spherical equivalent ≥6 D.

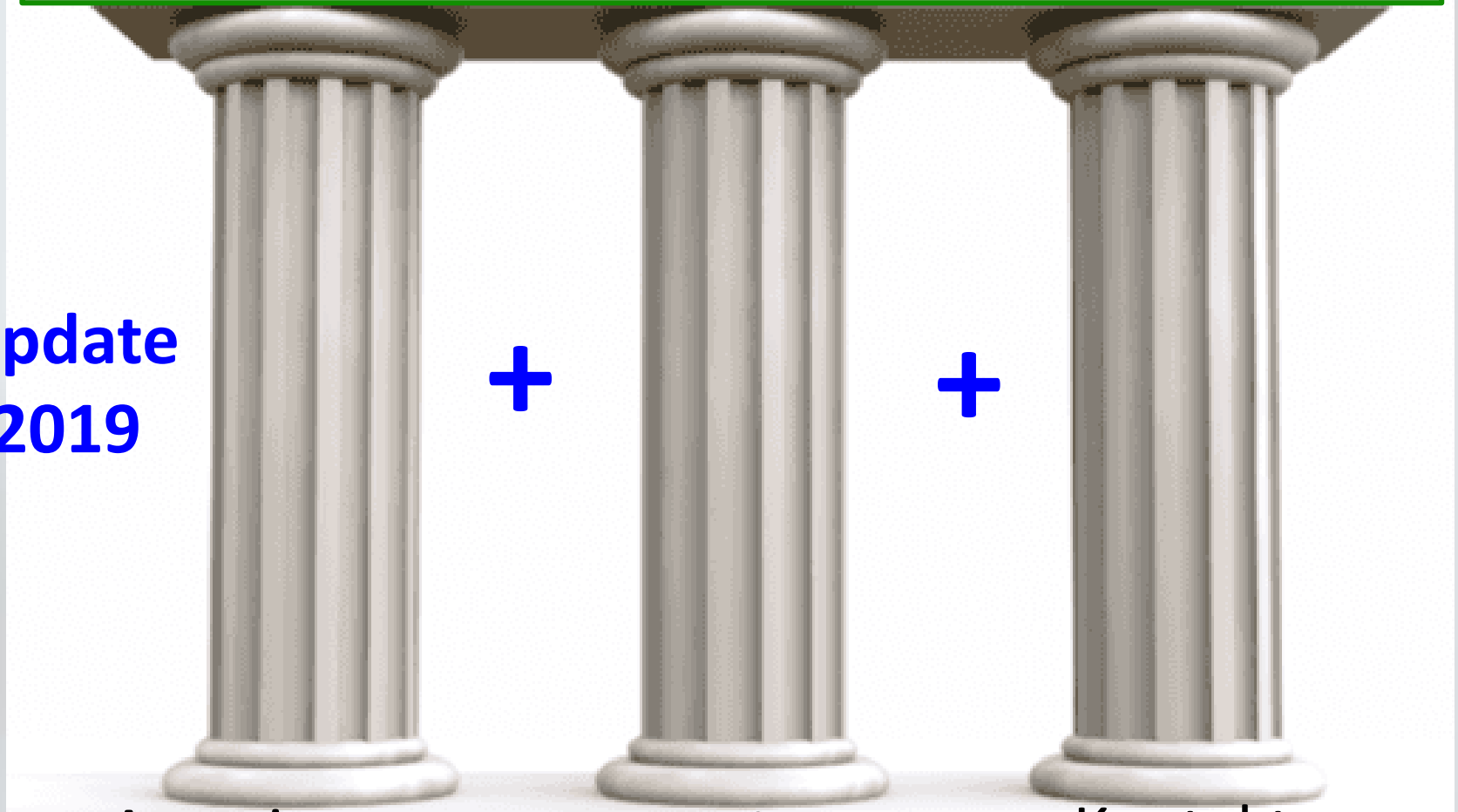
	Atropine (0.125%)			Atropine (0.025%)		
	Yes (OA3) (*N* = 24)	No (OK3) (*N* = 29)	*p*-Value	Yes (OA4) (*N* = 20)	No (OK4) (*N* = 20)	*p*-Value
Age	11.0 ± 1.8	10.8 ± 1.8	>0.05	10.8 ± 1.2	10.9 ± 1.3	>0.05
Female: male #	1:1	1.07:1		1:1	1:1	
Axial length (mm)						
Baseline	25.21 ± 1.35	25.29 ± 1.78	>0.05	25.28 ± 1.53	25.65 ± 1.67	>0.05
2 years	25.78 ± 1.46	25.93 ± 1.94	0.021	25.86 ± 1.21	26.05 ± 1.57	0.011
Difference in axial length	0.57 ± 0.17	0.64 ± 0.14	0.015	0.58 ± 0.08	0.4 ± 0.15	0.023
Spherical equivalent (D)						
Baseline	6.75 ± 1.5	6.75 ± 1.5	>0.05	6.63 ± 1.56	6.67 ± 1.73	>0.05
2 years	7.0 ± 0.5	7.2 ± 0.75	0.028	7.12 ± 1.83	7.32 ± 1.87	0.027
Photopic pupil diameter						
Baseline	3.9 ± 0.5	3.8 ± 0.7	>0.05	3.8 ± 0.57	3.6 ± 0.63	>0.05
2 years	6.6 ± 0.4	3.5 ± 0.6	<0.001	6.0 ± 0.7	3.7 ± 0.5	<0.001
Mesopic pupil diameter						
Baseline	4.8 ± 0.6	4.5 ± 0.7	>0.05	4.8 ± 0.5	4.7 ± 0.6	>0.05
2 years	6.9 ± 0.6	4.5 ± 0.8	<0.001	6.8 ± 0.6	4.8 ± 0.5	<0.001

