

# Insidious Myopic Comitant Esotropia in a Teenager

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**Purpose:** To describe the history, clinical presentation, investigation, and management of a case of insidious myopic comitant esotropia (IMCE).

**Methods:** Demonstration of a rare case report of IMCE, including history of onset, angle of deviation, refractive error, and treatment.

**Results:** We report a case of a 15-year-old patient presenting with progressive horizontal diplopia first at distance and eventually at near for 2 years. He had a history of 6 hours of smartphone usage per day. Orthoptic examination showed esotropia of 35 prism diopters (PD) at distance and 30 PD at near. Neuroimaging was normal. The patient underwent bilateral medial recession of 5.5 mm. After 8 months of follow-up, the patient was orthophoric, and full stereopsis was restored.

**Conclusion:** Our case demonstrated the insidious onset of myopic comitant esotropia in a teenager in whom excessive smartphone use could have accelerated the onset of the disease. Augmented bilateral medial rectus recession yielded a good outcome.

**Keywords:** myopia, esotropia, comitant esotropia, strabismus, acquired esotropia

## Introduction

Acute acquired comitant esotropia (AACE) is a rare disease with a prevalence of approximately 0.3%.<sup>1</sup> Type III AACE, also known as Bielschowsky esotropia, is associated with uncorrected myopia of  $-5.00$  diopters or more,<sup>2</sup> and its etiology may be related to excessive near-work activities.<sup>1,2</sup> It is characterized by acute onset and diplopia at distance fixation.<sup>1,2</sup> Comitant esotropia in myopia is characterized by diplopia initially at distance and then at near.<sup>3,4</sup> Different from Bielschowsky esotropia, the onset is insidious, vary grade of myopia and esotropia is slowly progressive and usually occurs in adulthood.<sup>3</sup> To date, there is only one report relating to acquired distance esotropia associated with myopia in a study involving 11 young adults.<sup>4</sup> Here, we report a rare case of what we termed “insidious myopic comitant esotropia” (IMCE) in a teenager.

## Case Report

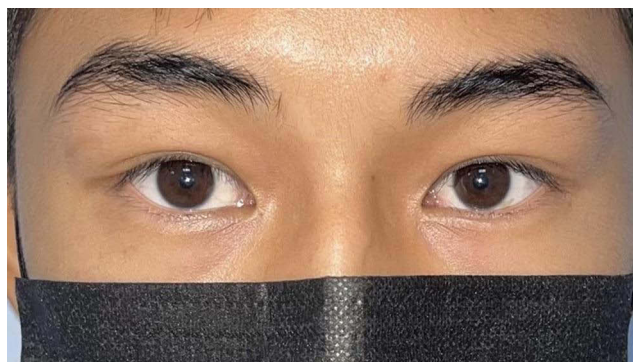
A 15-year-old patient presented with horizontal diplopia for 2 years. He noticed that he initially had double vision at distance and subsequently developed diplopia at near. His refractive status was myopia of  $-2.00$  diopters (D) in both eyes. He wore spectacles only for distance vision. He had a history of smartphone usage of more than 6 hours per day. He denied any history of stress, trauma, or underlying disease. A photograph of when he was 6 years old showed that he was orthophoric at this age (Figure 1). On examination, his unaided visual acuity (VA) was 20/50 in both eyes and the best-corrected VA with  $-2.00$  D was 20/20 in both eyes. A similar refractive error was found using cycloplegic refraction. Examination of the anterior and posterior segments was unremarkable. Orthoptic examination revealed esotropia of 35 prism diopters (PD) at distance and 30 PD at near (Figure 2) by the alternated prism cover test. The deviation difference was less than 5 PD in all gazes. Esotropia at near worsened with spectacles, at which point the patient also developed diplopia. Ductions and versions were full in both eyes. The Worth 4-dot test demonstrated diplopia at both distance and near. The result of the Bagolini striated glasses test showed unsuppressed esotropia. The accommodative convergence to accommodation ratio was 4:1 as determined by the lens gradient method. Computed tomography (CT) of the brain and orbits was unremarkable. The patient underwent a bilateral



**Figure 1** A photograph of the patient before the onset of insidious myopic comitant esotropia.



**Figure 2** A photograph showing the deviation before treatment.



**Figure 3** A photograph after surgical treatment.

medial rectus recession of 5.5 mm. The distance between the medial rectus insertion site and the limbus was 5.3 mm in the right eye and 5.2 mm in the left eye. There was no complication after treatment. He was orthophoric at both distance and near with stereoacuity Timus test of 40 sec of arc (Figure 3). The Bagolini striated glasses test at 3 months post-surgery showed normal binocular single vision. The follow-up time was 8 months, and there was no recurrence of esotropia.

