

MYOPIA CONTROL

Myopia Control Evidence-Based Practice – Clinical Study Summaries

For more information visit: <https://www.myopiaprofile.com/>

ATROPINE

ATOM₂ (Atropine for Treatment of Childhood Myopia) – 2015

- Population: Myopic children
- Intervention and comparisons: Atropine 0.01%, 0.1%, 0.5%
 - o Treated for 2 years → monitored without treatment for 1 year
- Theories:
 - o Atropine acts on parasympathetic nervous system muscarinic receptors in the eye → reduces excessive growth of the eye → reduces myopia progression
- Outcomes
 - o 0.01% is the optimal dosage to balance efficacy and safety
 - More sustained effect on slowing down myopia progression and overall reduction in myopia
 - Fastest recovery from SE
 - Least amount of mydriasis and cycloplegia
 - o Myopic rebound (SE and AL) was relative to dose (higher with higher doses)
- **Take home message: this study has been outdated by the LAMP study**

LAMP₁₊₂ (Two-Year Clinical Trial of the Low-Concentration Atropine for Myopia Progression (LAMP) Study: Phase 2 Report) – 2019

- Population: Myopic Children, 4-12 y/o with at least -1.00 D
- Intervention: Atropine 0.05%, 0.025%, 0.01% 1 drop daily both eyes for 2 years
- Outcome:
 - o 0.025% → 45% reduction in rate of progression of myopia
 - o 0.01% → 33% reduction in rate of progression of myopia
 - o No age-treatment interaction observed
 - o Efficacy was the same in year 1 and 2
- Clinical considerations:
 - o Need to taper to reduce rebound effect
 - o Need to treat for a minimum of 2 years
 - o Follow-up: 1 week 1 month, 3 months, 6months
 - o SE: glare sensitivity, light sensitivity, allergic conjunctivitis, blurry near vision, pupil dilation, burning, redness, itch, swelling, mouth and eye dryness, delirium, fast heart rate
 - o CI: Downs Syndrome, heart condition, asthma, usage of anticholinergic meds
 - o Considerations: still need to wear glasses
- **Take home message: Atropine 0.025% once daily is more effective than 0.01% for reducing the progression rate of myopia**
- More information at: <https://www.myopiaprofile.com/atropine-eye-drops-lamp-study/>

ORTHOKERATOLOGY

LORIC (The longitudinal orthokeratology research in children (LORIC) in Hong Kong: a pilot study on refractive changes and myopic control) – 2005

- Population: myopic children (up to -4.00 D refractive error)
- Intervention: Orthokeratology contact lenses for 2 years
- Comparison: control spectacles
- Outcome:
 - o Significant reduction in axial length (AL) elongation (length of the eye) and vitreous chamber depth (VCD)
 - AL mean change: 0.29 mm in treatment group vs 0.54 mm in control group (53% reduction)
 - VCD mean change: 0.23 mm in treatment group vs 0.58 mm in control group (39% reduction)
 - o Significant reduction in spherical equivalent refractive error occurred in the first 6 months of the trial
 - o need to continue lens wear to maintain effect
 - o safe, need proper fitting, compliance and care routine follow up
- **Take home message: Orthokeratology lenses significantly reduce the rate of myopia progression**

ROMIO (Retardation of Myopia in Orthokeratology) – 2012

- Population: low-mod level of myopia in children
- Intervention: overnight orthokeratology (OK) contact lenses for reducing progression of myopia
- Comparison: Single vision distance spectacles
- Outcomes:
 - o OK slowed axial elongation (length of the eye) increase by 43% (did not depend on initial myopia magnitude)
 - o Younger px show faster AL elongation – treat myopic children young to reduce the prevalence of pathological myopia
 - o Provides clear unaided vision during the day
- **Take home message: Orthokeratology lenses significantly reduce the rate of axial length growth by 43%**
- More information at: <https://www.myopiaprofile.com/is-orthokeratology-useful-for-control-of-low-myopia/>

TO-SEE (Myopia Control Using Toric Orthokeratology) - 2013

- Population: myopic children 6-12 y/o, 0.50-5.00 D myopia and mod-high astigmatism
- Intervention: toric orthokeratology lenses for 2 years
- Comparison: control contact lenses
- Outcome:
 - o Axial length elongation was 52% slower in the treatment group compared to the control group
 - o Axial length elongation correlates to age – younger patients progress faster – so start treatment early!
 - o No link between axial length elongation and sex, initial myopia magnitude, initial astigmatism magnitude
- **Take home message: toric orthokeratology lenses slow axial length elongation in myopes with moderate-high astigmatism**

SMART (Stabilizing myopia by accelerating reshaping technique (SMART)-study three year outcomes and overview) – 2015

- Population: myopic children
- Intervention: Orthokeratology (OK) contact lenses for 3 years
- Comparison: Single vision distance contact lenses (SVD CL)
- Outcome:
 - o OK: 0.19 D increase in myopia over 3 years
 - o SVD CL: 1.00 D increase in myopia over 3 years
- **Take-home message: Orthokeratology significantly reduced the amount of myopia progression compared to control over 3 years**
- More information at: <https://www.myopiaprofile.com/smart-study-orthokeratology-slows-myopia/>