- Signifikante Erweiterung der Pupille mit Atropin: + 135% to 256%

Das Schutz-Prinzip des Myopie Managements

Konsequente Nachbetreuung und Kooperation

Update 2019



Atropin	Outdoor	Kontakt-
0.01-0.05%	Tageslicht	linsen
ALTER **Bsp. 5 – 9+ Jahre**	**0 – >16 Jahre**	**Bsp. 8 – >16 Jahre**

Der Ophthalmologe

Leitlinien, Stellungnahmen und Empfehlungen

Berufsverband der Augenärzte Deutschlands e. V. (BVA)[1] · Deutsche Ophthalmologische Gesellschaft (DOG)[2]

[1] Berufsverband der Augenärzte Deutschlands e. V., Düsseldorf, Deutschland

[2] Deutsche Ophthalmologische Gesellschaft, München, Deutschland

Empfehlungen bei progredienter Myopie im Kindes- und Jugendalter

Stellungnahme von DOG und BVA. Stand Dezember 2018

INTERNATIONAL MYOPIA INSTITUTE

Journal of *Clinical Medicine*

MDPI

Article

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

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AMERICAN ACADEMY OF OPHTHALMOLOGY®

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.

Schlaglicht der Schweizerischen Ophthalmologischen Gesellschaft

Refraktion und Kontaktlinsen

Dr. med. Albert Franceschetti

Präsident der Kontaktlinsenkommission der Schweizerischen Ophthalmologischen Gesellschaft, Meyrin

SOG SSO

Myopie ist weltweit ein ernsthaftes Problem. Zwei Behandlungsmethoden gelten als wirksam. Bei weichen Kontaktlinsen gibt es drei Fehler, die es zu vermeiden gilt.

ophta

Myopie-Progression: Aktueller Stand der Forschung

Michael Bärtschi, Bern

Epidemiologie

Weltweit liegt die Prävalenz der Myopie bei 10–30 % in Ozeanien, Afrika und Südamerika, bei 30–40 % in Europa, verbrachte Zeit[14,18] oder Exposition bestimmter Wellenlängen[16,19]), der refraktive Fehler (peripherer Defokus[20,21] und Akkommodation / Konvergenz[22]) und der Ausbildungsgrad.[2,8]

In der Entwicklung / Erprobung befindliche refraktive oder visual-therapeutische Verfahren:

– Brillengläser (MyoSmart und MyoVision)

Einzeldosen Atropin in CH ?

- **Bichsel Laboratorium Interlaken**

oder

- **TopPharm Apotheke Meyer Sursee**

Was haben wir bisher gelernt ?

Myopie Progression ist:

- Multifaktoriell und stark altersabhängig
- Potentiell pathologisch bei wachsendem Auge
- Evidence based and klinisch erprobte effektive Strategien/Therapien sind verfügbar
- Sonnenlicht hilft vor allem während der Emmetropisierungs-Phase, sehr schwache/keine Korrelation zur Hemmung bei bereits bestehender Myopie
- Optimale Sonnenlicht/Outdoor Zeit zwischen 8 bis 14 Uhr
- Mobiltelefone sind weniger kritisch als erwartet
- **Kombination von schwach dosiertem Atropin und KL zeigen die besten Studienresultate**

Zusammenfassung / Take Home

- Starte früh/ jung und konsequent !
- 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 Therapiestrategies über die Zeit an** !
- Kooperation von Ophthalmologe und Optometrist ist wichtig

Abstimmung:

Werden Sie Myopie Management in Zukunft anbieten ?

