

Optimizing paediatric eye health with Homeopathy: A review

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ABSTRACT

The equilibrium of sensory organs has consistently been crucial for the holistic growth and development of a child. Among these, the significance of the eyes and vision has been paramount in shaping a child's progress. As the child matures, maintaining optimal eye health and vision has a direct correlation with their ability to keep pace in today's fast-paced world. But after the COVID-19 pandemic, the reliance on digital platforms for educational and recreational purposes among children has become nearly unavoidable. Consequently, there is a growing apprehension regarding the impact on children's eye health, necessitating a deeper exploration of the underlying causes of these eye-related issues. This article aims to introduce and explore eye and vision conditions that impact pediatric individuals, ranging from neonates to adolescents. Through the compilation of information from diverse published articles indexed in Google Scholar and PubMed, as well as standard Homoeopathic literature, a concise review is presented on various ophthalmological conditions. The primary objective is to provide insights into the approach of Homoeopathy in addressing these conditions and offer a comprehensive overview of the subject.

Key words: Paediatrics, Homoeopathy, Ophthalmology, Eye health, Computer vision syndrome

In today's context, the significance of understanding and addressing the continuous rise in internal and external factors influencing children's development and related disorders cannot be overstated. The delicate equilibrium among various sensory organs has emerged as a fundamental requirement for children to effectively adapt to the escalating demands of productivity and daily life. The ever-changing environment, including factors such as technological advancements, increased screen time, dietary changes, and exposure to pollutants, has contributed to a complex interplay of influences on children's development. These influences impact their physical, cognitive, and emotional well-being, making it crucial to maintain a harmonious balance among the sensory organs [1].

The sensory organs, including the eyes, play a vital role in a child's overall development. They are the primary source of information gathering, enabling children to explore and make sense of the world around them. However,

excessive strain imposed on these organs due to extended periods of screen time, improper lighting, or unhealthy visual habits can lead to various eye disorders and impact the child's ability to function optimally [2]. Recognizing the significance of this delicate balance and actively implementing strategies to support it can contribute to the healthy development of children and equip them with the necessary tools to thrive in today's fast-paced world. As the demand of productivity has seen an increase in today's world, it has also proportionately brought about an increase in the usage of the digital media and devices. Hence, the relevance of understanding the early signs and symptoms, especially in children becomes important.

Eye and vision disorders are highly prevalent in the world, especially in children. In rural India, 2.7% of the children have shown symptoms of mild to severe visual impairment [3]. Since about 55% of the teaching-learning methods emphasizes on the visual components, majority of the learning process in children is by visual means, familiarizing with these disorders and understanding its management

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is a necessity as this point. Understanding the eye disorders and treating them effectively will aid in the optimum functioning of the child at home and in the society.

Normal Visual Development

The progressive development of a child's vision begins at birth. A neonate's vision is initially poor, and although subjective assessments are not possible at this stage, electrophysiological and functional tests determine that the visual acuity is around 2/60. As the child grows into an infant, their visual acuity improves rapidly. By the age of 6 months, the visual acuity corresponds to approximately 6/12. Additionally, color vision, contrast sensitivity, and accommodation also show rapid improvement with the child's age [4]. Monitoring the visual development of the child can be effectively done through developmental milestones. These milestones include poor eyesight at birth with a prominent eye-blinking response to light, following an object at 1 month of age, reaching for objects at 4-5 months of age, identifying colors at 7 months of age, recognizing parents, and recognizing oneself in the mirror [5]. These milestones help provide an objective assessment of the child's visual development.

