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A REVIEW ON COMPREHENSIVE EYE EXAMINATION IN PEDIATRIC PHYSICAL THERAPY

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ABSTRACT

Background: Even early in Eye disease, children have reduced economy of activity of daily living. Early eye examination, diagnosis and management will reduce the consequences of other system originated by eye problems. The current literature is aimed to provide and explore the knowledge of Pediatric Physical Therapist about pediatric eye examination. This will help in early detection of any eye disorder and in good prognosis of visual health, physical growth, social and mental health as well.

Methods: The data and contents of current literature have been explored from different webpages, books and by personnel experience in pediatric physical therapy and optometry.

Results: In the beginning disclosure and immediate treatment of ocular diseases in children is necessary to prevent lifelong visual deterioration. Checkup of the eyes should be carrying out early in the neonates period and at all well-child visits. Neonates should be checked for ocular structural abnormalities, such as cataract, corneal opacity, and ptosis, which are known to cause in visual problems. Every child who are bring into being have an ocular anomaly or who fail vision examination should be referred to a pediatric ophthalmologist or an eye care specialist appropriately trained to treat pediatric patients.

Conclusions: Children account for a large and growing percentage of the population of the India. Studies have demonstrated that the prevalence of eye and vision disorders is substantial in this group. Researches also reveal that early detection and intervention are particularly important in children because of the very quick development of the visual system in early childhood and its sensitivity to interference. When disorders such as amblyopia and squint are undetected, the long-term consequences can be serious in terms of quality of life, comfort, appearance, and career opportunities.

Keywords: Asthenopia, Bruckener Test; Confrontation test; Hirschberg test; Refractive error; stereopsis; Version test; Visual Acuity; Visual milestone.

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INTRODUCTION

Pediatric Physical therapy is independent health care providers who examine, diagnose, treat, and manage diseases and disorders of the nervous, musculoskeletal and now visual system also in pediatric condition. Pediatric Physiotherapist provides more than two-thirds of the health care services in the United States. They are more extensively dispersed geographically than other health care providers and are readily accessible for the delivery of physical health and health care services. There are about 32,000 full-time corresponding doctors of physical therapy currently in practice in the India. Physiotherapists practice in more than 7,000 communities across the India, serving as the sole physical health care provider in addition 4,300 communities.

The responsibilities of the field of physiotherapy is to fulfill the physical and physical health concern needs of the communities through clinical concern, research, and education, all of which improve the trait of life. Through this literature a Pediatric Physical therapist can examine and diagnosed the eye problems and some of how can treat also like refractive errors, nystagmus, asthenopia, convergence insufficiency, headache due to visual problems, amblyopia, functional visual loss etc. For this there are very few published clinical trials and literature to treat the visual disorder and to examine the eye in pediatric physical therapy.

Physical therapists, through their clinical education, guidance, maturity, and extensive geographic allocation have the means to supply persuasive physical health concern and primary eye and vision care services to children in the United States. Primary care has been express as those benefits administered to subjects by a health concern practitioner "who appreciate them, who is unfilled for first contact and carrying on the care, and who bid a doorway of entry to specialists for those conditions affirming referral."[1] Eye care serves as valuable point of entry into the health care system because: for all practical purposes all population need eye care benefits at some time in their lives, by its very essence, eye care administer for the evaluation, assessment, and coordination of a large rainbow of health care needs, eye care is a fair form of health care, specifically to patients who are averse to follow general or precautionary medical care.[2]

This Physiotherapeutic unbiased routine ground rule for the pediatric eye examination report applicable examination procedures for judgments of the eye health and vision status of infants and children to reduce the risk of vision loss and promote normal visual development. It includes endorsement for proper diagnosis, treatment, and, when necessary, consultation or referral for treatment by other health care provider. This ground rule will assist physiotherapist in attaining the subsequent targets:

Cultivate a relevant timetable for eye and vision examinations for pediatric population, select relevant examination procedures for all pediatric population, examine the eye health and visual status of pediatric population efficiently, minimize the adverse effects of eye and vision problems in pediatric population through early detection, education, treatment, and prevention, inform and educate patients, parents or caregivers, and other health care providers about the attention and frequency of eye and vision examinations in pediatric population.

