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**Literature search results**

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**Search details**

Children between 8-13 with migraines, headaches and visual disturbances. Use of tinted lenses and coloured overlays, better than drug therapy in curing migraines?

**Resources searched**

NHS Evidence; TRIP Database; Cochrane Library; EMBASE; MEDLINE; Google Scholar; Google Advanced Search

**Database search terms** : MIGRAINE DISORDERS, HEADACHE/ OR exp HEADACHE DISORDERS, VISION DISORDERS/, (migraine* OR headache* OR "migraine headache" OR "visual disturbance" OR "vision disorder" ), exp CHILD, exp PEDIATRICS, (child* OR paediatric* OR pediatric*), exp ORTHOPTICS, ("tint* colo* glass*" OR "tint* lens*" OR "colo* overlay filter*" OR "colo* overlay" OR "overlay* OR "irlen lens*" OR "irlen filter*"), migraine* OR headache* OR "migraine headache" OR "visual disturbance" OR "vision disorder" OR "pattern glare" OR "visual perceptual distortion" OR "visual stress" OR "visual discomfort" OR "meares-irlen syndrome"

**Google search string** : child* AND (migraine* OR headache* OR "visual disturbance") AND ("tinted lenses" OR "coloured overlays")

**Summary**

There is not much published research about children with migraines etc and the possible use of tinted lenses and coloured overlays as a treatment method. From what was found it is obvious that there is a lot of debate surrounding these treatment methods. There is also little about the specifics of migraines and headaches, instead research has focused on the use of tinted lenses and coloured overlays in treating children with learning disabilities, reading problems and visual stress, although migraines and headaches would be symptoms of these disorders so the research could still be applicable. Half of the research argues that this treatment method is valid: 1, 8, 14, 15 and the other half argues that either it was not a valid treatment method: 10, 12, 18 or that there needs to be more research into the method to answer important queries: 13, 16.
Guidelines

Nursing Reference Center

Headaches, Migraines in Children, 2010

Royal College of Ophthalmologists

Reading and the Visual System, 2009

One theory has been proposed linking cortical excitability with visual stress. The latter term was introduced by Wilkins in 1995 [36, 37]. Visual stress is a theory, linking certain individuals with migraine who have an inability to read for long periods and prevalent in the population in good and poor readers. These individuals have difficulty seeing comfortably without distortion or discomfort. The theory of cortical excitability or hypersensitivity has been linked to contrast and pattern glare. [38] (p. 4)

Also, in particular p. 6-8 "Coloured overlays, tinted glasses and contact lenses"

Evidence-based reviews

Centre for Reviews and Dissemination

Prophylactic treatment of migraine in children - Part 1: a systematic review of non-pharmacological trials, 2005

This reasonably well-conducted review evaluated non-pharmacological migraine prophylaxes in children. The authors concluded that evidence of the effectiveness of relaxation, biofeedback and cognitive-behavioural therapy, instructions to improve sleep hygiene, or the use of special diets is limited, while evidence of the effectiveness of relaxation plus thermal biofeedback is moderate. The cautious conclusions are based on small studies but are likely to be reliable.

Symptomatic treatment of migraine in children: a systematic review of medication trials, 2005

There was moderate evidence that acetaminophen, ibuprofen and nasal sumatriptan are all effective symptomatic pharmacological treatments for episodes of migraine in children. However, the authors cautioned that most treatments have only been tested in one or two studies, thereby limiting the generalisability of the findings.

Published research

1. The Pattern Glare Test: a review and determination of normative values.

Author(s): Evans BJ, Stevenson SJ

Citation: Ophthalmic & Physiological Optics, July 2008, vol./is. 28/4(295-309), 0275-5408:0275-5408 (2008 Jul)

