**ORIGINAL ARTICLE**

# Pattern of Horizontal Squint Presentation in Pediatric Eye Department at Civil Hospital Karachi

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**ABSTRACT**

**Objective:** To estimate the magnitude and types of horizontal strabismus in children presenting in pediatric ophthalmic and orthoptic clinics.

**Materials and Methods:** A prospective analytical study was conducted on strabismic children presentingin theoutpatient departmentof pediatric ophthalmology and orthoptic clinics at Civil Hospital Karachi from 2008 to 2012. Details of patient was recorded in orthoptic performathat includedbiodata,history of presenting illness, wearing ofglasses, patching treatment , previous squint surgery and family history of strabismus.Orthoptic examination as visual acuity assessment with age appropriate tests was performed. Cover test, prism cover test, cycloplegicrefraction, hand mountedSlit lamp biomicroscopyand dilated fundus examination was also performed on each patient.

**Results:**A total of 1170 children presented in the pediatrics eye department. 1074 out of 1170 (91.79%) children were diagnosed to have horizontal strabismus. Majority 429(40%) of them were up to four years of age. 698(65%) children had horizontal esotropic strabismus while 376 (35%) had horizontal exotropic strabismus. 276 (25.69 %) esotropics had concomitant constant esotropia while 244(22.7%) exotropics had constant early onset exotropia.Statistical analysis was done by using SPSS version16

**Conclusion:** The magnitude of horizontal squint was found to be high in children.Esotropia with concomitant constant type was the most common type of strabismus followed byexotropia of constant early onset type.

**Key Words:** Strabismus, Horizontal squint, Esotropia , Exotropia

## INTRODUCTION:

It is normal for a newborn's eye to wander or cross occasionally during the first few months of life. By the time a baby is 4 to 6 months old, the eyes usually straighten out. If one or both eyes continue to wander in, out, up, down or even intermittently then the condition is called strabismus. If detected and diagnosed early, strabismus is curable through a variety of safe and effective treatment options. Moreover it is important for kids to be treated early because waiting too long or overlooking treatment completely can lead to permanent vision loss.The medical name for squint is strabismus It is misalignment or wandering of one or both eyes either inward (called esotropia), outward (exotropia), up (hypertropia), or down (hypotropia). The condition can be constant or parents may only notice it occasionally; for instance, when their child is tired or looking at something very close up. Strabismus can be present at birth or develop in childhood. In most cases, the cause is unknown, although kids with a family history of strabismus are at an increased risk for it.Most kids are diagnosed between 1 and 4 years of age. Rarely, a child might develop strabismus for the first time after 6 years of age. If this happens, it's important to contact your doctor immediately, who will then refer your child to a pediatric ophthalmologist and possibly a neurologist to rule out any underlying conditions that may be causing the problem.[1]

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Healthy eyes move together to send similar images along the optic nerve to the brain for fusion into a single 3-dimensional picture at the brain-vision junction, or visual cortex. Toward this end, six muscles attached to the outside of each eye contract and relax to move the eyes in perfect synchronization, permitting fusion, or binocular vision, across a large area of the visual field. Strabismic eyes, on the other hand, do not move infusion, A muscle may pull too weakly or too strongly against its opposing muscle, creating an imbalance that causes one eye to drift from parallel alignment with its mate; more than one pair of muscles may be imbalanced. Since each eye fixates on an object at a different point in space, the images received by the brain are dissimilar. The brain is unable to fuse the dissimilar images, resulting in double vision, which can be very disturbing. Without treatment, strabismus can cause permanent vision problems. For example, if the child is not using one eye because it is misaligned, he or she can develop poor vision in that eye (called lazy eye or amblyopia). In order for the eyes to move fully, together and in a co-ordinated way, there has to be correct functioning at three levels in the visual system:

- The six extraocular muscles: these are the four rectus muscles and the two obliques. When the eyes are looking straight ahead, they are said to be in the primary position. The extraocular muscles enable them to be moved into one of the six so-called cardinal positions of gaze (ie directed to one side or the other, either looking out and up, straight out or out and down) or into one of the two midline vertical positions (looking directly up or directly down). Deviations from these positions of

gaze provide the basis for diagnosis of a squint.