Disorders of Vision

1. Congenital Eye Anomalies

Congenital eye anomalies refer to structural abnormalities or malformations of the eye that are present at birth or develop during fetal development. These anomalies can manifest as isolated conditions or be part of systemic syndromes, and they can have a significant impact on visual function. The causes of congenital eye anomalies can vary and may include genetic factors, disruptions in embryonic development, intrauterine infections, or exposure to teratogens. It mostly is due to germ line or somatic mutation [6]. These anomalies encompass a wide range of conditions, including but not limited to microphthalmia (abnormally small eye), colobomas (incomplete closure of the optic fissure), congenital cataracts (clouding of the eye's lens), and various tumors such as retinoblastoma and infantile hemangiomas. Some of the commonly seen congenital eye disorders that leads to vision impairment are-

A. Infantile periocular Hemangiomas: Infantile hemangiomas are the most common tumors of the eyelids in infants. They have a distinct bright red or purple appearance, and superficial ones tend to blanch under pressure. Although they may go undetected at birth, they typically grow in size during the first year and then slowly

regress over the first decade. Vision loss can occur due to amblyopia caused by induced astigmatism or visual deprivation from ptosis [7]. The initial treatment of choice is typically steroid therapy, either intralesional or oral.

Published articles have shown the benefit of homeopathy in infantile hemangiomas. One case report showed how an infantile periocular hematoma in a 4-month-old girl was treated with the homeopathic remedy *Arnica montana* and showed remarkable results with complete healing of the hemangioma within 4 months of treatment. In the case, the Vancouver Scar Scale score decreased from 9 to 0 within four months [8]. Another publication mentioned 2 cases of infantile hematoma treated with homeopathy, where *Calcarea flour* and *Silicea* were given according to the indications in these cases. They not only reduced the size of the hemangioma from 9 to 0 in the first case and 9 to 1 in the second case using the Vancouver scar scale, but also eliminated the associated symptoms. It is noteworthy that the prescriptions in both cases were in higher potencies [9].

B. Epibulbar Dermoids: Epibulbar dermoids, also known as choristomas or congenital dermoid, congenital changes of mesodermal and ectodermal origin. They can induce astigmatism and contribute to refractive amblyopia. Excision of these dermoid may be performed to improve cosmetic appearance and prevent amblyopia [10]. In "The Condensed Materia Medica by Dr C Hering", he provides indications of 2 remedies for dermoid growths in the eye. *Natrum carb* when there is dermoid swelling on the conjunctiva with heaviness of eyelids and sensation of feathers before the eyes. Here the patient's vision is dim and has to wipe them constantly. He also mentions about *Nitric acid* where the patient has dermoid swelling of the eyes with eyelids swollen and eyes are dim and sunken [11]. Pulford in his Materia medica mentions about the indications of *Natrum muriaticum* which has dermoid tumors in the edge of the lid with strabismus [12].

C. Microphthalmia: Microphthalmia refers to a range of disorders due to genetic or teratogenic influences in which the axial length of the eye is at least two standard deviations below the normal range. The size of eyes in the child is small and it leads to various visual anomalies including blindness [13]. It is often associated with secondary orbital and ocular deformities, including cataracts and coloboma. Microphthalmia is frequently observed in conjunction with various genetic conditions such as trisomy 13 and Goldenthal's syndrome.

D. Colobomas: Colobomas result from the incomplete closure of the embryonic fissure on the inferonasal side of

the optic cup during embryogenesis [14]. They frequently coexist with microphthalmia. The visual prognosis depends on the degree to which the optic nerve and macula are affected. In his book "Ophthalmic Diseases and Their Therapeutics," Dr. Norton refers to a published case study in which a patient with Glaucoma and significant colobomas in both eyes, experiencing pain and reduced vision, achieved successful treatment using *Gelsemium* as the sole intervention [15].

