

A Study on the Distribution of Different Types of Intermittent Exotropia Among Patients with Intermittent Exotropia

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ABSTRACT

Background: Intermittent exotropia is a type of strabismus or eye misalignment, where one eye occasionally turns outward, away from the nose. Unlike constant exotropia, which is always present, intermittent exotropia happens periodically. The affected eye may drift outward intermittently while the other eye remains straight

Aim: To determine the type occurrence, incidence, clinical characteristics and angle of deviation (near and distance) of intermittent exotropia: divergence excess, basic exotropia or convergence insufficiency among 100 patients of age group 3-20 years.

Material and Methods: It was a retrospective cross-sectional study. A total of 100 patients with age of 3-20 years with intermittent exotropia had included in the study. Demographic and clinical data were collected of all the patients presenting to OPD of the SEH (Sitapur Eye Hospital) from 2020-2024. The subjects were the patients of the department of ophthalmology of Sitapur Eye Hospital.

The Procedure was to collect demographic data and clinical data then identify the type of intermittent exotropia (divergence excess, basic exotropia and convergence insufficiency), occurrence, incidence, clinical characteristics and to observe angle of deviation of different types by clinical data

and patients who has difference in their angle of deviation every month which we had determined by follow up of those patients and measure their angle of deviation by the prism bar cover test at 20 feet and at 33 cm without and with a +3.00 D add at near and the patients wore their correction, if any, and a small light source served for fixation in both distance and near vision, one eye of the patient was then occluded for 30-45 minutes and the procedure repeated.

Results: Among the 100 patients with intermittent exotropia, 55% were females and 45% were males. Intermittent exotropia was more common in the younger age group (3-12 years) compared to 13-20 years. Divergence excess was the most prevalent subtype, accounting for 70% of cases, followed by basic exotropia (20%) and convergence insufficiency (10%). The mean angle of deviation was approximately 20 prism diopters (PD) at near and 15 PD at distance. Patients with divergence excess demonstrated greater deviation at distance fixation, whereas convergence insufficiency showed larger deviations at near fixation. The angle of deviation varied with visual stress and fatigue, reflecting the intermittent nature of the condition.

Conclusion: The Intermittent Exotropia is very common problems in the females and young children. Hence early intervention with vision therapy can significantly improve

eye alignment and visual function in patients with intermittent exotropia. These findings underscore the importance of early diagnosis and targeted treatment.

Keywords: Intermittent Exotropia, Misalignment, Paediatric Optometry, Divergence Excess, Convergence Insufficiency

INTRODUCTION

Intermittent exotropia is a type of strabismus characterized by an occasional outward deviation of one eye relative to the other. Unlike constant exotropia, where the misalignment is persistent, intermittent exotropia occurs sporadically and can vary in frequency and severity [1].

IXT is a common form of childhood exotropia, accounting for about 50–90% of all the exotropia and affecting about 1% of the general population. [2].

Patients with late onset exotropia, that is, after the ages of 6–7 years may experience diplopia because the exotropia occurs after the loss of visual plasticity. One symptom that deserves a special comment is the closure of one eye in bright sunlight. Bright

sunlight dazzles the retina so that fusion is disrupted, causing the deviation to become manifest, and resulting in the closure of one eye. Monocular eye closure in sunlight is a mechanism used to reduce photophobia and is not related to avoidance of diplopia. [3].

The occurrence of intermittent exotropia is 1–4% in paediatric clinic of Sitapur eye hospital.

The research included patients aged 3 to 20 years. The conditions were observed across this age range, with variability in presentation based on age.

The age of onset of IXT coincides with the age of visual maturation for children, which is between 3 and 6 years. The binocular function is often disturbed by the exotropia [4].

The angle of deviation varied significantly based on the type of exotropia. Divergence Excess show more deviation at distance (20–50PD in distance and 5–15 PD in near), Basic Exotropia show consistent deviation at near and distance (15–30 PD) and Convergence Insufficiency (10–30PD in near and <10PD in distance) type, show greater deviation at near [5].

