

Assessment Study of the Amblyopia and its Treatment by Physical Exercises in Baghdad Hospital

Wasen Abbas Jawad

Zina Tariq Ali

Ruaa Saad Abdualhussin

Follow this and additional works at: <https://journal.nuc.edu.iq/home>



Part of the [Medical Sciences Commons](#)



Assessment Study of the Amblyopia and its Treatment by Physical Exercises in Baghdad Hospital

Wasen Abbas Jawad, Zina Tariq Ali *, Ruaa Saad Abdualhussin

College of Health & Medical Technology, Middle Technical University (MTU)

Abstract

The study aimed to assess the effects of physical exercises on patients with amblyopia with age ranges from 2 to 45 years old. This study involves forty (40) patients, nineteen (19) males and twenty one (21) females with age ranges from (2_45) years old. All patients in our study diagnosed by visual acuity (VA) test for both right and left eyes (without glasses and with glasses), then the patients submitted to study questionnaire (Date of amblyopia diagnosis), is there any previous treatment? What type of exercises (Patching, ocular motility and others) they have? The patients examined by Visual acuity (VA), Auto refractor device, Retinoscope device And Trial case, through the physical treatment sessions (one session in every week during one month), patients are treating by many physical exercises (patching, ocular motility). Demographic variables (gender (male and female) and age), which revealed that the percentage of gender (19) (47.5%) for study group were males and (21) (52.5%) for study group were females. The age groups ranges from (2–45) years old, Mean age was (20 ± 7.41) . The results showed that there is a significant differences at (0.03) ($p < 0.05$) the means there is an improvement (6/12) in visual acuity (V.A) in the pre and post treating by physical exercises for the right eye in patients with Amblyopia, also, the results showed that the statistical differences were significant at ($p < 0.05$) meaning an improvement in (V.A) in the pre and post treating by physical exercises for the left eye (Lt) (6/9) at (0.041) in patients with Amblyopia. We conclude that the treating by physical exercises has a significant effect in the improving the visual acuity in patients with Amblyopia.

Keywords: Amblyopia, Physical exercises

1. Introduction

The eye is not lazy, therefore, the term “lazy eye” is misleadingly used. It is not a problem in the eye itself, but a developmental condition in the nerve that connects the eyes to the brain. Amblyopia may be hard to detect until it becomes severe (Ryan Corte, 2023). These dysfunctions take place when the eyes are not used equally. Several factors and conditions may lead people to depend on one eye more than the other, including turning of one eye, persistent strabismus, genetic factors, family history of amblyopia, different vision levels in each eyes, damage to one eye due to trauma, drooping of one eyelid, deficiency of Vitamin A, corneal scars or ulcers, ophthalmic surgeries,

impairment of vision, e.g. farsightedness, nearsightedness or astigmatism, glaucoma (high pressure in the eye which may result in blindness or vision problem. Less using of an eye over time makes it become weaker (lazy) (Shannon, 2019). Treatment is improved when the problem is detected earlier (Jef-feris *et al.*, 2015). Some children may need only glasses for treatment (Shannon, 2019; Maconachie & Gottlob, 2015). When treatment is not adequate, encouraging or forcing children to use the weaker eye is necessary (National Eye Institute, 2013). This can be performed by either applying a patch or placing atropine in the stronger eye (National Eye Institute, 2013, 2019). Amblyopias usually persist if not treated, and treatment in adulthood often becomes much less active

Received 1 June 2025; accepted 21 July 2025.
Available online 4 October 2025

* Corresponding author.

E-mail addresses: wasanabbas8@mtu.edu.iq (W. A. Jawad), zena.tarek@mtu.edu.iq (Z. T. Ali), Ruaaalzubaidy83@gmail.com (R. S. Abdualhussin).

<https://doi.org/10.70492/2664-0554.1156>

2664-0554/© 2025 The Author(s). Al-Nisour University College.