Publication Date: July 2008

Abstract: Pattern glare is characterised by symptoms of visual perceptual distortions and visual stress on viewing striped patterns. People with migraine or Meares-Irlen syndrome (visual stress) are especially prone to pattern glare. The literature on pattern glare is reviewed, and the goal of this study was to develop clinical norms for the Wilkins and Evans Pattern Glare Test. This comprises three test plates of square wave patterns of spatial frequency 0.5, 3 and 12 cycles per degree (cpd). Patients are shown the 0.5 cpd grating and the number of distortions that are reported in response to a list of questions is recorded. This is repeated for the other patterns. People who are prone to pattern glare experience visual perceptual distortions on viewing the 3 cpd grating, and pattern glare can be quantified as either the sum of distortions reported with the 3 cpd pattern or as the difference between the number of distortions with the 3 and 12 cpd gratings, the '3-12 cpd difference'. In study 1, 100 patients consulting an optometrist performed the Pattern Glare Test and the 95th percentile of responses was calculated as the limit of the normal range.
The normal range for the number of distortions was found to be <4 on the 3 cpd grating and <2 for the 3-12 cpd difference. Pattern glare was similar in both genders but decreased with age. In study 2, 30 additional participants were given the test in the reverse of the usual testing order and were compared with a sub-group from study 1, matched for age and gender. Participants experienced more distortions with the 12 cpd grating if it was presented after the 3 cpd grating. However, the order did not influence the two key measures of pattern glare. In study 3, 30 further participants who reported a medical diagnosis of migraine were compared with a sub-group of the participants in study 1 who did not report migraine or frequent headaches, matched for age and gender. The migraine group reported more symptoms on viewing all gratings, particularly the 3 cpd grating. The only variable to be significantly different between the groups was the 3-12 cpd difference. In conclusion, people have an abnormal degree of pattern glare if they have a Pattern Glare Test score of >3 on the 3 cpd grating or a score of >1 on the 3-12 cpd difference. The literature suggests that these people are likely to have visual stress in everyday life and may therefore benefit from interventions designed to alleviate visual stress, such as precision tinted lenses.

Source: MEDLINE

Full Text:
Available in fulltext at EBSCO Host

8. Coloured overlays and their effects on reading speed: a review.

Author(s): Wilkins A

Citation: Ophthalmic & Physiological Optics, September 2002, vol./is. 22/5(448-54), 0275-5408:0275-5408 (2002 Sep)

Publication Date: September 2002

Abstract: Coloured overlays can reduce symptoms of visual stress and improve reading speed. These benefits are reliable and are not attributable simply to placebo effects. Five percent of children in mainstream education read at least 25% more quickly with an overlay, provided they have chosen the colour. The suboptimal design of children's text and the high level of classroom lighting may be partly responsible.

Source: MEDLINE

Full Text:
Available in fulltext at EBSCO Host

10. Spatiotemporal visual function in tinted lens wearers.

Author(s): Simmers AJ, Bex PJ, Smith FK, Wilkins AJ

Citation: Investigative Ophthalmology & Visual Science, March 2001, vol./is. 42/3(879-84), 0146-0404:0146-0404 (2001 Mar)

Publication Date: March 2001

Abstract: PURPOSE: Tinted lenses have been widely publicized as a successful new treatment for reading disorders and visual stress in children. The present study was designed to investigate a variety of visual deficits reported by children who experience high levels of visual stress and perceptual distortions when reading (Meares-Irlen syndrome; MIS) and to assess the improvements in visual comfort they report when tinted lenses are worn. METHODS: Twenty children (13.1 +/- 0.9 years of age) were recruited who had successfully worn tinted lenses for at least 6 months and were compared with an age-matched control group (12.6 +/- 2.2 years of age) of 21 children who were not lens wearers. A range of psychophysical tasks was adapted to identify specific anomalous visual perceptions. Spatiotemporal contrast sensitivity and contrast increment thresholds were used to investigate subjective reports of dazzle and hypercontrast, and a minimum motion perception (D(min)) and a motion-coherence task were used to assess subjective reports of visual instability and motion. RESULTS: In all viewing conditions (with versus without lens), no selective functional visual loss was demonstrated with any of the tasks used. Psychometric functions also revealed no significant difference between subject
groups (control versus MIS). CONCLUSIONS: Under thorough psychophysical investigation, these results revealed no significant difference in visual function between subject group, and this finding is consistent with the absence of any effect of the tinted lenses in the group with MIS.