2. Optic Nerve Disorders [16]

Optic nerve disorders in children encompass a variety of conditions that impact the optic nerve, a crucial pathway responsible for transmitting visual information from the eye to the brain. These disorders can lead to visual impairment or permanent vision loss. It includes Optic Nerve Hypoplasia, Optic Neuritis, Leber Hereditary Optic Neuropathy (LHON), and Optic Glioma. These disorders present a range of symptoms such as vision loss, eye movement pain, color desaturation, and proptosis. Diagnosis often involves a comprehensive ophthalmic evaluation, neuroimaging techniques like MRI, and occasionally, biopsy. According to Dr. Norton's book, the following remedies are described for specific symptoms of optic nerve disorders [15]:

1. **Belladonna:** This remedy is frequently recommended for hyperemia and inflammation of the optic nerve.
2. **Duboisia:** Considered highly effective in treating both hyperemia and inflammation of the optic nerve.
3. **Phosphorus:** Phosphorus is indicated for cases of hyperemia or inflammation of the optic nerve.
4. **Pulsatilla:** It is recommended for hyperemia and inflammation of the optic nerve and retina, often accompanied by varying degrees of severe headaches that are relieved in open air. Individuals may experience a sensation of having a veil before their eyes, or their vision may be significantly impaired.

3. Retinitis Pigmentosa (RP)

Retinitis pigmentosa (RP) is a group of inherited retinal disorders characterized by progressive degeneration of the photoreceptor cells in the retina [17]. It is a relatively rare condition that affects approximately 1 in 4,000 individuals worldwide. RP typically manifests during childhood or adolescence and leads to gradual vision loss over time. Including symptoms of Night blindness, Tunnel vision (Gradual loss of peripheral vision), Photopsia (Occasional perception of flashing lights or photic stimuli), Color vision abnormalities [18].

Diagnosis is done by ophthalmic evaluation including visual acuity testing, visual field assessment, and evaluation of the retina using techniques like fundoscopy or optical coherence tomography (OCT), Electroretinography (ERG) or Genetic testing. A case study demonstrated the successful treatment of Retinitis pigmentosa with Homoeopathic remedies in an old publication. But it showed the utility of correctly chosen remedy in the gradual, but progressive improvement in the symptoms.

The physician gave *Arum* as the first prescription followed by SL and then by multiple doses of *Sulphur*. They were able to demonstrate objective changes in the fundoscopic measurements and all the symptoms of RP [19]. Another recent case study of RP in a 25-year-old female, treated with individualized remedy of *Natrum sulph 200* showed positive results in vision and other associated symptoms which was followed up even after 4 years with positive improvement and absence of any recurrence [20]

4. Retinopathy of Prematurity

Retinopathy of prematurity (ROP) is a vision-threatening eye disorder that primarily affects premature infants. It occurs due to abnormal blood vessel development in the retina either due to excess or deficient oxygen supply [21]. Seen mostly in preterm neonates, ROP is a significant concern in neonatal care, and early detection and treatment are crucial to prevent vision loss. Presents as stages (stage 1 to 5) based on its severity, with symptoms of abnormal eye movements and visual disturbances including partial blindness.

It may lead to retinal detachment if not treated, and cause permanent vision loss. The extent and severity of ROP are classified using established systems such as the International Classification of Retinopathy of Prematurity (ICROP) [22]. Treatment for ROP depends on the stage and severity of the disease. Options may include laser therapy, cryotherapy, anti-VEGF injections, or surgical intervention to prevent retinal detachment. Regular follow-up examinations are necessary to monitor the progression and response to treatment. In Synthesis repertory, the following rubrics corresponds to the symptoms of ROP [23]

- EYE, DEGENERATION, Retina- agar, aur, dig, gels, ham, kali-I, lith-c, merc, merc-c,nux-v, phos, plb, sulph, syph, thiop
- EYE, DETACHMENT of retina- Arnica, Aur-m, Gels, apis, ars, sur, bry, ep,kali-i

5. Lacrimal Duct Disorders in Children

Lacrimal duct disorders in children are conditions that affect the drainage system responsible for tears. These disorders can lead to excessive tearing (epiphora), recurrent eye infections, and discomfort. The most common lacrimal duct disorder in children is congenital nasolacrimal duct obstruction (CNLDO), which occurs due to the blockage or narrowing of the tear drainage system. Congenital Nasolacrimal Duct Obstruction (CNLDO) [24]: CNLDO is the most common lacrimal duct disorder in children, characterized by the obstruction or narrowing of the nasolacrimal duct, which prevents tears from draining properly. Characterized by excessive tearing, discharge from the eyes, recurrent eye infections (conjunctivitis), and occasionally, swelling or redness around the tear duct area.