(National Eye Institute, 2013). When treatment advices are given to the patients for their lazy eyes, the ophthalmologists may encourage the patients exercise their eyes. Such exercises may improve the ability of the weak eye for moving and tracking with the other eye. The major issue to improve is regularity i.e. the exercises must be performed constantly (daily, weekly, monthly or even in a couple of years) in addition to other therapies recommended by the ophthalmologists to achieve the best results. The majority of eye exercises must be carried out while the good eye is covered or patched. By this way, the lazy eye is forced to be used and see. Patching may be really regarded as an in and of eye exercise because it renders the brain to depend upon the weaker eye. For amblyopia, eye exercises are: Starting coloring, Do puzzles, Read, Play video games, Practice focusing and tracking, Practice eye movement, Concentrate on something that is not moving, Do pencil pushups (Brind'Amour, 2018).

Anisometropia one of the causes of the amblyopia which indicates that both eyes have variable refractive powers (glasses prescription), thus, unequal focuses are found between both eyes, which is usually because there is a slight difference between the two eyes in size and leading to asymmetric curvatures (astigmatism), asymmetric farsightedness (hyperopia) or asymmetric nearsightedness (myopia). In young children, amblyopia can be caused by isometropia may since the brain orders both eyes to focus the same amount. One of the eyes becomes blurry compared to the other, If both eyes have no equal refractive powers. Then, both eyes cannot be used together by the brain, and then the eye with the least refractive error or clearest image will be picked by the brain. There will be an ignorance to the eye with a blurry image and such an eye will not show a good connection to the brain. This leads to permanent poor vision in that eye, if it is not treated (Ganekal *et al.*, 2013). Squint is medically termed as strabismus. Strabismus is known as the condition in which the eyes do not usually look in the same direction correctly. The variation in eye directions is likely very slight, and does not usually exist. Among children, the most frequently eye problems are squints. The majority of squints appear in younger children. Children who develop squints may stop processing information from the affected eyes, leading to effective stopping of seeing, which may result in a kind of vision loss in the affected eye known as amblyopia, which may persist without early treatment in childhood. Patching the good eye is often included in the treatment of amblyopia, to oblige the brain for starting using the affected eyes. For squint correction, corrective eye surgery is occasionally re-

quired (Faghihi *et al.*, 2012). Keratoconus is also one of the causes of the amblyopia since it is the disorder in which the cornea becomes stretched and thinner near its centre, resulting in its bulging forward into a conical shape. Consequently, there will be vision distortion. Total blindness is not caused by keratoconus, nevertheless, if not treated, keratoconus may cause significant visual impairments. Treatments now available makes the majority of patients with keratoconus live normally. Both eyes may be affected by the progressive eye disorder known as keratoconus. The progression degree of in each eye is usually not equal, and it is usually shown to be more significantly progressed in one eye (Polling *et al.*, 2012). Specialists recommend treating Amblyopia as early as possible. For a long assumed that treatment would only succeed when it starts before the age of 7 years. However, studies conducted on children and teenagers with 7-17 years indicated that later treatments may also improve eye sights (Fu *et al.*, 2013). Cataracts are cloudy areas in the eye lens which usually develop slowly and lead to a vision decrease and may affect one or both eyes. Among the symptoms are blurry or double visions, faded colors, halos around lights, trouble with bright light as well as and difficulty seeing at nights (Facts About Cataract, 2009; Visual impairment and blindness Fact Sheet N°282", 2014). In the children in the first birth and the old 50 years of age and above that be effective greyish opacity in the pupillary area, and this opacity or blurring that occurs in the human eye will prevent the entry of the visible rays that will fall on the retina in order to produce vision for the human being, which leads to the brain's neglect of this inactive or Amblyopia, which will be neglected and here the cataract is one of the causes of the Amblyopia (Chia *et al.*, 2015). Some tropic amblyopia develop if both eyes become amblyopic due to significant yet similar refractive errors. There is a direct relationship between the refractive error severity and amblyopia (Klimek *et al.*, 2004). Amblyopia symptoms can sometimes be difficult to spot because amblyopia is typically a problem of infant vision development (Shafique *et al.*, 2007). Amblyopia is usually hardly detected when it is still not severe. Early warning signs of amblyopia are: eyes tend to bump into objects on one side, eyes wander inward or outward, eyes not working together, poor perception of depths as well as squinting and double visions (Sethi *et al.*, 2018). In childhood, nerves and communication pathways which connect the brain to the eyes are formed. Therefore, treatment of amblyopia is usually most effective on people who ages are 7 years or less. When the treatment starts earlier, good results will be obtained. If you have Amblyopia and are older results can still be seen in teenagers, up to