Early findings

General symptoms that may occur from birth

Squints or blinks when looking at entity, the eyes are crossed, favors one eye more than the other when looking at an object, one or both of the eyes turn in or out, the pupils are hazy, excessive lacrimation, they are red, or the eye-lids are stuffed with matter, turns or tilts head abnormally, has frequent or persistent sties.

General Symptoms that may occur from 0-3 Months

Child does not follow an object in his visual field; child does not play with his hands.

General Symptoms that may occur from 3-6 Months

Child does not reach for toys in his visual field, child does not make eye contact when being fed or cuddled and child does not visually inspect objects in his hand.

General Symptoms that may occur from 6-9 Months

Child's motor skills such as rolling over, sitting or crawling. Do not develop, child does not appear to discriminate between similar objects or people, child does not pick up small objects successfully.

General Symptoms that may occur from 9-12 Months

Child shuts or covers one eye when focusing, child holds playthings very close to eyes, child bumps into large objects when crawling, child rubs his eyes excessively, child does not attempt to grasp spoon or cup when being fed, child does not appear to notice interesting or bright coloured objects that are at short distance, child does not imitate simple motor play such as waving bye-bye.

General Symptoms that may occur from 1-2 Years

Walking is delayed, bumps into large objects, child not interested in playing, child not interested in picture books, child holds books or objects very close or far from the eyes to see them, child appears to be afraid to walk or move in strange environment, child clumsy and awkward for his age, child does not bother about colourful objects, child pays more attention to sounds.

General Symptoms that may occur from 2-5 Years

Stumbles over small objects, bumps into large, objects is clumsy and awkward, tot interested in games involving catching, throwing, bouncing or tagging, not interested in tasks that require sustained visual concentration, not interested in books, complains of: headaches, nausea, dizziness, burning or itching of eyes, blurring of vision, cannot see distant things clearly, places head close to the tasks he is doing, does not notice colour differences.

General Symptoms that may occur from School Age

Teacher or parent may observe in the child, body is rigid while looking at distant or near objects, short attention span and daydreams, places head close to book or desk when colouring, reading or writing, uses unusual or fisted pencil grasp, frequently breaking pencil, has a spidery, excessively sloppy, or very hard to read hand writing, closes or covers one eye, dislikes tasks requiring sustained visual concentration; feels nervous, irritable, restless or unusually fatigued after maintaining visual concentration, loses place while reading and uses the finger or marker to guide the eyes, difficulty in remembering what is read, skips words and re-reads, difficulty remembering, identifying, and reproducing basic geometric forms, difficulty in sequential concepts, poor eye-hand coordination and unusual awkwardness including difficulty with stairs, throwing and catching ball, buttoning and unbuttoning and tying, gets easily frustrated, withdrawn and has difficulty in getting along with children.

The Pediatric Eye and Vision Examination

The term “pediatric population" can be applied to subjects within a broad age range, including all those between birth to 18 years of age. Although the capacities and needs of children vary somewhat the pediatric population can be classified into three subcategories.[3-5] Infants and toddlers (birth to 2 years, 11 months), Preschool children (3 years to 5 years, 11 months), School-age children (6 to 18 years).

These subcategories of the pediatric population are established on the basis of developmental alterations that occur from birth through childhood. Clinical maturity and research trials have shown that at 6 months the average child has reached a number of demanding developmental milestones, making this a relevant age for the first eye and vision examination. At this age the normal child can sit up with support and cognitively is concerned with immediate sensory experiences.[6] Visual acuity (VA),[7] accommodation,[8,9] stereopsis, and other aspects of the infant’s visual system have developed very quick, reaching adult levels by the age of 6 months.[10,11]

At about 3 years of age children have attain acceptable receptive and expressive language ingenuity to begin to conspire for some of the classical eye and vision tests. However, the examiner often needs to make adjustment in the testing to collect useful information. By age of 6 years, the child has completed enough that many adult tests can be used, with small procedural adjustments. Because a child can vary considerably from expected age norms, it is valuable not to wait only upon chronological age when selecting testing processes. Suitable test process needs to be based on the child's developmental age and specific potential.

