



## Binocular Vision: Why is it So Important?

### Ilse Homan\*

Department of Optometry, Rand Afrikaans University (RAU), Founder at Eyeli, South Africa

\*Corresponding Author: Ilse Homan, Department of Optometry, Rand Afrikaans University (RAU), Founder at Eyeli, South Africa.

Received: April 25, 20

Published: May 19, 2021

© All rights are reserved by Ilse Homan.

Binocular vision should form a fundamental part of every visual assessment, especially when looking after children's vision, for three main reasons.

#### Binocularity:

Having two eyes that work together, enables us to have three-dimensional vision, depth perception, distance judgement and eye-hand coordination. Without binocular vision, catching a ball, driving a car or even a simple task like walking becomes difficult.

- Binocular vision problems could have a significant effect on quality of life and have the best prognosis if diagnosed and treated early when the visual system is still developing [1].

#### Comfortable vision when reading and learning:

- Children spent at least 60% of their time in the classroom looking at near objects and digital screens, with fixations from distance-to-near occurring 10 times a minute. This requires a stable and accurate visual system to ensure comfort and comprehension [2].
- An insufficient accommodation reserve affects our ability to focus on near work for sustained periods, while accommodation infacility would make changing focus from distance-to-near slow and tedious.
- Alignment issues, like reduced vergence facility and esophoria, are known to affect not only our visual comfort, but also speed and accuracy during reading [3].
- Convergence insufficiency (CI) becomes so uncomfortable, that it is linked to behaviours issues like attention and avoid-

ance of schoolwork. Many children have been diagnosed with attention deficit hyperactivity disorder (ADHD), when in fact, they actually had CI [4].

#### Myopia onset, progression and management:

- Myopia is affected by inaccurate binocular vision - including near esophoria, higher AC/A ratios, accommodative lag and greater variability in accommodative responses [5-8].
- Intermittent exotropia (IXT) has also been associated with a higher prevalence of myopia, with 47% of children with IXT becoming myopic by age 10 and 91% by age 20 [9].
- Binocular vision is therefore a very important consideration when deciding on treatment options for a myopic patient.
- Myopia management, when esophoria, accommodation issues and higher AC/A ratios are present, have shown better efficacy with progressive addition or bifocal (BF) spectacle lenses, as supposed to peripheral defocus spectacle or contact lenses [10].
- Fitting exo myopic children from spectacles to contact lenses, can increase their exo deviation which could affect visual comfort and myopia control efficacy [11,12].

#### Bibliography

1. Marianne EF and Simmers AJ. "It's too late'. Is it really? Considerations for amblyopia treatment in older children". *Therapeutic Advances in Ophthalmology* 11 (2019): 2515841419857379.

2. Narayanasamy S. "Visual demands in modern Australian primary school classrooms". *Clinical and Experimental Optometry* 99.3 (2016): 233-240.
3. Quaid P and Simpson T. "Association between reading speed, cycloplegic refractive error, and oculomotor function in reading disabled children versus controls". *Graefe's Archive for Clinical and Experimental Ophthalmology* 251.1 (2013): 169-187.
4. Granet DB, et al. "The relationship between convergence insufficiency and ADHD". *Strabismus* 4 (2005): 163-168.
5. Ciuffreda KJ and Vasudevan B. "Nearwork-induced transient myopia (NITM) and Permanent myopia – is there a link?" *Ophthalmic and Physiological Optics* 28.2 (2008): 103-114.
6. Seidemann A and Schaefel F. "An evaluation of the lag of accommodation using photorefraction". *Vision Research* 43.4 (2003): 419-430.
7. Chung KM and Chong E. "Near esophoria is associated with high myopia". *Clinical and Experimental Optometry* 83.2 (2000): 71-75.
8. Gwiazda J, et al. "Response AC/A ratios are elevated in myopic children". *Ophthalmic and Physiological Optics* 19.2 (2002): 173-179.
9. Ekdawi NS, et al. "The Development of Myopia Among Children with Intermittent Exotropia". *American Journal of Ophthalmology* 149.3 (2010): 503-507.
10. Fulk GW, et al. "A Randomized Trial of the Effect of Single-Vision vs. Bifocal Lenses on Myopia Progression in Children with Esophoria". *Optometry and Vision Science* 77.8 (2000): 395-401.
11. Gwiazda J, et al. "A randomized clinical trial of progressive addition lenses versus single vision lenses on the progression of myopia in children". *Investigative Ophthalmology and Visual Science* 44.4 (2003): 1492-1500.
12. Hunt OA, et al. "Ocular motor triad with single vision contact lenses compared to spectacle lenses". *Contact Lens and Anterior Eye* 29.5 (2006): 239-245.

**Volume 4 Issue 6 June 2021**

**© All rights are reserved by Ilse Homan.**