Definition: A form of strabismus where one eye intermittently deviates outward (exotropia) when fusion is broken, and realigns with effort or when fusion is reestablished.

1. Clinical Pictures

- Distance – Control (phoria, eyes straight)
- Distance – Manifestation (exotropia)
- Near – Control (phoria, eyes straight)
- Near – Manifestation (exotropia)

2. Key Clinical Features

- Intermittent outward deviation of one eye.
- More common at distance than near.
- Variable control: patient can realign the eyes voluntarily.
- Worse when tired, ill, or inattentive.
- May have compensatory face turn or head posture in some cases.
- Stereopsis (depth perception) may be reduced if long-standing or frequent.

3. Control Scale (Newcastle Control Score)

Score	Control of Deviation
0	No exotropia at distance or near
1	Exotropia recovers within 1 second after cover-uncover test
2	Exotropia recovers in >1 second after cover-uncover test
3	Exotropia present before cover test, but recovers with refixation
4	Exotropia present before cover test and does not recover

4. Common Tests

- Cover-Uncover Test: To detect and assess deviation.
- Alternative Cover Test: To measure angle of deviation.
- Near-Distance Assessment: Deviation usually greater at distance.
- Control Assessment: Using Newcastle Control Score.
- Stereopsis Testing: e.g., Titmus, Randot.

5. Management

- Observation: In cases with good control and minimal symptoms.
- Refractive Correction: Treat any refractive error.
- Orthoptic/Exercises: To improve fusional control.
- Surgery: Indicated in cases with poor control, large deviation, or deterioration of stereocacuity.

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Fig 1: Figure depicting the brief introduction about intermittent exotropia

Intermittent exotropia (IXT) is one of the most common forms of childhood strabismus and is characterized by an intermittent outward deviation of one eye while the other eye maintains fixation. Unlike constant exotropia, the ocular misalignment in intermittent exotropia occurs only periodically and is often influenced by factors such as fatigue, illness, inattention, or prolonged visual tasks. The condition usually begins in early childhood and may progressively increase in frequency and magnitude if left untreated [1].

Intermittent exotropia accounts for a significant proportion of exotropia cases worldwide and has been reported to affect approximately 1-4% of the pediatric population [6]. The condition can negatively affect binocular vision, stereopsis, visual development, and psychosocial well-being. Children with intermittent exotropia may experience difficulties in maintaining eye contact, reduced depth perception, asthenopic symptoms, and social embarrassment due to visible ocular deviation [5].

Based on the relationship between near and distance deviations, intermittent exotropia is commonly classified into three major clinical subtypes: divergence excess, basic exotropia, and convergence insufficiency. Divergence excess is characterized by a greater angle of deviation at distance than near fixation, basic exotropia demonstrates similar deviations at both distances, and convergence insufficiency presents with a larger deviation at near fixation. Accurate classification is important because treatment planning and prognosis may vary among the different subtypes [7].

The etiology of intermittent exotropia is multifactorial and may involve abnormalities in fusional control, vergence mechanisms, sensory adaptation, and genetic predisposition. The condition often demonstrates variable control, with patients alternating between periods of normal ocular alignment and manifest deviation. Clinical assessment typically includes measurement of the angle of deviation using prism cover

testing at both near and distance fixation, evaluation of sensory status, and assessment of binocular visual function [8].

Several management options are available for intermittent exotropia, including refractive correction, vision therapy, orthoptic exercises, overminus lens therapy, prism therapy, and surgical intervention. Early diagnosis and appropriate treatment are important for preserving binocular vision and preventing progression to constant exotropia. Despite the high prevalence of intermittent exotropia, variations in the occurrence and distribution of its clinical subtypes remain insufficiently documented in many regions [4].

Understanding the prevalence and clinical characteristics of different types of intermittent exotropia is essential for improving diagnostic accuracy and developing effective management strategies. Therefore, the present study was undertaken to determine the types of intermittent exotropia, including divergence excess, basic exotropia, and convergence insufficiency, among patients aged 3-20 years attending Sitapur Eye Hospital. The study also aimed to evaluate the occurrence, incidence, clinical characteristics, and angle of deviation at near and distance fixation in these patients.