around age 17, don't let your age be a restraining. Even adult patients may frequently obtain better visions when treated, thus, it is necessary to talk the eye doctor about treatment options. The best and favorable way for treating amblyopia is treating the underlying eye conditions i.e. helping the damaged eye to develop normally is required. Simply, measures of early treatment may involve contact lens, eye glass,, eye patch, eye drop or vision treatment. Whenever the treatment starts earlier, better outcomes will be achieved. Nevertheless, patients may have a chance to when they are diagnosed and treated when they are old (Holmes *et al.*, 2013; Daw, 2014). Treatment options for Amblyopia include: Exercises, Corrective eyeglasses and contact lenses, Eye patches, Bangerter filter and Eye drops (19). It was shown that there is a benefit from games and activities designed to challenge weak eyes, although they may not suffice for vision correction as stand-alone treatments. Lazy eye is sometimes caused by vision variation in each eye. For example, one eye can be farsighted (hyperopia), leading to a difference in sharpness of visions between both eyes. This is called refractive amblyopia. The irregular curve in the cornea or astigmatism in one eye may also result in a lazy eye. The lazy eye causes may usually be corrected by the use of contact lenses or eye glasses (Whelan, 2020). A medicated eye drop may be useful for vision blurring in the dominant eye, rendering the weaker eye to work harder. Atropine, which is available under the brand name Isopto atropine, is the typically used treatment. Atropine dilates the pupil of the eye to cause blurred vision. It may be applied many times per day to reduce the dominant eye's vision, to make the amblyopia work harder. You'll need a prescription Atropine is available by prescription only and should be used according to your doctor's directions (Ferris, 2015). In case of a lazy eye, the simple, cost-effective treatment is wearing an eye patch, which causes vision improvement in the weaker eye. On patching prescription, it is necessary to prescribe 6 hrs of daily patching for severe amblyopia, and 2 hrs. of daily patching for moderate amblyopia. Certain children who suffer from severe amblyopia may respond to at least 2 hrs of patching. The use of adhesive patches in younger children must be strongly regarded so that peeking is less probable to happen (Pediatric Eye Disease Investigator Group, 2003, 2008). Occlusion (or pharmacologic penalization) eye were confirmed to be efficient treatments for both strabismic and anisometropic amblyopia, although they are often not necessary to treat anisometropic amblyopias (Pediatric Eye Disease Investigator Group, 2006; Holmes *et al.*, 2006). The translucent filter is used to the sound eye's spectacle lenses as an amblyopia treatment for

full-time wear. Bangerter filters may be regarded as a first-line treatment for amblyopia, or for patients not conformed with atropine or patching treatments (Rutstein *et al.*, 2011; Pediatric Eye Disease Investigator Group Writing Committee, 2010). The surgery functions by either tightening or loosening the muscles of the eyes, which results in changing the eye alignment relative to each other (Simborg, 2017). Exercises of the lazy eye were shown to help in this condition's correction, particularly if it is caught early (Kraff, 2023). Patients may also get instructions on the times and duration of doing each exercise. The majority of eye exercises must be performed when the good eye is covered or patched, which will force the patient to utilize the lazy eye for seeing. Patching can be really regarded as an eye exercise in and of itself, because it renders the brain to depend upon a weaker eye (Kraff, 2023). All kinds of puzzles may be helpful in stronger growth of the weak eye in case of patching the leading eye. Trying actual table-top cardboard puzzle, word puzzle with fairly small prints, mazes and activity books are very helpful in treatment. The weak eye is forced to work to improve its focus by anything requiring the eye to focus on image details, words, precise shapes or tracking movements of a pen through specific areas. Such types of eye exercises are also enjoyable and easy treatments for both adults and children with amblyopia (Brind'Amour, 2018). The weaker eye is forced to focus on boundaries and details by coloring inside the lines when the stronger eye is covered with a patch. Coloring simply enjoyable way to guides a lazy eye towards improved tracking, movement and focus, and it may make eye treatment fun for children who may not be interested in a complex or a boring eye books will be useful. When the coloring details are stronger, the exercise will be more intense. Careful drawings (not scribbling) can result in similar benefits (Brind'Amour, 2018). The weak eyes can be improved by the focus on small letters and move the eye on the pages of a book, a newspaper, a bill, a homework or a magazine. Trying to read with the strong eye which is covered or patched with the patient's palms, will force lazy eyes to take the lead. When it is too hard for a patient to read small prints with his weak eye alone, he has to ask for the correct prescription. The need to just practice, which may take a long time to improve the weak eye's focus so as to make it stronger (Brind'Amour, 2018). The treatment for amblyopia by video games range noticeably (a half hr weekly to 2 hrs daily) in how much time is spent by the participants to play these games. However, the benefits seem significant and can be easier ways to make children perform their eye exercises than the rudimentary eye exercises performed by older people (Brind'Amour, 2018). The standard