• The three cranial nerves: all the movements of the eyes are enabled by the third cranial nerve other than lateral abduction (lateral rectus) which is generated by the sixth (abducent) cranial nerve and a downward, inward gaze (such as looking where to put your feet when going down a flight of steps - superior oblique) which is generated by the fourth (trochlear) cranial nerve. If strabismus is present when the patient looks with both eyes, the condition is called manifest strabismus or Heterotropia. This condition includes horizontal tropias exotropia and esotropia which are outward and inward horizontal deviations and hypertropia and hypotropia which are when one eye is set higher or lower than the other eye. Exotropia and esotropia are also known as divergent or convergent squint respectively.A deviation present only after binocular vision (viewing with both eyes open) has been interrupted by occlusion of one eye, is called latent strabismus or Heterophoria. This condition includes exophoria, esophoria, hyperphoria, and hypophoria.Strabismus is divided into paretic and non-paretic types. The paretic type is due to paralysis of one or several muscles that are responsible for natural eye movements. Non-paretic strabismus is not due to paralysis of these muscles.Paralytic strabismus has many causes including Oculomotor nerve palsy, Fourth nerve palsy, Congenital fourth nerve palsy, Sixth nerve palsy, Progressive external ophthalmoplegia, and Kearns-Sayre syndrome.Other causes of strabismus include Brown's syndrome, Duane syndrome, and monofixation syndrome.[2]

Pseudo-strabismus is a condition when a person's eye appears mis-aligned but with accurate examination no deviation is observed.

Strabismus can be caused when the cranial nerves III (oculomotor), IV (trochlear), or VI (abducens) have a lesion. A strabismus caused by a lesion in either of these nerves results in the lack of innervation to eye muscles and results in a change of eye position. A vulnerable to damage from brain swelling, as it runs between the clivus and brain stem.[3] The primary sign of strabismus is a visible misalignment of the eyes, with one eye turning in, out, up, down or at an oblique angle.Recent evidence indicates that a cause for infantile strabismus may lie with the input that is provided to the visual cortex. Esotropia (crossed eyes) needs to be treated early in life to prevent amblyopia.Less noticeable cases of small-angle strabismus are more likely to cause disruptive visual symptoms, especially if the strabismus is intermittent or alternating. In addition to headaches and eye strain, symptoms may include an inability to read comfortably, fatigue when reading and unstable or "jittery" vision. If small-angle strabismus is constant and unilateral, it can lead to significant amblyopia in the misaligned eye.

**MATERIALS AND METHODS:**

The study was conducted in Paediatric Ophthalmology and Orthoptic Units of Department of Ophthalmology, Civil Hospital, Dow University of Health Sciences (DUHS) Karachi from September 2008 to Jan 2012.All children that presented with visible manifest horizontal squint were included while those who had phorias, vertical and pseudo squint and not diagnosed as a manifest squint were excluded from the study. A detailed orthoptic proforma was filled out including the biodata,history of presenting illness, wearing of glasses, patching treatment, previous squint surgery and family history of strabismus.Orthoptic examination included

• Visual acuity assessment with age, appropriate tests. Lea gratings, Kay picture test, Lea symbols and ETDRS (logMAR) were used for different age groups.

• For younger age patients who did not cooperate with visual acuity test, density of amblyopia was assessed by CSM (central, steady and maintained) fixation of child uniocularly and binocularly.

• Squint assessment included cover/uncover/alternate cover tests with and without glasses for near and far, prism cover test for near, far and in gazes, krimsky test for younger children.

• Titmus test and Lang test were used to check stereopsis.

• Worth 4 dot test was performed in older children.

• Extra ocular movements were checked in all positions of gazes.

• Cycloplegic retinoscopy was performed in 10 years and under and non cycloplegic for older patients.Ophthalmic examination included, anterior segment examination using table mounted slit lamp or hand held slit lamp as per age of the child.

• Indirect ophthalmoscope was used for fundus examination of all patients.

