Peninsula Cerebra Research Unit
PenCRU Childhood Disability Research

What's the Evidence?

Yoked Prism Lenses, Eye Care and Children with Disabilities

Key Findings

- Children with disabilities are more likely than non-disabled children to have visual problems.
- Yoked prism lenses are offered as part of a treatment for a variety of visual problems.
- There is insufficient scientific evidence of the effectiveness of yoked prism lenses.
- American health organisations do not endorse use of prism lenses for children with learning disabilities.
- Research is needed to establish effective strategies for improving the vision of children with neurodisabilities.

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What were we asked?

Two questions were received about the use of yoked prism lenses; one asked if there was any reliable research about their use in glasses for children with cerebral palsy and the other asked if the use of yoked prism glasses was effective in the treatment of toe-walking in children with autism.

What did we do?

To understand the use of yoked prism lenses as a treatment we undertook a scoping exercise, which involved contacting professionals working in the field and reading around the subject. This revealed a complicated area of practice with different providers who have different reasons for using yoked prisms and use different definitions. Yoked prisms are also known as traditional prism, conjugate, Kaplan or ambient lenses, but also referred to more generally as part of vision therapy.

Using all of these different definitions, we then searched a range of academic databases to consider: what are the outcomes of using yoked prism lenses for children with neurodisabilities such as cerebral palsy and autism?

What did we find?

Children with neurodisabilities and eye care health services

- As visual processing is a complicated function of the brain, visual problems are often associated with neurodisabilities.
- There is evidence that children with disabilities are more likely than their non-disabled peers to have a visual impairment[1]. However, there is no evidence that neuro-developmental disability causes visual problems or vice versa.

- Woodhouse et al (2012) undertook a survey of children attending special schools in Wales and found that one third had never had an eye test. Only 6% had visual problems recorded on their SEN statement but from their eye examinations within the study, they found that one in five had a visual impairment that was likely to impact their education[2].
- Children can find it difficult to say how they see the world, making it critical that eye care is considered and incorporated into integrated support plans for children with neurodisabilities.
- Eye care health services are provided by a number of different professionals[3]:

  Regulated by General Optical Council/Association of British Dispensing Opticians:

  - *Dispensing Opticians* (advise, fit & supply glasses and contact lenses)
  - *Optometrists* (examine eyes for defects, offer advice and make referrals to specialists)

  Regulated by General Medical Council/Royal College of Ophthalmologists

  - *Ophthalmologists* (medical specialists who treat eye disease, carry out eye-surgery)
  - *Ophthalmic Medical Practitioners* (subgroup of ophthalmologists who examine eyes for abnormalities)

  Regulated by Health Professions Council/British & Irish Orthoptic Society:

  - *Orthoptists* (focus on problems relating to eye movement/ability of eyes to work together)

  Represented by British Association of Behavioural Optometrists

  - *Behavioural Optometrist* (work outside of the NHS to assess and treat visual system/sensory integration)

So what are yoked prism lenses and what are they thought to treat?

Prism lenses are glasses with a pair of 3-sided transparent pyramids rather than traditional refractive lenses which can be positioned in a variety of ways to bend the light and affect perception of depth and space. Prism lenses can differ in strength (dioptre) and yoked prisms are prism lenses of equal strength that are orientated with the base of the pyramid in the same direction.

Vision therapy utilises yoked prism lenses, along with filters, occluders, computer programs and visual motor co-ordination exercises with the aim to improve problems such as: eye-movement disorders, misalignment of the eyes (strabismus/ squint), double vision (diplopia), reduced vision (lazy eye/amblyopia), focusing problems (accommodative disorders) and other visual disturbances.

Both Orthoptists & Behavioural Optometrists provide vision therapy. Treatment plans are designed to meet individual needs, so depending on the severity of the condition; it can involve a number of visits with exercises to be carried out at home.

So are yoked prism lenses an effective treatment?

- The evidence-base for the use of yoked prisms is very limited. Current NICE guidance only refers to their use in relation to treating visual neglect or double vision following a stroke[4].
- A Cochrane review of randomised controlled trials which looked at prism lenses to treat Convergence Insufficiency (common eye muscle problem), found that they were no more effective than placebo reading glasses in improving children's symptoms. It also found that outpatient vision therapy is more effective than home-based vision therapy exercises[5].
- The UK College of Optometrists commissioned a review of behavioural optometry which was updated by Barrett in 2009, who found a continued absence of rigorous scientific evidence to support behavioural optometry approaches[6].
- No studies could be found which explored the use of yoked prism lenses for children with cerebral palsy.
- A few small studies have been carried out looking at yoked prism lenses in the treatment of posture, balance and gait for children with autism[7]. The studies all had small sample sizes and generally only looked at short-term effects, using subjective outcome measures.
- The American Academy of Paediatrics, American Academy of Ophthalmology and American

Association of Certified Orthoptists do not endorse, nor recommend the use of prism lenses or other forms of behavioural vision therapy for children with learning disabilities[8].

- Williams et al (2013) systematically reviewed the published evidence for vision-based interventions that aim to help children with neurodisabilities. They did not find any studies which involved yoked prisms and reported that in general, there is a lack of evidence on effective vision-based strategies for children with neurodisabilities[9].

What do we think?

- It is critical for children with neurodisabilities to have regular eye examinations.
- There is no evidence on the use of yoked prism lenses for children with cerebral palsy.
- There is insufficient evidence of the effectiveness of yoked prism lenses for children with autism and no evidence in relation to toe-walking.
- The use of yoked prism lenses as a treatment for children with neurodisabilities is experimental as the theories behind their use are unproven.
- Research is needed to establish effective strategies for improving vision for children with neurodisabilities.

Signposts to other information

- www.seeability.org.uk (Seeability have information on eye care services, eye conditions and how to identify eye problems in individuals with learning disabilities).
- www.nhs.uk/NHSEngland/AboutNHSservices/opticians /pages/childrens-eyes.aspx (information pages about NHS eye care services).

We would like to hear your feedback on this summary, please contact us, if you have any comments or questions.

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