Source: MEDLINE
Full Text:
Available in fulltext at Highwire Press


Author(s): anonymous
Citation: Pediatrics, November 1998, vol./is. 102/5(1217-9), 0031-4005;1098-4275 (1998 Nov)
Publication Date: November 1998
Abstract: Learning disabilities are common conditions in pediatric patients. The etiology of these difficulties is multifactorial, reflecting genetic influences and abnormalities of brain structure and function. Early recognition and referral to qualified educational professionals is critical for the best possible outcome. Visual problems are rarely responsible for learning difficulties. No scientific evidence exists for the efficacy of eye exercises (“vision therapy”) or the use of special tinted lenses in the remediation of these complex pediatric developmental and neurologic conditions.

Source: MEDLINE
Full Text:
Available in fulltext at American Academy of Pediatrics

13. Scepticism about Irlen filters to treat learning disabilities.

Author(s): Romanchuk KG
Citation: CMAJ Canadian Medical Association Journal, August 1995, vol./is. 153/4(397), 0820-3946;0820-3946 (1995 Aug 15)
Publication Date: August 1995
Source: MEDLINE
Full Text:
Available in fulltext at Ovid
Available in fulltext at EBSCO Host
Available in fulltext at EBSCO Host
Available in fulltext at National Library of Medicine

14. Effect of pattern glare and colored overlays on a stimulated-reading task in dyslexics and normal readers.

Author(s): Evans BJ, Cook A, Richards IL, Drasdo N
Citation: Optometry & Vision Science, October 1994, vol./is. 71/10(619-28), 1040-5488;1040-5488 (1994 Oct)
Publication Date: October 1994
Abstract: Scotopic sensitivity syndrome or the Irlen syndrome describes symptoms of asthenopia anamolous visual performance experienced while reading that are lessened by colored filters. One putative explantation for this condition relates to pattern glare: a
hypersensitivity to repetitive patterns, including lines of print on a page. Experiment 1 used a placebo-controlled paradigm to investigate the effect of pattern glare and colored overlays on performance at a simulated reading visual search task. Despite the fact that the subjects were university students, the results showed a tendency, of border-line significance, to support the conclusion that colored filters seem to improve reading through ameliorating pattern glare. In experiment 2 we compared the prevalence of pattern glare in matched groups of dyslexic children and good readers. The dyslexic group reported more pattern glare, but also reported more glare from a control stimulus. Pattern glare in the dyslexic group was directly correlated with flicker sensitivity. The results are related to recent research on visual processing and ocular-motor function in dyslexia.

Source: MEDLINE


Citation: Ophthalmic & Physiological Optics, October 1994, vol./is. 14/4(365-70), 0275-5408;0275-5408 (1994 Oct)

Publication Date: October 1994

Abstract: We selected 68 children who reported benefit from individually chosen sheets of coloured plastic placed upon the page when reading, and who used these regularly without prompting. These children viewed text illuminated by coloured light in an apparatus that allowed the separate manipulation of hue (colour) and saturation (depth of colour), at constant luminance. Many of the children reported improvements in perception when the light had a chromaticity within a limited range, which was different for each individual. A pair of plastic spectacle lenses (‘experimental’ lenses) was dyed so as to provide the appropriate chromaticity under conventional white (F3) fluorescent light. An additional pair was prepared having very similar colour but with a chromaticity outside the range in which perception was reported to improve (‘control’ lenses). Each pair was provided for 1 month in random order. The children kept diaries (36 completed) recording symptoms of eye-strain and headache. The children and those responsible for their assessment were unable reliably to distinguish ‘experimental’ from ‘control’ lenses. Nevertheless, symptoms were less frequent on days when the ‘experimental’ lenses were worn (P < 0.003).