Analysis was conducted by using the statistical package for social sciences (SPSS) version16 and results were expressed as mean and percentage.

**RESULTS:**

A total of 1170 children presented in the pediatrics eye department. 1074 out of 1170 (91.79%) children were diagnosed to have horizontal strabismus. Boys were 54 % and girls were 46 % (Figure 1). Majority 429(40%) of them were up to four years of age (Table 1). 698(65%) children had horizontal exotropic strabismus while 376 (35%) had horizontal exotropic strabismus (Table 2). 276 (25.69 %) exotropics had concomitant constant esotropia (figure 2) followed by infantile, accommodative, paralytic and sensory exotropia (Table 3). while 244 (22.7%) exotropics had constant early onset exotropia(figure 3) followed by intermittent, sensory and paralytic exotropia (Table 4)

**Table1**
Age Wise Distribution

| AGE IN YEARS | PATIENTS | % |
|---|---|---|
| 0-4 | 429 | 40 |
| 05-08 | 290 | 27 |
| 09-12 | 191 | 17.78 |
| 13-16 | 164 | 15.27 |
| TOTAL | 1074 | 100 |

**Table 2**
Types of Horizontal Strabismus

| Groups | No. of patients | % |
|---|---|---|
| Esotropia | 698 | 65 |
| Exotropia | 376 | 35 |
| Total | 1074 | 100 |

**Table 3**
Types of Esotropia (ET)

| TYPES | PATIENTS | % |
|---|---|---|
| Concomitent Constant ET | 276 | 25.69% |
| Infantile Esotropia ET | 161 | 15% |
| Accomodative ET | 144 | 13.4% |
| Paralytic ET | 60 | 5.5% |
| Sensory ET | 57 | 5.3% |
| Total | 698 | 65% |

**Table 4**
Types of Exotropia (XT)

| TYPES | PATIENTS | % |
|---|---|---|
| Constant (early onset) XT | 244 | 22.7% |
| Intermttent XT | 93 | 8.65% |
| Sensory XT | 25 | 2.32% |
| Paralytic XT | 14 | 1.30% |
| Total | 376 | 35% |

**Figure 1:**
Gender Distribution

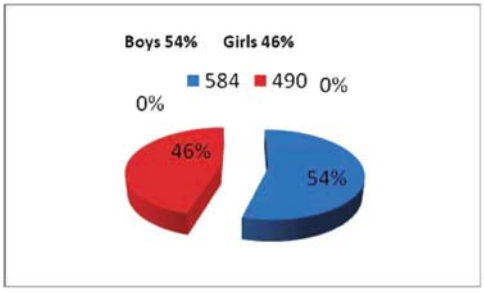


**Figure 2**
Concomitant Constant Esotropia

**Figure 3**
Constant exotropia

**DISCUSSION:**

Untreated strabismus leads to functional and psychological disturbances in the patient and his or her family, affecting the quality of vision and life. Children with strabismus suffer great psychosocial disadvantages and the same remains true even in adulthood.Thus appearance ofocular misalignment may interfere with social as well as psychological development with potentially serious effects for all patients with strabismus[4,5,6,7].

Squint and amblyopia are common conditions: about one in fifty children have squint[7] and up to 5% of the population have an amblyopic or lazy eye[8,9]. In view of their lifelong impact on visual function and physical appearance, with consequences for education, jobs and psychological wellbeing[10], good management offers substantial long-term benefits. Recent work favours early diagnosis and treatment, and there has been increasing effort to treat children as soon as possible. There is also renewed interest in the treatment of adults.

In our study total number of patients with horizontal strabismus was 1074.Eso-deviations698\1047(65%) were more frequent then exo-deviations 376/1074(35%).The esotropia werefound as a primary horizontal strabismus morbidity that included all types of esotropias.This is strongly supported by the study of Graham which documented that 60% patients had eso deviation and 20% have exo deviation. According to the study of Yekta the prevalence of exotropia and esotropia was 1.30 % and 0.59 %, respectively.

