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Review Article

Visual Acuity Assessment in Pediatric Age Group- A Review.

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ABSTRACT

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Abstract- Assessing visual acuity is little challenging but very sensitive steps for proper evaluation and developmental of vision and visual acuity. Eye care professional having crucial role for evaluation of visual acuity which is responsible for emmetropization. Selection of right method of assessment of visual acuity is the right way to obtaining correct visual acuity. There are various types of charts/cards to assess visual acuity according to age. We need to choose specific charts as per requirement like verbal or pre-verbal as well school going and others.

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INTRODUCTION

Very similar to medical examination and vaccination at childhood are a necessity, assessment of visual acuity and its cure is equally important for a safer future vision. At the same time, accurate assessment of visual acuity in pre- verbal children is a challenging task.

Vision impairment (VI) in children may be present from birth itself or may develop soon thereafter. VI affects the development of the

infant to a large extent and hence, it is important to examine children during their early developmental stages – this can be done with need specific assessment techniques.¹

It is incorrect to say that “the infant is too young to be ‘assessed’ or is a non-co-operating subject”. Since developmental milestones are well known, changes from normal range can be easily quantified and assessed.

Developmental Milestones

Age	Visual behavior/ developmental milestone	Visual Acuity
Newborn	Pupillary light reflex/red reflex	6/120-6/360
1 month	Stable Ocular alignment	6/120-6/480
4 months	Fixation developed, Blink response to visual threat, track more smoothly, Making attention more flexible	6/30-6/120
6-12 month	Development of stereopsis, Attend small objects Eye-hand coordination	6/24-6/90
1-2 year	Experience cognition Visual attention on others activities	6/7.5-6/30
2-3 years	Attends complex visual display such as television, videogames and mobiles	6/5-6/9
3-6 years	Visual field development continues until adult like visual field is attained.	

Note: Several factors contribute to this development delay in maturation of vision:

** The visual development occurs in two phases: Rapid phase (birth to 8-9 months) and Slow phase from (8 months to 8 years)

**Nature versus Nurture

Note- Photoreceptors are distinguished even 15 weeks prior to birth, but they do not attain adult like dimensions until four months after birth.

Myelination of visual pathway is completed by one month, but the amount of myelin may increase in the subsequent months up to two years.

Cortical neuronal dendritic growth and synapse formation is visible at 25 weeks of gestation age, and is very active in the first two years.

Variations in visual maturation and behavior among children of similar chronological ages may differ from child to child.²

During history the eye care practitioner should take special pains to develop a good rapport with the child. (It is best to avoid wearing an apron, but one can keep toys, offer chocolates and be familiar with their parents among other things, to make the child more comfortable.)

Assessment of Visual acuity

- Objective method
- Subjective method

Objective method includes:

- Observation of behavior
- Fixation and following
- Opto kinetic Nystagmus (OKN)

- Assessing fixation pattern
- Ability to locate and pick up small objects

Subjective method includes:

- Teller acuity test.
- Sheridan Gardiner test.
- E test
- Testing optotypes in linear form.

Charts to assess visual acuity can be divided into three categories

1 Detection acuity tests

These tests enable the practitioner to assess and detect the smallest stimulus (even if the child

being assessed does not recognise the objects correctly). Included in this category are the

- ✓ Catford drum test
- ✓ STYCAR graded ball's test
- ✓ Boek candy beads test
- ✓ Dot visual acuity test

2 Recognition acuity tests

These tests enable the practitioner to assess the patient's ability to recognise the stimulus and/or distinguish it from other competing stimuli. They include:

a Direction identification tests

- ✓ Sjogren's hand test
- ✓ Landolt's C test
- ✓ Snellen's E test
- ✓ Arrows test

b Letter identification tests

- ✓ Snellen's chart
- ✓ Sheridan's letter tests (STYCAR)
- ✓ Lippman's HOTV tests
- ✓ Flook's symbol test

c Picture identification charts/miniature toys

- ✓ Beal Collin's picture charts
- ✓ Light house test
- ✓ Allen's picture card
- ✓ Domino card test
- ✓ Miniature toy test of Sheridan

d Picture identification on behavioural pattern

- ✓ Bailey - Hall cereal tests
- ✓ Cardiff acuity cards

3 Resolution acuity tests

- ✓ Optokinetic drum
- ✓ Preferential looking tests
- ✓ Visually evoked responses

Formula for estimating visual acuity:

The visual acuity (VA) of a subject can be estimated, by knowing the size of the smallest recognized object by a subject at a particular distance by this formula, V.A. in decimal units ($\frac{6}{6} = 1.0$)

Visual acuity equals to 0.3 multiplied by object distance in meters by object size in mm.

Test of visual acuity according to age group:

New born to 12 months - Response to occlusion, blink reflex, reflex responses, dazzle reflex with bright light gives gross estimation of visual potential, Visual Evoked Potential (VEP).

<18months-Boek Candy beads test, Keeler acuity cards (forced choice preferential looking test), Stycar graded balls test, Cardiff acuity cards.

2-3 years- Keeler acuity cards, Cardiff acuity cards, Kay picture test, Sheridan Gardiner test.

3-5 years- Kay picture test, Sheridan Gardiner test, Stycar test, Glasgow acuity cards, Picture charts.

5+years- Sheridan Gardiner test, Stycar test, Glasgow acuity cards, Snellen's or log MAR test.

(The response may be variable from expected age so, selection of test procedure may vary)^{3,4}

Conclusion

In conclusion, Optometrists and other eye care personals are having big responsibility to check accurate visual acuity in pediatric age group which is most important factor for deciding management plan for better emmetropization. We understand that vision assessment at the pediatric age is challenging and demanding but at the same time interesting and rewarding too. It would be right to say that visual loss could be reversed if detected and treated on time. Proper selection of visual acuity charts and their application will depend on visual development of the child. The accuracy of management and outcomes is directly proportional to assessment.

REFERENCES:-

1. How to test for the red reflex in a child. *Community Eye Health* 2014;27:36.

2. Tingley DH. Vision screening essentials: Screening today for eye disorders in the pediatric patient. *Pediatr Rev* 2007;28:54–61
3. Kothari M, Bhaskare A, Mete D, et al.. Evaluation of central, steady, maintained fixation grading for predicting inter-eye visual acuity difference to diagnose and treat amblyopia in strabismic patients. *Indian J Ophthalmol* 2009;57:281–4.
4. National Research Council (US) Committee on Disability Determination for Individuals with Visual Impairments; Lennie P, Van Hemel SB, editors. *Visual Impairments: Determining Eligibility for Social Security Benefits*. Washington (DC): National Academies Press (US); 2002. 4, ASSESSMENT OF VISION IN INFANTS AND CHILDREN.

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