The aims of the pediatric eye check-up are several:

Checkout the functional quality of the eyes and visual system, taking into account each child's level of development, determine the ocular health and related systemic health conditions, build a diagnosis and draw up a treatment plan, guidance and enlighten parents/caregivers respecting their child's visual, ocular, and related health concern situation, containing instructions for therapy, administration, and precautionary concerns.

General Considerations

This portion of the ground rule defines procedures for checking and assessing infants and toddlers from birth to 2 years of age. Children in this age class in most cases perform best if the checkup takes place when they are attentive. Checkup in the fresh morning or after an infant's light sleep is usually most effective. Because infants tend to be more harmonious and attentive when feeding, it is also beneficial to advise that the parent bring a bottle for the child. Age applicable checkup and administration strategies should be used. Major alteration includes awaiting more on objective checkup procedures and performing tests significantly very quickly than with elder children.

Early diagnosis and management

Early diagnosis and administration of therapies as soon as possible are fundamental to inhibit vision conditions that have the potential to source of long lasting visual loss. Screening by the pediatrician or other primary health concern physician is essential at birth and during the first 6 months of life when the visual system is eminently prone to meddling. However, screening pediatric population has been dubious, dominant to under detection of squint, amblyopia, and significant refractive error.[12, 13]

Examination Sequence

Patient History

A complete patient history for infants and toddlers may involve:

Quality of the presenting problem, including chief accusation; ocular history; General health history, including pre, peri, and postnatal history; Family eye and medical past events; developmental mile stones of the child.

The assortment of demographic data commonly anticipates the taking of the patient past event. Having the parent(s) fill out a inquiry eases to acquire the patient history. Feedback to questions linked to the mother's pregnancy, birth of the child, and the child's general and vision development will help direct the leftover of the checkup.

Visual Acuity (VA)

Fixation preference tests, Favored looking visual acuity test. Calculation of vision in an infant or toddler can help to validate or rebuff certain hypotheses about the level of binocularity and bring route for the residue of the checkup. Because subjective visual acuity testing demanding rhetorical description of letters or symbols appeal continued attention, this test cannot be applied with infants and toddlers. However, other tests may be used to make expectation about VA. For example, when a single, constant squint is present, VA is believed to be decreased in the squinting eye. In the presence of a constant, alternating squint, VA is probable to be normal in both eyes.

In the nonappearance of squint, fixation preference testing with a vertical base up or down 10 prism diopter (PD) lens to create diplopia has been shown to be productive in discover about a three-line VA difference between the eyes and diagnose moderate to severe amblyopia.[14] Clear-cut clinical ground rule have been grown to estimate VA on the basis of the fortitude of fixation preference.[15, 16] Clinical use of preferential looking acuity is usually most successful. Teller acuity cards can be applied with infants and budding children until they are ready for more emotional testing.[17,18,19,20] When in doubt, the physical therapist can refer the child for electro diagnostic testing, such as visual evoked potentials (VEP), which has been delineated to be an important method for direct evaluation of VA in infants.[21-23] Consult with an optometrists or ophthalmologists who have advanced clinical training.

Binocular Vision and Ocular Movement

The succeeding procedures are valuable for assessing binocular function:

Cover test, Hirschberg test, Krimsky test, Bruckner test, Versions, Near point of convergence. The cover test is the measure of choice for judgment of binocular vision in younger children because it is impartial and needs little time to execute. If the cover test results are not trustworthy because of the child's refusal to testing, other methods may be used.

Hirschberg test is frequently favorable in infants 6 months and younger. Prisms can be applied with the Hirschberg test to adjust the corneal reflections (Krimsky test) and decide the degree of the variation. In a person with normal ocular lining up the light reflex lies slightly medial from the center of the cornea (nearly 11 prism diopters or 0.5mm from the pupillary axis), as a conclusion of the cornea acting as a laterally spin convex mirror to the spectator. When performing the test, the light reflexes of both eyes are distinguished, and will be well-proportioned in an individual with usual fixation. For an peculiar result, stationed on where the light falls on the cornea, the therapist can detect if there is an exotropia (abnormally eye rotated laterally), esotropia (abnormally eye rotated medially), hypertropia (abnormally eye goes up than the normal one) or hypotropia (abnormally eye goes down than the normal one).