A comprehensive ophthalmic examination, including a careful evaluation of the tear drainage system, and sometimes additional tests such as lacrimal irrigation, dye disappearance test, or nasolacrimal duct probing will help in diagnosing this condition. In the *Materia medica* published by S. R. Phatak, remedies for lacrimal duct obstructions are given. *Fagopyrumis* given when there is pain along the lachrymal duct. *Mercurius dulcius* is given when there is closure of the duct. *Natrum mur* is given when there is stricture of the duct, with escape of mucous when pressing on the sac [25]. *Argentum metallicum* is indicated when there is stricture of lachrymal gland acc to *Materia medica* by Dr J H Clarke [26].

6. Childhood Cataract

Childhood cataract refers to the presence of opacities or clouding of the lens of the eye in children. It is a significant cause of visual impairment and blindness in pediatric populations. Childhood cataracts can occur due to various causes. Genetic Factors such as mutations in genes such as CRYAA, CRYAB, GJA8, and PITX3 have been associated with congenital cataracts [27]. Intrauterine Infections such as Rubella (German measles) and Toxoplasmosis are also responsible for this condition [28]. Metabolic Disorders such as Galactosemia and Lowe Syndrome (X-linked genetic disorder) can cause congenital cataracts along with other ocular and systemic abnormalities [29].

Perinatal Trauma also are responsible for congenital cataracts. Congenital cataracts present with symptoms of decreased vision, strabismus, nystagmus and leukocoria [30]. Diagnosis is done by Comprehensive eye examination, Genetic evaluation and systemic evaluation. Generally managed by surgical removal of the cataract

with implantation of intraocular lens and symptomatic management of the symptoms by therapy.

Dr J H Clarke describes the utility of remedy called '*Plantan*' where a girl child of 5 and half year old who was blind from double cataract had improved considerably with the usage of this remedy in tincture form [26]. In *Synthesis repertory*, *Mag-carb* is the single remedy for the rubric- EYE, CATARACT, children, in [21]. Norton describes remedies like *Causticum*, *Phosphorous*, *Iodoform*, *Sepia*, *Calcarea phosphand Naphthelene* for various symptoms associated with Cataract [15].

7. Refractive Errors in Children

Refractive errors in children refer to abnormalities in the focusing of light onto the retina, resulting in blurred vision. These errors can affect children of all ages and can have a significant impact on their visual development and overall quality of life. Common types of refractive errors in children include myopia (nearsightedness), hyperopia (farsightedness), and astigmatism. Diagnosed using visual acuity testing, retinoscopy, and subjective refraction, which is necessary to diagnose refractive errors in children. Cycloplegic Refraction by usage of cycloplegic eye drops, and corneal topography or optical coherence tomography (OCT) may be performed to assess the corneal shape or the health of the retina [31]. The prevalence of refractive errors in today's children can largely be attributed to the prevailing pattern of excessive screen time. This issue is extensively discussed in the following section, where various approaches to manage it are explained. Effective management strategies involve the use of prescription eyeglasses, contact lenses, orthokeratology, and refractive surgeries like laser-assisted in situ keratomileusis (LASIK).

Multiple remedies for refractive errors, particularly myopia, have been discussed in literature, supported by several modern scientific studies. To establish the efficacy of these remedies, a number of rigorous studies were conducted. A parallel-group, randomized, double-masked, placebo-controlled study involved 125 participants aged 7 to 25 years, all exhibiting spherical refraction ranging from -1.0 to -10.0 diopters (D) and astigmatism d" -2.0 D. The participants were assigned to receive either *Ruta 6c* or a placebo and were closely monitored for a period of 2 years. The study revealed a statistically significant difference in refraction and axial length between the two groups, providing conclusive evidence that *Ruta 6C* effectively regulates ocular refraction and axial length [32]. A retrospective study demonstrated the efficacy of Homeopathic *Ruta 3C*, administered twice daily over a

span of 2 years, in effectively managing the annual progression rate of myopia in individuals with simple myopia. Furthermore, the study revealed that the progression rate was further reduced when patients received personalized Homoeopathic treatment [33].

