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Organization and Principles of a Specialized Kindergarten for the Treatment of Strabismus and Amblyopia in Young Children with Vision Impairments

A. V. Vasilenko, F. M. Khamidova
Department of Ophthalmology, Samarkand State Medical University, Samarkand, Uzbekistan

Abstract: This article explores the morphological and functional factors leading to comitant strabismus and outlines measures for its prevention and conservative treatment. It highlights the establishment of specialized kindergartens in the former Soviet Union and Uzbekistan, focusing on their success in treating children with vision impairments. These kindergartens, pioneered by scientists like Professor T.P. Kashchenko and Associate Professor A.Kh. Sharapova, combined therapeutic exercises, advanced ophthalmologic tools, and innovative methodologies to restore binocular vision and improve visual health in children. The article also emphasizes the importance of early diagnosis and intervention for visual disorders like amblyopia, myopia, and strabismus, presenting these facilities as effective solutions for fostering children's overall development.

Keywords: Strabismus, amblyopia, orthoptics, pleoptics.

The visual organ is the most critical tool for understanding the external world from early childhood. The eye functions as a distant analyzer, enabling spatial perception, depth awareness, movement observation, and distance evaluation of surrounding objects. A significant portion of information about the external environment is processed through this optical analyzer, contributing to the child's development.

Loss or impairment of vision substantially affects the perception of the surrounding world. The degree of impact depends on the age at which the pathology occurs. When this happens in early childhood, especially within the first year of life, the decline in visual acuity can be rapid. This is why early detection, diagnosis, and treatment are essential for restoring vision, overall health, and the child's personal development.

Amblyopia results from incomplete development of the visual system during the first years of life. It may be caused by strabismus, refractive differences between the eyes, or other factors that interfere with proper visual stimulation of the retina (e.g., loss of transparency in an eye component). Often, amblyopia goes unnoticed when one eye retains normal vision.

Amblyopia develops because the brain starts to ignore visual input from the weaker eye, even if its structures are healthy, leading to further deterioration in vision. Treatment typically involves:

- Correcting refractive errors (myopia or hypermetropia) with glasses.
- Addressing barriers to proper retinal stimulation (e.g., cataract removal, corneal clarity improvement).

- Patching the healthy eye to encourage the weaker eye's development through activities such as drawing, writing, or reading.

Myopia (Nearsightedness). Myopia is characterized by reduced clarity of distant vision, often caused by an elongated eyeball. This results in light focusing in front of the retina rather than directly on it. Early signs include difficulty seeing distant objects clearly.

Types of myopia include:

1. **Congenital Myopia:** Requires regular monitoring and, if necessary, correction.
2. **Hereditary Myopia:** Affects up to 50% of children if both parents are myopic, often starting as early as one year old.
3. **Acquired Myopia:** Develops in children aged 7–16 due to excessive near-work, poor lighting, or overuse of screens.

Myopia can be stationary (non-progressive) or progressive, with the latter potentially leading to severe physiological changes in the eye due to constant elongation of the eyeball. Treatment includes glasses, contact lenses, and specialized visual training.

Hypermetropia (Farsightedness). Hypermetropia involves difficulty focusing on close objects due to a shortened eyeball shape, causing light to focus behind the retina. This is common in young children and may resolve naturally by age 8.

If untreated, hypermetropia can lead to symptoms such as eye strain, headaches, and blurred vision, potentially resulting in amblyopia or strabismus. For older children with symptoms, glasses, contact lenses, or video-computer stimulation therapy may be prescribed.

Astigmatism. Astigmatism is a refractive error caused by an irregularly shaped cornea or lens, resulting in distorted or blurry vision. This condition can lead to amblyopia and strabismus if untreated.

Astigmatism is categorized as congenital or acquired (e.g., from trauma or surgery). A comprehensive ophthalmological examination is essential for accurate diagnosis and appropriate correction using glasses, contact lenses, or visual training exercises.

Strabismus (Crossed Eyes). Strabismus is an eye alignment issue caused by improper muscle coordination, leading to misaligned gaze directions. The brain suppresses the image from the misaligned eye, disrupting binocular vision and potentially causing amblyopia.

Strabismus can be congenital or acquired and is classified into:

- **Comitant Strabismus:** Characterized by synchronized eye movements but misalignment due to refractive errors or eye structure issues.
- **Paralytic Strabismus:** Caused by nerve or muscle damage, often associated with trauma or neurological disorders.

Treatment may involve corrective lenses, patching, visual stimulation exercises, or surgery. Early intervention is critical for successful outcomes.

Specialized Kindergarten for Vision Treatment

In 1976, a specialized kindergarten was established in Samarkand by Dr. A.H. Sharapova as a practical application of her 1974 dissertation. The facility was designed to treat preschool children with conditions such as amblyopia and strabismus, aiming to restore binocular vision and symmetrical eye alignment through therapeutic exercises, corrective glasses, and, if necessary, surgical preparation.

The kindergarten featured an ophthalmology room equipped with essential tools, including:

- Synoptophore

- Herschel prisms
- Reflex-free ophthalmoscope
- Echophthalmometer
- Field separator
- Perimeter
- Therapeutic games and toys

The facility provided exercises to alleviate accommodative spasms, vitamin therapy, and medications to relax eye muscles. The results of these interventions demonstrated high effectiveness, contributing to children's development and the broader implementation of similar facilities across the country.