In current study constant esotropia(as the name implies,esotropia presents all the time, usually develop between the ages of 2 and 4 years) found as

276\1074(25%) Infantile esotropia found as 161\1074(15%) An (esotropia that is constant by 6 months of age, ) this persentage compared with other study that shows the incidence of infantile esotropia estimates vary from 8% of childhood esotropia and 1 in 400 livebirths .

Some evidence suggests that early surgery is associated with a better binocular outcome.

In current study the magnitude of accommodative esotropia (An esotropia that is acquired, is either constant or intermittent.

144\1074 cases(13.4%) patients presented with accommodative esotropia.On other hand population based survey conducted by Louwagie described theincidence of accommodative esotropia(36.4%)higher than infantile esotropia (8%.)16.It could be due to our hospital based study and earlier presentation of infantile esotropia as compaired to accommodative esotropia. Out of all accommodative esotropia, partial accommodative esotropia( A group of esotropias that are helped, but not cured, with glasses for hypermetropia)were 37\1074 (3.4%) in comparison to the study of Louwagie17that showed partial accommodative esotropia incidence of 10%. The association between hypermetropia and the development of strabismus is well documented in studies[18,19,20]

The incidence of strabismus increases to 17.6%v/s 3-4% when a positive family history is elicited.[21] The risk of developing esotropia in patients with a positive family history is increased four-fold in the presence of hypermetropia.[22] Rosner showed that given superficial instruction, parents can detect 66-76% strabismus.[23]

In current study the sensory esotropia (A convergent strabismus resulting from visual deprivation or trauma in one eye that limits sensory fusion) found 57\1074 (5.3%), almost same with slightly higher percentage of paralytic esotropia (esotropia that occur due to paresis of any of extra ocular muscles) 60\1074 (5.5%) although the difference is not significant. This is justifiedby the study of Greenberg in which the incidence and types of childhood esotropia in a population of 385 children was sensory esotropia 6.5 %, paralytic esotropia 6.5 %.[24]

In our study exotropia was found to be the second most common formof horizontal strabismus that is less frequent than the esotropia.This is supported by international statistics where approximate ratio of esotropia ET to exotropia XT is 3:1. , However, the National Health Surveyof individuals 4?74 years of age found a higher prevalence of exotropia(2.1%) than esotropia (1.2%) in the U.S. population. This difference is probably related to the fact that the overall prevalence of strabismus in persons 55-75 years of age (in whom exotropia is more common) is 6.1%substantially greater than for very young children 1-3 years ofage (1.9%) or children and adults 4-54 years of age (3.3%).

In current study the constant or congenital or early onset exotropia (The term congenital exotropia is typically reserved for patients presenting in the first year of life with a large, constant angle.) was found as the major type of the exotropia 244\1074 (22.71%)

However Hunter[25] stated no published study provides a rationale for this restrictive definition. In his study he evaluated differences between infants, aged younger than 1 year, with constant exotropia versus intermittent exotropia at presentation He found that half of infantile exotropia patients may present with intermittent exotropia, with similar clinical outcomes regardless of presentation. A study conducted by Moore, who limited his subjects to healthy infants ,(congenital) exotropia was reported 0.003%. Another researcher has also limited their sample to healthy infants under age one and reported a 0.12% prevelance rate of congenital exotropia.[26],This is quite low then current study it could be because our study included all children presenting with constant or congenital exotropiaand was not restricted only to healthy subjects. Several authors believe that intermittent XT is more prevelent than constant exodeviations.[27,28,29] but our data doesnot correlate with these studies asin our study intermittent exotropia was 93\1074 (8.65%) lower than constant exotropia. This may be because constant exotropia creates more visible cosmetic disability than Intermittent XT therefore parents bring their childrento hospitals for treatment as early as possible. Sensory exotropia causes a blind or poorly seeing eye that may drift outward. In our study sensory exotropia was found to be present in 25\1074 subjects(2.32%) that is not high in comparison to other types of horizontal strabismus, same remain true also for paralytic exotropia that was 14\1074 (1.30%) only.

**CONCLUSION:**

The magnitude of horizontal squint was found to be high in children. Esotropia with concomitant constant type was the most common type of strabismus followed by exotropia of constant early onset type.

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