Another study focusing on myopia was conducted over a period of nearly 6 months, involving a sample size of 40 individuals ranging from 7 to 30 years of age. The individuals with myopia were evaluated using the Likert scale to assess their progress. Notable improvements were observed in subjective symptoms based on the Likert scale scoring, although no clinically significant changes in the degree of myopia were observed [34]. Multiple repertories list various remedies for myopia. According to the Phatak repertory, higher grade remedies include *Nitric acid*, *Phosphorus*, and *Pulsatilla*. Additionally, *Conium*, *Lilium tig*, *Acid Phos*, and *Physostigma* are also indicated as remedies for this condition [35].

8. Conjunctival Disorders

Conjunctival disorders in children encompass a range of conditions that affect the conjunctiva, which is the thin membrane covering the front surface of the eye. These disorders can vary from common infections to more serious inflammatory or neoplastic conditions. Some of the notable conjunctival disorders in children include:

1. Conjunctivitis: Commonly known as "pink eye," conjunctivitis is characterized by redness, itching, discharge, and sometimes swelling of the conjunctiva.
2. Allergic Conjunctivitis: This condition is often associated with allergies and leads to symptoms such as itching, tearing, redness, and swelling of the conjunctiva.
3. Conjunctival Neoplasms: Although rare, conjunctival neoplasms refer to tumors that develop on the conjunctiva. Examples of conjunctival neoplasms include conjunctival nevi or conjunctival lymphoma. These neoplasms may manifest as pigmented or non-pigmented lesions on the conjunctiva.

Diagnosis of the condition is accomplished through a comprehensive clinical examination, microbiological testing, and, if necessary, biopsy. Bacterial infections are typically treated with topical antibiotic eye drops or ointments as the primary approach. Supporting treatment measures include the use of artificial tears, cold compresses, and practicing good hygiene. Management strategies for allergic conditions involve allergen avoidance, utilizing cold compresses, and the application of antihistamine eye drops.

A case study details the exploration of a homeopathic remedy and treatment plan chronic follicular conjunctivitis in one eye. It was treated initially with *Silicea* and cured using *Lycopodium* [36]. In another case study published, a 13-year-old girl was successfully cured of allergic conjunctivitis using *Nat Mur 30 OD* for three consecutive days [37]. During an outbreak of viral conjunctivitis, a double-blind study was conducted to investigate the effects of *Euphrasia 30c* compared to a placebo. A total of 994 participants were included in the follow-up analysis. The study suggests that the existing protocol for testing *Euphrasia* can be utilized as is to scientifically validate the efficacy of a genus epidemicus [38].

9. Eye disorders due to excessive screen time-computer vision syndrome

Computer Vision Syndrome (CVS), also known as digital eye strain, is a condition characterized by a collection of symptoms that result from prolonged or excessive use of digital screens such as computers, smartphones, tablets, and televisions. While CVS is not considered a specific medical diagnosis, it is a recognized and common condition affecting individuals of all ages who regularly engage in digital screen use [39]. Computer Vision Syndrome can also affect the pediatric age group, causing a range of eye-related issues. Children are increasingly exposed to screens at a young age, whether for educational purposes or entertainment. Extended periods of screen time can strain their developing visual system, leading to symptoms of CVS.

Children may experience eye fatigue, dry eyes, blurred vision, headaches, and neck or shoulder discomfort. Continuous screen use can also disrupt their natural blinking patterns, resulting in dry and irritated eyes. Moreover, the blue light emitted by screens can potentially interfere with their sleep patterns. This phenomenon was unavoidably seen during the COVID-19 pandemic when the whole world had to shift to digital means. A study was conducted in Bangladesh on 917 postsecondary students on Computer Vision Syndrome and its association with the unavoidable online digital education during the COVID-19 pandemic. The results revealed an overall prevalence of CVS of 68.16%. After adjusting for confounding factors, the study found significant associations between CVS and the use of mobile or tablet devices (adjusted odds ratio, AOR 8.954, 95% confidence interval) [40].