Source: MEDLINE

Full Text: Available in fulltext at EBSCO Host

16. Comparison of Irlen scotopic sensitivity syndrome test results to academic and visual performance data.

Author(s): Lopez R, Yolton RL, Kohl P, Smith DL, Saxerud MH

Citation: Journal of the American Optometric Association, October 1994, vol./is. 65/10(705-14), 0003-0244;0003-0244 (1994 Oct)

Publication Date: October 1994

Abstract: UNLABELLED: Irlen has defined a condition called Scotopic Sensitivity Syndrome (SSS) that is associated with reading problems. According to Irlen, SSS can be treated by the use of colored filters, but there is disagreement about the existence of SSS and the efficacy of colored filter therapy.METHODS: Thirty-nine children participated in the study: 24 were academically normal, nine had specific reading problems, and six had problems in multiple academic areas. SSS levels and preferred overlay colors were determined. Optometric test data were also available for each subject.RESULTS: No significant relationships were found between academic classification and degree of SSS. There were also no significant relationships between preferred overlay color and any other variables. There was, however, a significant tendency for subjects with higher SSS levels to be candidates for vision therapy and to derive greater benefit from the colored overlays.CONCLUSIONS: Many questions about the use of colored filters for the treatment of reading problems remain unanswered. Among these are questions dealing with whether
the M-pathway anomalies found in some dyslexics are also present to a lesser degree in other cases of reading disabilities, and how colored filters could re-balance the M- and P-pathways. Is it the color of the filter itself that is critical, or is it the change in luminance or contrast produced by the filter that seems to make it easier for some subjects to read? More research will be needed to answer these questions.

Source: MEDLINE

17. **Tinted lenses and related therapies for learning disabilities--a review.**

Author(s): Evans BJ, Drasdo N

Citation: Ophthalmic & Physiological Optics, July 1991, vol./is. 11/3(206-17), 0275-5408;0275-5408 (1991 Jul)

Publication Date: July 1991

Abstract: Research relating to the use of Irlen tinted lenses and coloured overlays for underachievers is reviewed. Many of the studies were not published in refereed journals and were methodologically poor. The weaknesses of the Irlen argument are discussed, including the absence of evidence to support the claims that these tints need to be uniquely prescribed and manufactured. Syntonics is another form of visual colour therapy that has been applied to those with a learning disability. Research on this is reviewed, and is also shown to have procedural irregularities which preclude firm conclusions. Owing to the poor quality of much of this research the claims of the protagonists of these therapies cannot be proved or disproved. A proposed new therapy is normally preceded by a valid theoretical hypothesis; this has been lacking in the present topic. Recently, a feasible explanation has been proposed in terms of 'pattern glare' resulting from mild hypersensitivity to epileptogenic patterns. This, together with potential alternative theories, is discussed. In the conclusion of this review, advice is given for eye-care practitioners who may be consulted on these therapies.

Source: MEDLINE

18. **A review of the use of Irlen (tinted) lenses.**

Author(s): Cotton MM, Evans KM

Citation: Australian & New Zealand Journal of Ophthalmology, August 1990, vol./is. 18/3(307-12), 0814-9763;0814-9763 (1990 Aug)

Publication Date: August 1990

Abstract: Helen Irlen identified a syndrome defined as 'scotopic sensitivity' which it was claimed could be responsible for the inability of some people to read fluently and the symptoms of which could be ameliorated by the wearing of prescribed coloured lenses. The literature to date presents a confused and inconsistent picture concerning the use of the lenses. The literature (much of which is unpublished and difficult to obtain) is critically reviewed. Recent experimental evaluations of the lenses do not support the use of the lenses as a useful intervention for children with reading disabilities.

Source: MEDLINE

19. **Vision characteristics of individuals identified as Irlen Filter candidates.**

Author(s): Scheiman M, Blaskey P, Ciner EB, Gallaway M, Parisi M, Pollack K, Selznick R

Citation: Journal of the American Optometric Association, August 1990, vol./is. 61/8(600-5), 0003-0244;0003-0244 (1990 Aug)

Publication Date: August 1990

Abstract: Individuals with "scotopic sensitivity syndrome" have been reported to have visual symptoms including eye strain, headaches, blurred vision, double vision and words moving
on the page. This study was designed to investigate Irlen's claims that these symptoms are unrelated to vision anomalies. She suggests that the use of Irlen tinted lenses/filters relieves these symptoms and results in improved reading performance. Thirty nine subjects (age 10-49) were recruited by advertising for a study of Irlen Filters/Lenses. Before the Irlen screening all subjects received an optometric examination. The results of this study demonstrate that 95 percent of the subjects identified as candidates for Irlen Filters did have significant and readily identifiable vision anomalies. Fifty seven percent of the subjects had received vision care within the past year, yet testing revealed that 90 percent of these subjects had significant vision problems that had not been corrected.