The Bruckner test is an ophthalmoscope performed and used to assess the Foveolar reflexes ("red-eye" in photos). If there is no strabismus, the color of the illumination pupil is the same both sides (in children generally gray red more). However, if a manifest strabismus before, so, the pupil of the eye a more bright eyed red hue on, due to the reflection of extra foveal network and choroid areas. Applying the Bruckner test at different distances to (1-5 meters), so can also be an indication of existing higher-grade anisometropia make. The Bruckner test is a purely qualitative analysis and gives no indication of the exact extent of a squint angle in degrees or prism diopters.

The presence of a Bruckner reflex is considered a positive result, and is a good indication of squint,

even of small amounts. Once detected with the Bruckner reflex, the deviation should be quantified with the cover test or Krimsky technique.

Ocular Health Evaluation
An evaluation of ocular health may include: Evaluation of the eye anterior segment and index, Evaluation of the eye posterior segment, Evaluation of pupillary responses, Visual field screening (confrontation).
The diagnosis of eye disease in infants and toddlers presents some unique challenges. Accepted practice like bio microscopy, tonometry, and binocular indirect ophthalmoscopy are considerably harder to do in this age group.

The cover test and versions, both important binocular vision evaluation processes, are also important for eye health evaluation. Pupil function (direct, consensual light reflexes, and RAPD) should also be evaluated. Measuring intraocular pressure (IOP) is not a periodic part of the eye checkup of the infant or toddler. Although it is extremely rare in this age group.[24]

During the eye health evaluation and systemic health screening of infants and children of any age, it is valuable to get that health concern worker are culpable for identifying and reporting signs of child abuse, its global and a serious bad situation. Between 1990 and 1994 disclosed child abuse cases increased 27%, from 800,000 to 1,012,000, with nearly half of the victims under the age of 6 years.[25] Parents have a individually essential role in identifying child abuse in addition to Shaken Baby Syndrome (SBS) because of external eye trauma, and retinal trauma (hemorrhages, folds, tears, detachments, and schisis) are common eye's findings from child abuse. Most often the child is between 2 and 18 months of age at the time of abuse.[26,27] In abundant states, physiotherapist must report suspected child abuse or neglect to the state child welfare service. Lack of success to report a doubtful case of child abuse brings that child, his or her other siblings, and in some way a parent/caregiver in threat of begin again abuse at home.

Examination of Preschool Children
General Considerations
Even though the huge majority of children in this age group can connect verbally, it is favored in most cases for the parent/caregiver to attend the child into the examination room. It is crucial to assure that the child feels breezy and at comfort, which is often best adept by starting the checkup with procedures that develop less ominous. Age-appropriate checkup and management plan of action should be applied with preschool children.

Early Detection and management
Accepted approach to early detection and prevention of vision complications in preschool children is vision assessment by pediatricians or other primary care physicians or lay examiners. Screenings for this population are less dubious than for infants and toddlers because some subjective testing is likely; however, screenings are less precise for preschool children than for older children.[28-30] Fairly precise screening tests are available for the evaluation of many visual functions. All- inclusive eye checkup at 3 years of age continues to be the most effective approach to prevention or early detection of eye and vision complications in the preschool child.

Examination Sequence
Patient History (Follow the same as above)
VA
An evaluation of VA usually includes one of the following procedures:
Lea Symbols chart, Broken Wheel VA cards, HOTV test.