METHODOLOGY

Types of study: It was a retrospective cross-sectional and quantitative study.

Sampling Method: Non-Probability Judgemental Sampling was taken.

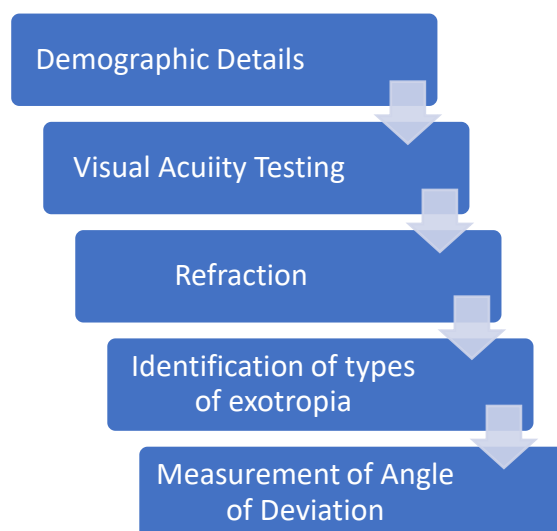
Sample Size: 100 patients of age group 3-20 years.

Sampling Procedure: Demographic and clinical data were collected of all the patients of intermittent exotropia from year 2020-2024

The Procedure was to collect demographic data and clinical data then identify the type of intermittent exotropia (divergence excess, basic exotropia and convergence insufficiency), occurrence, incidence, clinical characteristics and to observe angle of deviation of different types by clinical data

and patients who has difference in their angle of deviation every month which we had determined by follow up of those patients and measure their angle of deviation by the prism bar cover test at 20 feet and at 33 cm without and with a +3.00 D add at near and

the patients wore their correction, if any, and a small light source served for fixation in both distance and near vision, one eye of the patient was then occluded for 30-45 minutes and the procedure repeated.



Inclusion Criteria: Age Group between 3-20 Years Patients of intermittent exotropia.

Exclusion Criteria: Patient with age group more than 20 years and presence of other eye diseases, previous eye surgery, current use of medications was excluded from the study.