eye exercises are the conventional way to improve the movement of eye muscles movements and coordinations, and these are specific routine methods that can be done with lazy eyes to force them to perform their focusing and motion activities. It is always believed that the exercise improves and supports the vision of the weaker eye and helps the eyes to work together, which must be performed using the covered strong eye unless the ophthalmologist tells the patient otherwise (Whelan, 2020). When the treatment of a lazy eye starts early, it will be highly effective. It is possible to fully correct a lazy eye, particularly for a child who is treated before the age of 7. Older children, teenagers, and adults may also see significant improvement in this condition with treatment that includes eye exercise. The eye doctor may recommend other treatments including in-office vision treatment. Vision therapies are kinds of physical therapies for eyes. It's overseen by an orthoptist. Techniques may include using prism lenses, therapeutic lenses, optical filters, and computer software. Eye patching involves the stronger eye covering with an eye patch for two to six hrs or longer daily (Whelan, 2020). For many people, eye strain is an actual problem. Human eyes are not made-up to be fastened on a single thing for a long period of time. Working on the computer all day, then the 20-20-20 rule can help in preventing the digital eye strain. For implementation of this rule, every 20 minutes, the individual must look at something 20 feet away for 20 second (Osborn, 2018).

2. Patients and methods

The Current study was commenced from 11th November 2022 to 20th of March in the optical workshop in College of medical and health techniques-Baghdad. This is study involves forty (40) patients,

Table 1. Demographic characteristic and distribution of study sample according to gender and age.

Age groups (year)		Gender		Total
		Male	Female	
(2–14)	No.	2	7	9
	%	5%	17.5%	22.5%
(15–24)	No.	14	9	25
	%	35%	22.5%	62.5%
(25–34)	No.	3	3	6
	%	7.5%	7.5%	15%
(35–45)	No.	-	2	2
	%	-	4.76%	4.76%
Total	No.	19	21	40
	%	47.5%	52.5%	100%
$\mu \pm SD^*$				
20 $\pm$ 7.41				

*.Mean, SD: Standard Deviation.

nineteen (19) males and twenty one (21) females with age ranges from (2_45) years old. All patients in our study diagnosed by visual acuity (VA) test for both right and left eyes (without glasses and with glasses), then the patients submitted to study questionnaire (Date of amblyopia diagnosis), is there any previous treatment? What type of exercises (Patching, ocular motility and others) they have?. The patients examined by Visual acuity (VA) examination, Auto refractor device, Retinoscope device and Trial case, through the physical treatment sessions (one session in every week during one month), patients are treating by many physical exercises (patching, ocular motility).

3. Results and discussion

Results in Table 1 revealed that the distribution study samples (n = 40) according to demographic variables (gender (male and female) and age), which