By 3 years of age, most children have the essential behavioral and psychological development to grant subjective VA testing. However, particularly conceive tests are still beneficial to check the amount of verbal communication needed. The 3-year-old child can match simple forms without difficulty and behave well to learning through demonstration and simulation of work. VA tests for these age groups beautifully engage a matching task or a forced-choice task, such as pointing to the exact answer. Use of the Broken Wheel VA cards is applicable for this age group. The Lea Symbols chart, which consists of four optotypes (circle, square, apple, house), also can be applied with great benefit.[31] The Lea Symbols chart is the first pediatric VA test based on the logMAR scale, as approved by the National Research Council Committee on Vision.[32]

Binocular Vision, Accommodation and Ocular Movement (Follow same as above)
Ocular Health Assessment (Follow same as above)
With some alteration, classical testing applied to evaluate eye health in adults can be applied in preschool children. Most preschool children will conspire, allowing the use of the bio microscope to assess the anterior segment with support and cooperation from the parent, to help control fixation. Color vision testing can generally be done with standard pseudo isochromatic plates or, alternatively, with tests such as the Pease- Allen Color Test (PACT), the Mr. Color Test, or Color Vision Made Easy, which do not require the child to identify a number.[33-35]

Supplemental Testing

Denver Developmental Screening Test (DDST), Developmental Test of Visual Motor Integration (DTVMI)

The DDST was created for use with children from birth to 6 years of age. Other test that can be used for checkup children as young as 3 years is the DTVMI.[36] Referral for consultation with the ophthalmologist, optometrist, pediatrician or other primary care physician or a child psychologist or psychiatrist should also be deliberated when problems in language and social development are noticed.

Examination of School-Age Children

Early Detection and Determent

The value of and need for school-based vision checkup have been debated for decades. One concern is that the majority of school vision checkup test only VA. Such testing primarily finds lazy eye (amblyopia) and myopia, and only high degrees of astigmatism and hypermetropia. Although discovery of such disorders is certainly a helpful objective, checkup for VA alone in most cases finds only about 30% of children who would fail a professional eye examination.[37] VA checkup often fails to find those circumstances that would be wonted to shift learning. Parents or caregivers of children who pass vision checkup may incorrectly assume that their children do not needed additional professional care.

Examination Sequence

Patient History (Follow same as above)

VA

VA may be assessed with the Snellen acuity chart (fitted for children 6-8 years of age). A recommended alteration is the isolation of one line, or even one-half line of letters, rather than projection of a full chart.

Binocular Vision, Accommodation, and Ocular Movement (Follow same as above)

Other than refractive errors, the most widespread vision conditions in children fall into the category of accommodative and binocular visual abnormalities.[38] These conditions may impede with school accomplishment, causing a number of symptoms, including asthenopia, blurring of vision, diplopia, loss of place, skipped lines, word movement on the page, inability to continue concentration when reading, and decreased reading intelligence over time.[39-45] Careful evaluation of these conditions in the school-age population is critical.

Binocular evaluation should include the cover test and tests of accommodative convergence/ accommodation (AC/A) ratio, fusional vergence amplitude with either the Risley prisms or the prism bar and stereopsis, using a random dot stereopsis test. Furthermore, negative relative accommodation (NRA) and positive relative accommodation (PRA) tests may be partly responsible to an understanding of both accommodation and binocular status.

Qualitative examination of eye movements involves three distinct steps: assessment of stability of fixation, saccadic action, and pursuit action. Subjective techniques involving consideration of the patient's fixation and eye movements have been grown, along with rating graduated system, to probe these three areas.[46]

Ocular Health Assessment and Systemic Health Screening (Follow same as above)

The measurement of IOP in school-age children is generally successful with either applanation or noncontact tonometry. If color vision testing was not administered when a preschool child, it should be carry out at this age. As children get in school, it is helpful to know whether a color vision deficiency prevail, because severe color vision deficiency may bring about misleading of a child as learning incapacitated.[47] Moreover, color vision deficiency may signify an eye health problem.[48] Evaluation of visual fields can be performed in school-age children using confrontation visual field screening.

CONCLUSION

Children account for a large and growing percentage of the population of the India. Studies have demonstrated that the prevalence of eye and vision disorders is substantial in this group. Researches also reveal that early detection and intervention are particularly important in children because of the very quick development of the visual system in early childhood and its sensitivity to interference. When disorders such as amblyopia and squint are undetected, the long-term consequences can be serious in terms of quality of life, comfort, appearance, and career opportunities. In addition, the cost of providing appropriate treatment for longstanding eye and vision disorders may be significantly higher than the cost of detecting and treating these problems early in life.

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