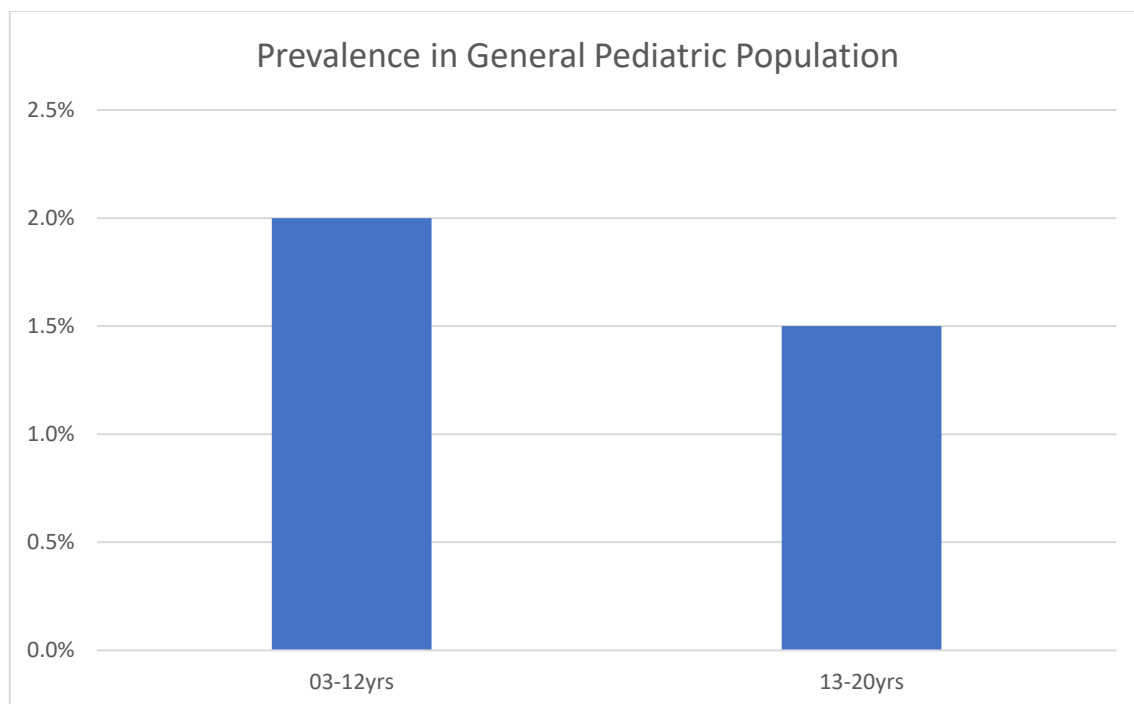
RESULT

Among the 100 patients with intermittent exotropia, 55% were females and 45% were males. Intermittent exotropia was more common in the younger age group (3-12 years) compared to 13-20 years. Divergence excess was the most prevalent subtype, accounting for 70% of cases, followed by basic exotropia (20%) and convergence insufficiency (10%).

The mean angle of deviation was approximately 20 prism diopters (PD) at near and 15 PD at distance. Patients with divergence excess demonstrated greater deviation at distance fixation, whereas convergence insufficiency showed larger deviations at near fixation. The angle of deviation varied with visual stress and fatigue, reflecting the intermittent nature of the condition.

Table-1: Prevalence of the patients as per age

Age-Specific	Prevalence
3-12 Years	~2%
13-20 Years	~1.5%



Occurrence of Intermittent Exotropia was common in age group 3-12 years were 2% followed by age 13-20 years were 1.5% (Table-1)

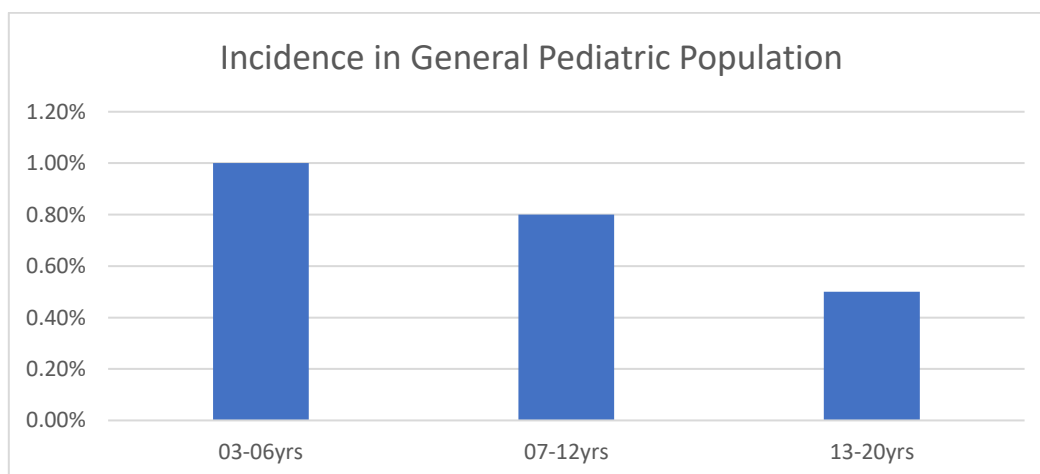
Table 2: Relationship depicting the types of intermittent exotropia and percentage of occurrence.

Type of Intermittent Exotropia	Percentage Of People Affected
Divergence Excess	70
Basic Exotropia	20
Convergence Insufficiency	10

Among all the patients, occurrence of type of Intermittent Exotropia, Divergence excess, Basic exotropia, Convergence Insufficiency was approx. 70%, 20% and 10% respectively.

Table 3- Distribution showing Incidence as per the age group

Age-Specific	Incidence
3-6 Years	~1%
7-12 Years	~0.8%
13-20 Years	~0.5%



DISCUSSION

The present study was conducted to determine the occurrence, incidence, clinical characteristics, and types of intermittent exotropia (IXT) among patients aged 3-20 years attending Sitapur Eye Hospital. A total of 100 patients diagnosed with intermittent exotropia were evaluated and classified into divergence excess, basic exotropia, and convergence insufficiency types based on their clinical findings and angle of deviation measurements.