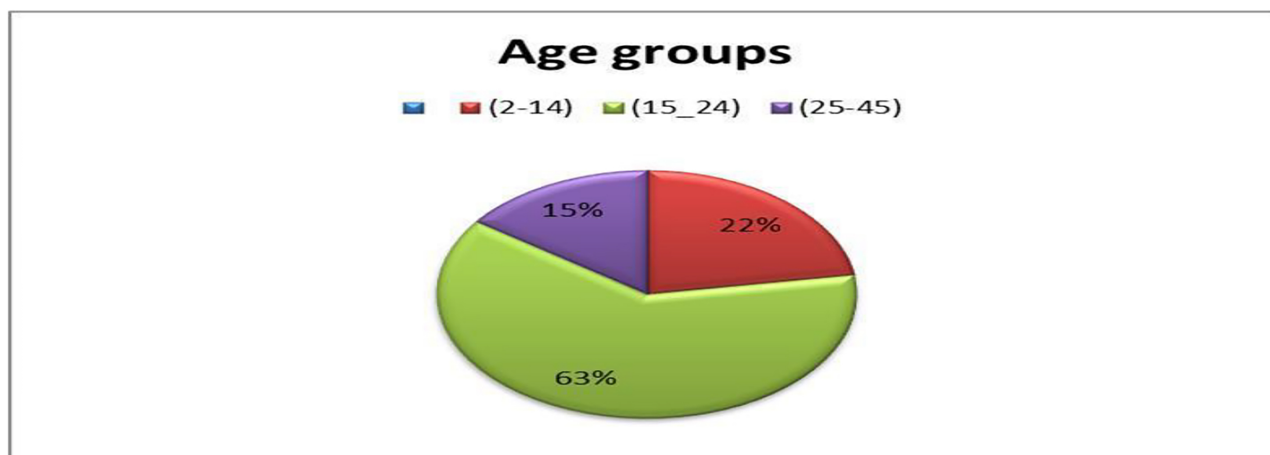


Fig. 1. Distribution of the study samples according to age groups.

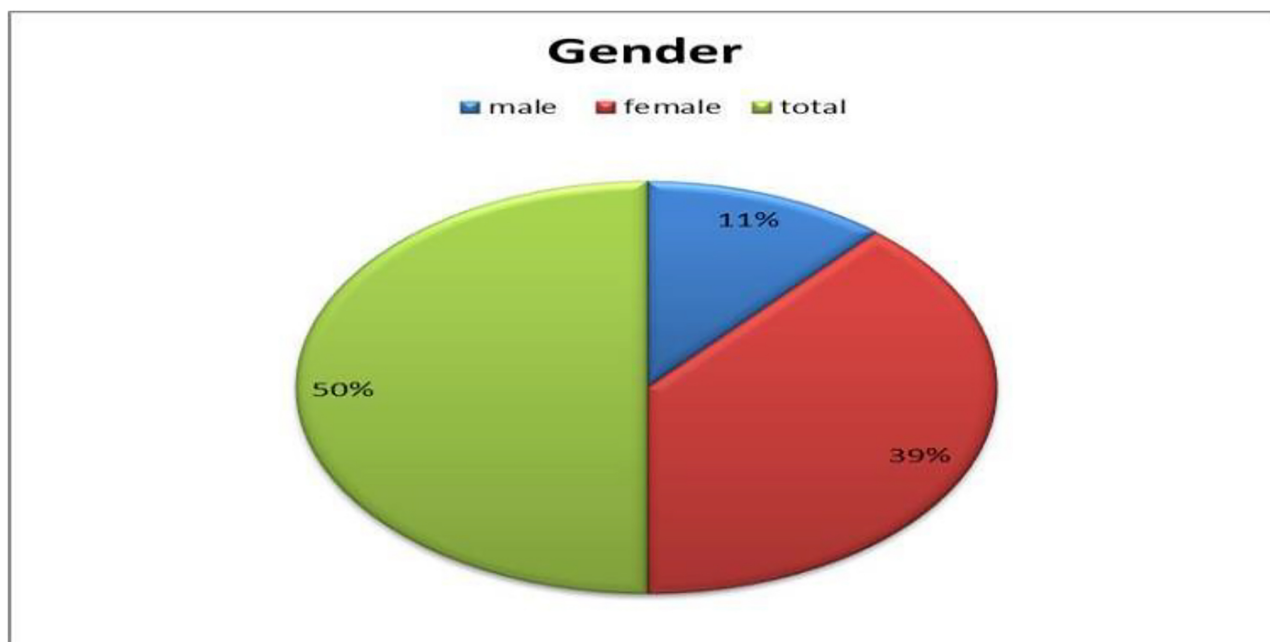


Fig. 2. Distribution of the study samples according to gender.

Table 2. Comparison between the before and after treating by physical exercises of the visual acuity for the right eye (Rt) in patients with Amblyopia using a t-test.

Visual acuity of the right eye	Mean	S.D	Minimum	Maximum	p-value	Sig.
Pre physical exercises	6\24	±3.004				
post physical exercises	6\12	±1.362	6\6	6\60	0.03*	Significant

* Statistically significant using the T-test at the level of 0.05.