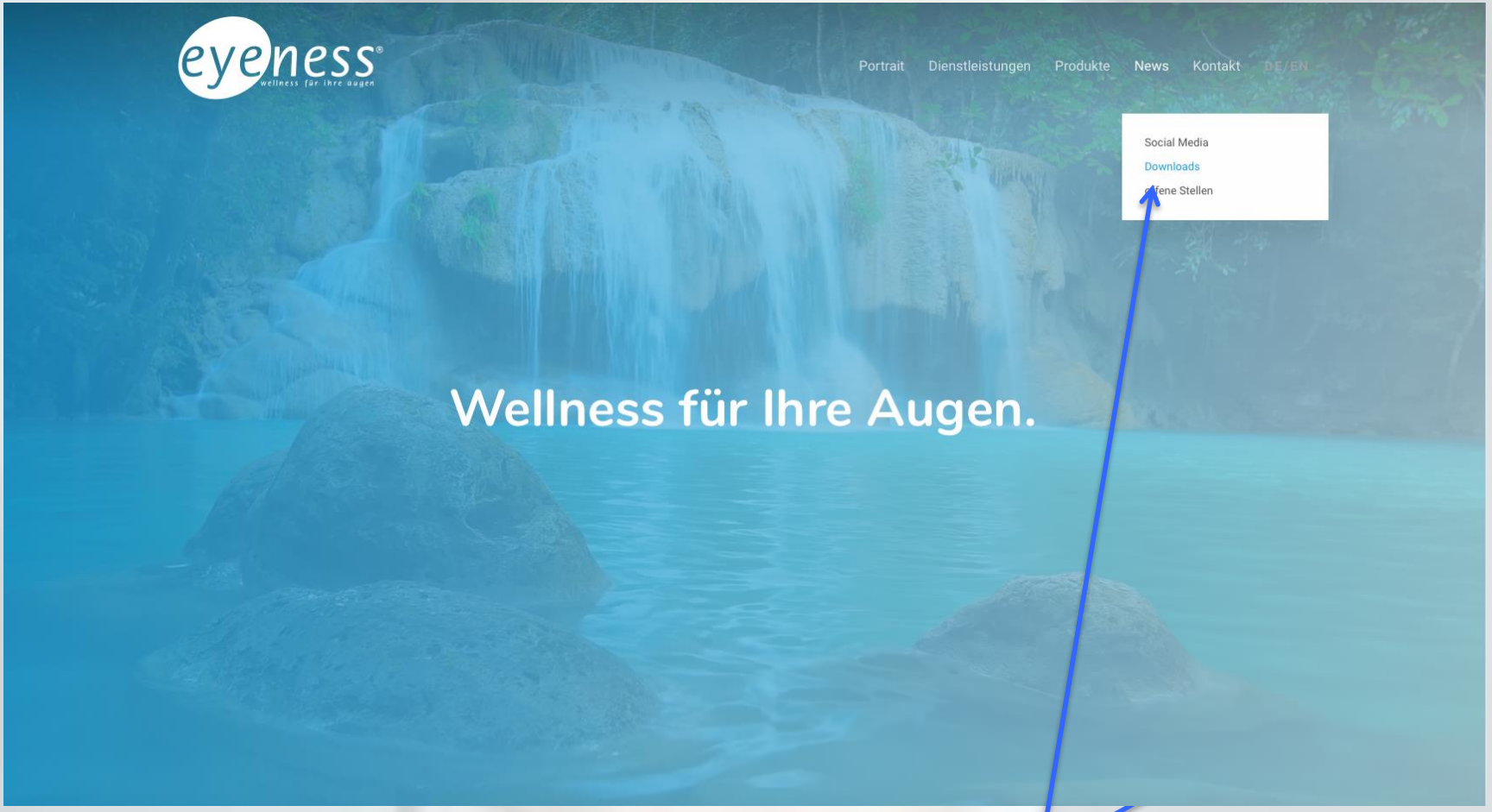
A. Ja, mehr als vorher

B. Ja, aber weniger als vorher

C. Nein

D. Weiterhin unsicher

Herzlichen Dank



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