Results and Expansion of Specialized Kindergarten Programs

The implementation of treatment methods developed through practical experience and close collaboration with the Helmholtz Institute led to the widespread adoption of similar institutions throughout the Soviet Union. By 1979, a specialized kindergarten for vision treatment was opened in Tashkent, modeled after the Samarkand facility.

These institutions proved effective in addressing congenital and acquired visual impairments in children. Early diagnosis and timely intervention were shown to significantly enhance treatment outcomes, aiding children's physical and cognitive development.

Binocular Vision Disorders

Binocular vision disorders are a common feature of various eye pathologies. Such disorders arise when the brain cannot combine images from both eyes into a single cohesive picture. Causes include differences in image size, clarity, or alignment on the retinas. As a result, one eye may be excluded from the visual process, leading to monocular vision and the loss of depth perception.

Correction involves:

- Exercises to train the eyes for coordinated vision.
- Addressing the underlying causes of monocular vision.

Preventative Measures for Eye Disorders

Prevention is critical in mitigating the impact of visual impairments on children’s development. Key measures include:

1. **Proper Nutrition:** A well-balanced diet supports eye health.
2. **Adequate Physical Activity:** Ensures overall well-being.
3. **Optimized Visual Workloads:** Alternating near and distance vision, along with regular eye exercises.
4. **Timely Corrections:** Addressing hypermetropia, myopia, or other conditions promptly.
5. **Injury Prevention:** Safeguarding against eye infections, head trauma, and eye injuries.

Modern Approaches to Vision Treatment

Advances in technology have introduced video-computer vision correction systems and automated training devices. These methods enhance the efficacy of traditional treatments by utilizing interactive techniques tailored for children. For example, video-computer autotraining (VCA) combines neurofeedback with visual stimuli to activate the brain’s natural mechanisms for image restoration.

Research has shown that VCA can improve vision even in severe cases of amblyopia with improper fixation. However, early intervention remains a decisive factor in achieving successful outcomes.

Contributions and Legacy

Professor Tamara Pavlovna Kashchenko played a key role in developing these advanced vision correction complexes, emphasizing their collaborative creation by specialists across various institutions, including the Department of Ophthalmology at SamMI and the specialized kindergarten in Samarkand.

Conclusions

The early identification and treatment of visual impairments during childhood are essential for effective therapy and the child's overall development. Specialized institutions, such as kindergartens for vision treatment, provide an optimal environment for implementing therapeutic and corrective measures under professional supervision. Their success demonstrates the importance of integrating medical expertise with child-friendly approaches to foster healthier development.

References

1. Бабаев, С. А., Кадирова, А. М., Юсупов, А. А., Бектурдиев, Ш. С., & Сабирова, Д. Б. (2016). Наш опыт хирургического исправления вторичного расходящегося косоглазия у детей. *Точка зрения. Восток-Запад*, (3), 124-126.
2. Кащенко Т.П., Райгородский Ю.М., Корнюшина Т.А. Функциональное лечение при косоглазии, амблиопии, нарушениях аккомодации. Методы и приборы монография 2016: Москва; Саратов: 163 с. Кащенко Т. П. Проблемы глазодвигательной и бинокулярной патологии //Вестник офтальмологии. – 2006. – Т. 122. – №. 1. – С. 32-35.
3. Шарапова А. Х. Методы восстановления фузионной способности при косоглазии и их клиническая оценка //Автореферат дисс. канд. мед. наук. – 1974. – С. 21
4. Юсупов, А. А., Юсупова, М. А., Юсупова, Н. А., & Василенко, А. В. (2020). Микроимпульс трансклеральная циклофотокоагуляция (мтсцфк) при лечении рефрактерной глаукомы: предварительные результаты. In *мировая экономика. Проблемы, перспективы, инновации* (pp. 42-49).
5. Юсупов, А. А., Юсупова, М. А., Юсупова, Н. А., Насретдинова, М. Т., Василенко, А. В., & Бабаев С. С. Результаты лечения терминальной болящей глаукомы с использованием метода микроимпульсной трансскле ральной циклофотокоагуляции «Офтальмология. *Восточная Европа*, (2023) *13*(1), 16-29.
6. Юсупов, А. А., & Василенко, А. В. (2012). Хамидова Ф.М. Наш опыт применения препаратов простогландинового ряда при глаукоме с нормальным и низким офтальмотонусом. В сб. научных трудов Московской медицинской академии им. И.М. .Сеченова. *Москва*, 300-30.
7. Юсупов, А. А., Хамидова, Ф. М., Василенко, А. В., & Эшназаров, И. К. Некоторые клинические материалы о взаимосвязи синдрома сухого глаза и атрофического ринита. Ўзбекистон республикаси соғлиқни сақлаш вазирлиги Тошкент тиббиёт академияси, 3, 152.
8. А.А. Юсупов, А.В. Василенко, Н. А. Юсупова Результаты хирургической коррекции анизометропии у пациентов с косоглазием. Проблемы биологии и медицины.- 2018/11/ 4 (104).- С.135-136