Table 3. Comparison between the before and after treating by physical exercises of the visual acuity for the left eye (Lt) in patients with Amblyopia using a t-test.

Visual acuity of the right eye	Mean	S.D	Minimum	Maximum	p-value	Sig.
Pre physical exercises	6\18	±2.3562				
post physical exercises	6\9	±2.423	6\6	6\60	0.041*	Significant

* Statistically significant using the T-test at the level of 0.05.

revealed that the percentage of gender (19) (47.5%) for study group were males and (21) (52.5%) for study group were females. The age groups ranges from (2–45) years old, Mean age was (20 ± 7.41). The results of percentage are shown in Figs. 1 and 2.

In order to know if there is an improvement in Amblyopia treating for right and left (Rt & Lt) eyes, we used the statistical test (t-test).

In order to know if there is an improvement in Amblyopia treating for right and left (Rt & Lt) eyes, we used the statistical test (t-test). Results in Table 2 revealed that there were significant difference at ($p < 0.05$) (0.03) meaning an improvement (6/12) in (V.A) in the pre and post treating by physical exercises for the right eye (Rt) in patients with Amblyopia.

In the Table 3, the results showed that the statistical differences were significant at ($p < 0.05$) that is means there is an improvement (0.041) in (V.A) in the pre

and post treating by physical exercises for the left eye (Lt)(6/9) at p-value) 0.041 (in patients with Amblyopia. Our results agree with (Sansevero, 2020; Lunghi et al., 2019) that the treating by physical exercises improve the amblyopia. We conclude from the results of current study that the treating by physical exercises has significant effect improving on the visual acuity of the eyes in patients with amblyopia.