MYOPIA-CONTROL SPECTACLES

DIMS – (Evaluating the myopia progression control efficacy of defocus incorporated multiple segments (DIMS) lenses and Apollo progressive addition spectacle lenses (PALs) in 6- to 12-year-old children: study protocol for a prospective, multicenter, randomized controlled trial) – 2020

- Population: myopic children
- Intervention: DIMS multiple segment spectacle technology – defocus in multiple segments
 - o Central zone: 9 mm diameter – to correct distance refractive error
 - o Peripheral zone: schematic array of multiple segments, 1.3 mm in diameter each, +3.50 D myopic defocus
- Comparison: single vision distance lenses
- Outcomes
 - o DIMS lenses: -0.41 D, 0.21mm progression
 - o Single vision distance lenses: -0.85 D, 0.55 mm progression
- **Take-home message: DIMS lenses had a 50-60% effect on controlling myopia progression in myopic children**
- More information at: <https://www.myopiaprofile.com/the-next-generation-dims-and-halt-technology-spectacle-lenses-for-myopia-control/>

BIFOCAL AND MULTIFOCAL GLASSES

COMET (Correction of Myopia Evaluation Trial) – 2003

- Population: Myopes -1.25 D to -4.50 D
- Intervention: Progressive additional lenses (also called PALs or multifocals) with +2.00 D add power in the bottom of the lens
- Comparison: single vision distance lenses
- Theory: plus powered lenses induce “myopic defocus” which studies have shown to produce a “stop” signal for excessive eye growth → slows myopia progression
- Outcome: PAL slowed myopia progression by a small statistically significant amount (0.20 D) only in the first year out of 3
- **Take-home message: PALs are not a good option for slowing down the rate of myopia progression, but they may be a good option for children who have high lag in accommodation and near esophoria**

Multifocals Vs Bifocal Spectacle Lenses for Myopia Control

- Population: Myopic children
- Intervention: Multifocal glasses
- Comparison: Bifocal glasses
- Theory: myopic defocus creates a strong “stop” signal for excessive eye growth
- Outcome:
 - o Children with normal binocular vision – negligible results
 - o Esophoria or accommodative lag at near → glasses were effective
 - o Exophoria at near → contact lenses and orthokeratology make the deviation worse
 - o Multifocal glasses may not be as effective because children may look over the plus add segment eye movements behind lens/ compliance/ large non-treatment zone/ swim
- **Take-home message: bifocal or multifocal glasses may be effective for reducing myopia progression rates in children who have esophoria or accommodative lag**

MYOPIA-CONTROL CONTACT LENSES

DISC (Defocus Incorporated Soft Contact (DISC) lens slows myopia progression in Hong Kong Chinese schoolchildren: a 2-year randomised clinical trial) – 2013

- Population: Myopic children
- Intervention: +2.00 D Multifocal soft contact lenses
- Outcome
 - o 25% reduction in myopia progression
 - o 31% less Axial Length excessive growth
 - o 5 hours/ day 46% risk reduction
 - o 7 hours/ day 58% risk reduction
- **Take home message: Peripheral defocus soft contact lenses reduce myopia progression by 25%**

DIMENZ (A 3-year Randomized Clinical Trial of MiSight Lenses for Myopia Control) – 2019

- Population: Myopic children 8-12 y/o, -0.75 D to -4.00 D, < 0.75 D astigmatism
- Intervention: MiSight CL (Multifocal Soft Contact Lenses), daily or monthly
- Comparison: Single vision distance soft contact lenses
- Theory: myopic retinal defocus → “stop” signal for excessive eye growth
- Outcome
 - o Children wearing MiSight Contact lenses had an average of 36% reduction in rate of myopia progression
 - o Considerations: Correct vision, no glasses needed, easy to change script
 - o Side effects: Risk of infection (small with proper compliance), limited wear time, allergies, cannot swim with them
- **Take-home message: MiSight CL reduce the rate of myopia progression by 36%**

BIFOCAL CONTACT LENSES

BLINK (Effect of High Add Power, Medium Add Power, or Single-Vision Contact Lenses on Myopia Progression in Children The BLINK Randomized Clinical Trial) – 2020

- Population: myopic children
- Intervention:
 - o High add power bifocal contact lenses
 - o Medium add power bifocal contact lenses
- Comparison: Single vision distance contact lenses
- Theory: accommodative lag or myopia defocus → reduced stimulus for AL elongation
- Outcome:
 - o +2.50 add: reduced myopia by 43%
 - o +1.50 add: no sig change
 - o +1.50 in patients with 3 Prism Dioptre base in exophoria: reduced rate of myopia by 57% in 3 years
- **Take-home message: bifocal contact lenses are a good option for reducing myopia if MiSight lenses are unavailable/ parameters not suitable**