## Discussion

Myopic comitant esotropia in our case demonstrated insidious rather than acute onset in AACE. The pathogenesis of the IMCE is still unclear. Prolonged adduction of the medial rectus muscle from near-target convergence could have resulted in the shortening of the medial rectus muscle and advanced the insertion, leading to diplopia initially at distance and eventually at near.<sup>5</sup> Moreover, in a study on young adults with myopic esotropia, pathological examination of the lateral

rectus showed muscle atrophy, which worsened esotropia over time.<sup>4</sup> Furthermore, IMCE was associated with varying grades of myopia,<sup>3,4</sup> and the patient already wore spectacles with normal accommodation. In IMCE, convergence abnormality plays a substantially more important role than accommodation, which can lead to the development of acquired esotropia. Type III AACE, meanwhile, the etiology of esotropia is uncorrected myopia of  $-5.00$  diopters or more.<sup>2</sup> Abnormalities in accommodation and vergence with low fusional divergence or latent esophoria underly esotropia in AACE.<sup>5,6</sup>

Our case showed an early age of onset, which might be related to excessive smartphone use. Excessive near-activities can accelerate the progression of esotropia, both AACE and IMCE.

The other causes of acute comitant esotropia in adults include age-related distance esotropia, divergence palsy, accommodative esotropia, decompensated esophoria and some neurological disorders. Acquired esotropia may be related to an abnormal lesion in the brain or orbits, and neuroimaging is suggested. Our case showed normal CT brain and orbit.

The patient underwent bilateral medial recession augmented by 0.5 mm relative to Parks'<sup>7</sup> standard surgical formula.<sup>8</sup> Intra-operation, we found that the distance from the insertion of the medial rectus to the limbus was shorter than normal (5.0 mm. right eye and 5.0 mm. left eye), which may be indicative of strengthened convergence.<sup>9</sup> Eye alignment and binocular function were fully restored after surgery.

In conclusion, we demonstrated a case of insidious onset of myopic comitant esotropia in a teenager, in whom disease onset may have been accelerated by excessive smartphone usage. Augmented bilateral medial rectus recession yielded a good outcome.

## Ethical and Consent Statements

Since the data were anonymous and no threat to patient's rights, the Ethics Committee of Mettapracharak Hospital exempts the need for ethical approval. The authors certify that they have obtained all appropriate patient consent forms. Written informed consent was obtained from the parents of the patient and the patient, including for the publication of the article and its content.

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## Disclosure

The authors report no conflicts of interest.

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## References

1. Buch H, Vinding T. Acute acquired comitant esotropia of childhood: a classification based on 48 children. *Acta Ophthalmol.* 2015;93(6):568–574. doi:10.1111/aos.12730
2. Lee HS, Park SW, Heo H. Acute acquired comitant esotropia related to excessive smartphone use. *BMC Ophthalmol.* 2016;16(1):37. doi:10.1186/s12886-016-0213-5
3. Martinez-Thompson JM, Diehl NN, Holmes JM, Mohny BG. Incidence, types, and lifetime risk of adult-onset strabismus. *Ophthalmology.* 2014;121:877–882. doi:10.1016/j.ophtha.2013.10.030
4. Zheng K, Han T, Han Y, Qu X. Acquired distance esotropia associated with myopia in the young adult. *BMC Ophthalmol.* 2018;18(1):51. doi:10.1186/s12886-018-0717-2
5. Guyton DL. The 10th Bielschowsky lecture. Changes in strabismus over time: the roles of vergence tonus and muscle length adaptation. *Binocul Vis Strabismus Q.* 2006;21:81–92.
6. Campos EC. Why do the eyes cross? A review and discussion of the nature and origin of essential infantile esotropia, microstrabismus, accommodative esotropia, and acute comitant esotropia. *J AAPOS.* 2008;12:326–331. doi:10.1016/j.jaapos.2008.03.013
7. Parks MM. *Atlas of Strabismus Surgery.* Philadelphia: Harper and Row Publishing; 1983.
8. Lekskul A, Chotkajornkiat N, Wuthisiri W, Tangtamaruk P. Acute acquired comitant esotropia: etiology, clinical course, and management. *Clin Ophthalmol.* 2021;15:1567–1572. PMID: 33883873; PMCID: PMC8055253. doi:10.2147/OPHTH.S307951
9. Cai C, Dai H, Shen Y. Clinical characteristics and surgical outcomes of acute acquired comitant Esotropia. *BMC Ophthalmol.* 2019;19:173.

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