It is important to encourage children to follow healthy digital habits, such as taking regular breaks from screen time, maintaining proper posture, and ensuring appropriate lighting conditions. Implementing the "20-20-20 rule,"

where every 20 minutes, children take a 20-second break and focus on an object at least 20 feet away.

A study results demonstrated noteworthy changes in patients experiencing dry eye symptoms following the educational method of the "20-20-20 rule," which not only showed slight reduction in the symptoms of Computer Vision Syndrome, but also a significant increase in the tear breakup time (TBUT) [41]. Various Homoeopathic remedies correspond to the symptoms of CVS which may help in reducing the intensity of the symptoms associated with it. Remedies like *Ruta*, *Arsenic*, *Picric acid*, *Euphrasia*, *Lithium carb*, *Jaborandi*, *Senega* and *Duboisinum* may help in treating CVS, especially when associated with dry eye [42]

GENERAL MANAGEMENT

To promote healthy eyes and reduce the risk of eye disorders in children, several general management strategies can be implemented. These include:

1. Routine Eye Examinations

- Regular comprehensive eye examinations by an eye care professional are essential to detect and address any potential eye disorders early on.
- Recommended frequency: The American Optometric Association suggests that infants should have their first eye examination between 6 to 12 months of age, followed by subsequent examinations at the age of 3 and before starting school, and then every one to two years.
- It is recommended that all children undergo a vision assessment, and if there are indications of subnormal vision during screening, a refraction test should be performed. This assessment is ideally done before the child begins schooling, around 3-4 years of age, as part of preschool screening situations including ocular surgery (especially congenital cataract) [43].

2. Eye Protection

- Encouraging children to wear protective eyewear, such as safety glasses or goggles, during activities that could pose a risk of eye injury (e.g., sports, recreational activities, DIY projects).
- Promoting the use of sunglasses that provide 100% UV protection when outdoors to reduce the risk of long-term damage from UV radiation exposure.
- Policies on preventing prolonged online classes and digital exposure needs to be implemented in schools

3. Proper Lighting and Reading Conditions: Ensuring adequate lighting in study areas, especially in classrooms, to prevent eye strain and discomfort. Promoting proper reading distance and posture to maintain a comfortable viewing distance and minimize eye fatigue.

4. Balanced Nutrition: Encouraging a well-balanced diet rich in fruits, vegetables, and foods containing essential nutrients for eye health, such as vitamin A, C, E, zinc, and omega-3 fatty acids. Promoting hydration to maintain overall eye health.

5. Hygiene and Preventive Measures: Encouraging good hygiene practices, such as washing hands regularly to minimize the risk of eye infections. Educating children about avoiding rubbing or touching their eyes excessively to prevent the spread of infections.

CONCLUSION

Eye disorders in children require careful attention and management to ensure optimal visual health and well-being. It is crucial for parents and caregivers to seek professional medical advice as early as possible to prevent any permanent damage to the eye. Through a review of the literature, it is evident that Homoeopathy offers potential solutions for a range of eye disorders in children. The studies discussed demonstrate positive outcomes and significant improvements in symptoms associated with conditions such as myopia, allergic conjunctivitis, and dry eye syndrome. The use of specific remedies such as *Ruta graveolens*, *Physostigma venenosum*, and *Natrum muriaticum* and many others has shown promising results in addressing these eye disorders.

However, further research and clinical trials are needed to strengthen the evidence base and establish the efficacy of Homoeopathy in treating eye disorders in children. While conventional medical approaches play a significant role in the diagnosis and treatment of pediatric eye disorders, Homoeopathy, with its individualized approach and focus on holistic well-being, presents a potentially beneficial option for the management of eye disorders in pediatric patients.

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