Source: MEDLINE

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**Google Scholar**

**Optometric function in visually sensitive migraine before and after treatment with tinted spectacles**

BJW Evans, R Patel… - … and Physiological Optics, 2002 - Wiley Online Library

... six per cent of the patients had symptoms of visual discomfort, and 64% suffered from headache, although only ... A family history of migraine was twice as likely in those who found colour helpful ... trial of the use of the Intuitive Colorimeter and Precision Tints for children with reading ...

Cited by 29 - Related articles - Find@The Christie - BL Direct - All 11 versions

**Tinted spectacles and visually sensitive migraine**

AJ Wilkins, R Patel, P Adjamian... - Cephalalgia, 2002 - cep.sagepub.com

... All the patients gave a family history of migraine. ... None had undergone eye operations, although four had experienced monocular patching or eye exercises as a child. ... All but two experienced perceptual disturbances in association with their headache. ...

Cited by 35 - Related articles - Lancashire Teaching Hospitals - Find@The Christie - BL Direct - All 9 versions

**The effect of colored lenses on the visual evoked response in children with visual stress**

PM RIDDELL, A Wilkins... - Optometry & Vision ..., 2006 - journals.lww.com

... 1-3 Anecdotal reports of the success of her tinted lenses were met with skepticism justified by the lack of scientific evidence ... The symptoms of the children who had been prescribed lenses were used to divide children into two groups: those with a history of migraine or severe ...

Cited by 8 - Related articles - Lancashire Teaching Hospitals - Find@The Christie - BL Direct - All 3 versions

**Coloured overlays in schools: orthoptic and optometric findings**

L Scott, H McWhinnie, L Taylor... - Ophthalmic and ..., 2002 - interscience.wiley.com

... were also recorded: 'Do you feel that the page is too bright to look at?'; ‘Do you ever get a headache and/or sore ... The children who were still using the overlay differed from those who had stopped using it with respect to (1) a greater incidence of reports of ‘migraine’ (16 cf. ...

Cited by 36 - Related articles - Find@The Christie - BL Direct - All 6 versions

**Predicting the continued use of overlays in school children—a comparison of the Developmental Eye Movement test and the Rate of Reading test**

N Northway - Ophthalmic and Physiological Optics, 2003 - interscience.wiley.com


Cited by 24 - Related articles - Find@The Christie - BL Direct - All 9 versions

**Prevention of visual stress and migraine with precision spectral filters**
How big does a coloured overlay have to be?

M Waldie... - Ophthalmic and Physiological Optics, 2004 - interscience.wiley.com ...

Keywords: coloured overlays, dyslexia, Meares–Irlen syndrome, reading speed, visual stress ...

Five per cent of children in mainstream education read more than 25% faster when using ... fluency are thought to relate to the cortical hyperexcitability with which migraine is associated ...

Over the past two decades, the use of colored lenses to improve reading comfort and performance has become a prominent issue in both the popular media and ...

MM Scheiman - Optometric Management of Learning-Related ..., 2005 - books.google.com ...

7 People with migraine and epilepsy are sensitive to patterns like that in Figure 5 ...

Double-masked placebo-controlled trial of precision spectral filters in children who use coloured overlays ... Evans BJ, Drasdos N. Tinted lenses and related therapies for learning disabilities: a review ...

The influence of tinted lenses upon ocular accommodation

AJ Simmers, LS Gray... - Vision research, 2001 - Elsevier ...

1. Introduction. It has been claimed that tinted lenses are beneficial in reducing perceptual distortions in patients with dyslexia and migraine (Wilkins et al., 1992a). Many of these patients complain of perceptual distortions and ...

The prescription of tinted lenses to assist children and adults with reading difficulties is based ...of visual symptoms and distortion (visual perception, eye strain and headache) that can ... Coloured overlays and tinted lenses are used to improve reading ability and visual perception ...