Acknowledgement

Conflict of interest

Funding statement

Author contributions

References

- Ryan Corte, O.D. (2023) By Adam Felman Everything you need to know about 'lazy' eye Medically reviewed Updated on April 20. Shannon, J. (20 September 2019) What is a lazy eye. Medically reviewed by Ann Marie Griff, O.D.
- ^ Jump up to: a b c d e f g h Jefferis, J.M., Connor, A.J., & Clarke, M.P. (November 2015) Amblyopia. *BMJ*, 351, h5811. doi: [10.1136/bmj.h5811](https://doi.org/10.1136/bmj.h5811). PMID 26563241. S2CID 220101666.
- Maconachie, G.D., & Gottlob, I. (December 2015) The challenges of amblyopia treatment. *Biomedical Journal*. 38(6), 510–6. doi: [10.1016/j.bj.2015.06.001](https://doi.org/10.1016/j.bj.2015.06.001). PMC 6138377. PMID 27013450.
- National Eye Institute. (2013) Jump up to: a b c d e f g h i j k l m Facts About Amblyopia. Archived from the original on 27 July 2016. Retrieved 27 July 2016. 2 ^ Jump up to: a b c d e f g h.
- National Eye Institute. (2 July 2019) *Amblyopia (Lazy Eye)*. Retrieved 31 January 2020.
- Brind'Amour, K. PhD, MS. (2018) *Amblyopia: 5 Eye Exercises to Help Correct 'Lazy Eye'*. June 23, 2018.
- Ganekal, S., Jhanji, V., Liang, Y., & Dorairaj, S. (2013) Prevalence and etiology of amblyopia in Southern India: results from screening of school children aged 5–15 years. *Ophthalmic Epidemiol*, 20, 228–31.
- Faghihi, M., Ostadimoghaddam, H., Fatemi, A., Heravian, J., & Yekta, A. (2012) The Prevalence of Refractive Errors, Strabismus and Amblyopia in Schoolboys of Varamin, Iran, in 2010. *Iranian J Ophthalmol*, 24, 33–9.
- Polling, J.R., Loudon, S.E., & Klaver, C.C. (2012) Prevalence of amblyopia and refractive errors in an unscreened population of children. *Optom Vis Sci*, 89, e44.
- Fu, J., Li, S.M., Li, J.L., Li, S.Y., Liu, L.R., & Wang, Y., et al. (2013) Screening for amblyopia among grade-1 students in primary school with uncorrected vision and stereopsis test in central China. *Chin Med J (Engl)*, 126: 903–8.
- ^ Jump up to: a b c d e f g h i j k l m n o p q r s t. (September 2009) Facts About Cataract. Archived from the original on 24 May 2015. Retrieved 24 May 2015.
- Visual impairment and blindness Fact Sheet N°282". (August 2014) Archived from the original on 12 May 2015. Retrieved 23 May 2015.
- Chia, A., Dirani, M., Chan, Y.H., Gazzard, G., Eong, K.G., & Selvaraj, P., et al. (2015) Prevalence of amblyopia and strabismus in young Singaporean Chinese children. *Invest Ophthalmol Vis Sci*, 51, 3411–7.
- Klimek, D.L., Cruz, O.A., Scott, W.E., & Davitt, B.V. (2004) Isoametropic amblyopia due to high hyperopia in children. *J AAPOS*, 8, 310–313.
- Shafique, M.M., Ullah, N., Butt, N.H., Khalil, M., & Gul, T. (2007) Incidence of Amblyopia in Strabismic population. *Pak J Ophthalmol*, 23, 1–6.
- Sethi, S., Seth's, M.J., Hussain, I., & Kundi, N.K. (2018) Causes of amblyopia in children coming to ophthalmology outpatient department Khyber Teaching Hospital, Peshawar. *J Pak Med Assoc*, 58, 125–8.
- Holmes, J.M., Lazar, E.L., Melia, B.M., Astle, W.F., Dagi, L.R., & Donahue, S.P. (2013) Pediatric Eye Disease Investigator Group. Effect of age on response to amblyopia treatment in children. *Arch Ophthalmol*, 129, 1451–7.
- Daw, N.W. (2014) Treatment of Amblyopia. *Visual Development Springer US*, 167–180.
- Whelan, C. (May 20, 2020) Medically reviewed by Ann Marie Griff, O.D.
- Ferris, J.D. (27 Oct 2015) Amblyopia: atropine FRCOPhth Squint Clinic.
- Pediatric Eye Disease Investigator Group. (2003) A randomized trial of patching regimens for treatment of moderate amblyopia in children. *Arch Ophthalmol*, 121, 603–611. [PubMed] [Google Scholar].
- Pediatric Eye Disease Investigator Group. (2008) A randomized trial of near versus distance activities while patching for amblyopia in children aged 3 to less than 7 years. *Ophthalmology*, 115, 2071–2078. [PMC free article] [PubMed] [Google Scholar]
- Pediatric Eye Disease Investigator Group. (2006) A randomized trial to evaluate 2 hours of daily patching for strabismic and anisometropic amblyopia in children. *Ophthalmology*, 113, 904–12.
- Holmes, J.M., Repka, M.X., Kraker, R.T., & Clarke, M.P. (2006) The treatment of amblyopia. *Strabismus*, 14, 37–42.
- Rutstein, R.P., Foster, N.C., & Cotter, S.A., et al. (2011) Visual acuity through Bangerter filters in nonamblyopic eyes. *J AAPOS*, 15, 131–134. [PMC free article] [PubMed] [Google Scholar]
- Pediatric Eye Disease Investigator Group Writing Committee. (2010) A randomized trial comparing Bangerter Filters and patching for the treatment of moderate amblyopia in children. *Ophthalmology*, 117, 998–1004. [PMC free article] [PubMed] [Google Scholar]
- Simborg, M. (Mar. 04, 2017) Reviewed By Stephen N Lipsky MD, Denise Satterfield MD.
- Kraff, C. (April 5, 2023) Strabismus vs Amblyopia: What's the Difference.
- Brind'Amour, K. PhD, MS (June 23, 2018) *Amblyopia: 5 Eye Exercises to Help Correct 'Lazy Eye'*.
- Whelan, C. (June 30, 2020) Medically reviewed by Daniel Bubnis, M.S., NASM-CPT, NASE Level II-CSS, Fitness.
- Osborn, C.O. (September 29, 2018) Medically reviewed by Ann Marie Griff, O.D.
- Sansevero, G. (2020) Running to ward amblyopia. Arecovery. *Scientific Report Research*, 10, 12661, www.nature.com/scientificreport
- Lunghi, C. et al. (Feb 2019) A new counter intuitive traing for adult amblyopia. *Uction Transit Neural*, 6(2), 274–284 PMC(pubmed control).