In the present study, intermittent exotropia was observed more frequently in the younger age group (3-12 years) compared to older children and adolescents (13-20 years). This finding is consistent with previous literature, which suggests that intermittent exotropia commonly develops during early childhood and is often first noticed by parents between the ages of 2 and 5 years. Early onset may be related to the immaturity of binocular vision mechanisms and reduced fusional control during visual development [1].

The study demonstrated a slightly higher prevalence of intermittent exotropia among females (55%) compared with males (45%). Similar gender distributions have been reported in some epidemiological studies, although most researchers consider the condition to affect both sexes relatively equally. The higher female predominance observed in the present study may be attributed to regional demographic variations and the hospital-based nature of the sample [9].

Among the various types of intermittent exotropia, divergence excess was the most common subtype, accounting for approximately 70% of cases, followed by basic exotropia (20%) and convergence insufficiency (10%). These findings are in agreement with previous studies that reported divergence excess as a frequently encountered form of intermittent exotropia in pediatric populations. The predominance of divergence excess may be explained by greater exodeviation at distance fixation due to reduced fusional divergence control [10].

Assessment of the angle of deviation revealed characteristic differences among the subtypes. Patients with divergence excess exhibited larger deviations at distance than near fixation, whereas convergence insufficiency showed greater deviation at near fixation. Basic exotropia demonstrated relatively equal deviation at both distances. These observations are consistent with standard clinical descriptions and validate the diagnostic classification used in the study. Accurate measurement of deviation using the prism bar cover test and prolonged occlusion test remains essential for distinguishing among different subtypes of intermittent exotropia [7].

The average angle of deviation observed in the study was approximately 20 prism diopters (PD) at near and 15 PD at distance. Variability in deviation was commonly noted during periods of fatigue, illness, or visual stress, reflecting the intermittent nature of the condition. Similar fluctuations have been reported by previous researchers, emphasizing the importance of repeated examinations and follow-up assessments for proper diagnosis and management [4].

The findings of this study highlight the importance of early detection and intervention in children with intermittent exotropia. Early management through vision therapy, refractive correction, orthoptic exercises, and surgical intervention when indicated may help improve binocular vision, maintain ocular alignment, and prevent deterioration of visual function. Timely treatment may also reduce psychosocial impacts associated with visible ocular misalignment.

A limitation of the present study is its hospital-based design and relatively small sample size, which may limit the generalizability of the findings to the broader population. Furthermore, the study was conducted at a single tertiary eye care center and did not evaluate long-term treatment outcomes. Future multicenter studies with larger sample sizes and longer follow-up periods are recommended to better understand the natural history and

management outcomes of intermittent exotropia.

Overall, the present study confirms that divergence excess is the most common type of intermittent exotropia among children and adolescents attending Sitapur Eye Hospital, with a higher occurrence in younger age groups. These findings contribute to the existing knowledge regarding the epidemiology and clinical characteristics of intermittent exotropia and reinforce the need for early diagnosis and individualized management strategies.

CONCLUSION

This study evaluated the occurrence, incidence, clinical characteristics, and types of intermittent exotropia among 100 patients aged 3–20 years attending Sitapur Eye Hospital. The findings revealed that intermittent exotropia was more common in younger children and showed a slight female predominance. Divergence excess was identified as the most prevalent subtype (70%), followed by basic exotropia (20%) and convergence insufficiency (10%).

The study also demonstrated characteristic variations in the angle of deviation among different subtypes, highlighting the importance of accurate clinical assessment for proper diagnosis and classification. Early identification and timely management of intermittent exotropia are essential to maintain binocular vision, improve ocular alignment, and prevent progression of the condition.

Overall, the findings emphasize the need for regular screening, early diagnosis, and individualized treatment strategies to achieve optimal visual outcomes in patients with intermittent exotropia.

Declaration by Authors

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