



## CASE STUDY

### ACCOMODATIVE SPASM- VARIED PRESENTATION AND TREATMENT

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#### ABSTRACT

**Aim:** The aim of our study was to analyse the varied presentation and difficulties encountered while treating the patients with accommodative spasm.

**Methods:** A retrospective study of four patients of accommodative spasm. Three were children and one adult. All underwent a thorough work-up to be diagnosed with accommodation spasm and then treated with vision therapy.

**Results:** Average age of the patients was 14.25 years. All the patients underwent in-office vision therapy for the average of 16 sessions followed by maintenance therapy. The average follow-up period was 9 months (range – 6-9 months). One patient didn't show improvement after 12 sessions as expected, so sent for systemic evaluation. She was diagnosed with hypothyroidism and treated for the same and continued with vision therapy. One patient presented with acute acquired comitant esotropia (AACE) with pseudomyopia. With the treatment of accommodative spasm, the esotropia and the pseudomyopia resolved.

**Conclusion:** We have discussed about the varied presentation of accommodative spasm and the promising results with vision therapy. Accommodative spasm needs to be looked in children presenting with AACE.

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## INTRODUCTION

Accommodative disorders are commonly encountered in eye care practices which includes accommodation insufficiency, accommodative infacility and accommodative spasm (Scheiman, 2008). Accommodative spasm (AS) is an involuntary condition when there is greater than normal accommodative response than the stimulus (Rutstein, 1988). A lead of accommodation is seen with dynamic retinoscopy. With AS, hyperopes may appear less hyperopic, emmetropes may appear myopic, and myopes may appear more myopic. AS can be caused by head trauma, emotional problems, and other causes (London, 2003; Moore, 1973). Diagnosed mostly in children, adolescents, and young adults, AS is rare and occurs in less than 3% of patients with accommodative disorders (Daum, 1983). Here we are presenting some interesting case scenarios of accommodative spasm presented to us.

## CASE 1

**Accommodative Spasm Improved With Vision Therapy:** 11 year old boy presented to us with blurring of vision. Best corrected visual acuity (BCVA) was 20/20 with -1.75D in OD and -0.50 D in OS. Cover test revealed orthophoria for distance and 5pd esotropia for near. Fundus examination was normal. Cycloplegic refraction came out to be -0.5D (OU). On orthoptic evaluation, the negative relative accommodation (NRA) was +1.50 D. MEM retinoscopy showed lead of accommodation (-0.25) in both eyes. He had difficulty in clearing plus lenses monocularly. Diagnosis of accommodative spasm was made and patient was called for In-office therapy with VTS-4 software and orthoptic training. After 12 sessions, patient symptomatically improved and was comfortable. BCVA was 20/20 with -0.25D. MEM improved to +0.5 D in both eyes. Then the patient was put on maintenance therapy to prevent any recurrence. Even after 6 months of stopping the treatment, there was no recurrence.

## CASE 2

**Accommodative excess with Hypothyroidism:** 27 year old female presented to us with blurring of vision, more towards

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the evening, while working with the computer. She was regularly using glasses with the power of: OD -1.50 / -0.50 X 180 : OS -0.75 / -0.75 X 165 . BCVA was same as the spectacle power with 20/20 in both eyes. Cover test revealed 6 pd of exophoria for distance and 12 pd exophoria for near. On orthoptic evaluation, AC/A ratio (measured with gradient method) came to be 4:1. MEM retinoscopy was +0.25 D OU. NRA was + 1.75 D. PRA -3.00D. There was difficulty clearing plus lenses monocularly. Diagnosis of accommodative excess was made and orthoptic exercises prescribed. After 12 sessions of In-office therapy, poor performance was seen. As patient was not responding to the treatment, She was sent to general physician for systemic evaluation. She was diagnosed with hypothyroidism and started on treatment with Levothyroxine tablet. After her thyroid status improved, she started showing improvement with vision therapy and symptomatically improved.

### CASE 3

**Increase in myopia with accomodative spasm:** A 9-year-old boy presented to us with complaints of severe headache and blurred vision. Past ocular history was insignificant for glasses. The patient denied any head trauma and was not taking any medication. BCVA was 20/20 with -1.50 Ds /-0.50 Dc @90 OD and -1.00/-0.50 Dc @90 OS. Orthophoria was noted at distance and near. Stereopsis was 100 seconds of arc. Versions were full as were pupillary responses to light and accommodation. Cycloplegic retinoscopy was -0.25 Dc @100 OD and -0.50 @85 OS .On orthoptic evaluation, MEM showed -0.25D denoting the lead of accommodation. He had difficulty with clearing plus lenses monocularly. Fundus examination was normal. He was diagnosed with accommodative spasm and started on vision therapy. After 22 sittings of in-office therapy which he did in 4 months, the orthoptic parameters improved. His cycloplegic refraction came out to be -2.00/-0.50@90 OD & -1.25 D OS. Within a period of 4 months time of accommodative spasm, the myopia increased in both eyes.

### CASE 4

**Acute Onset Comitant Esotropia (AACE) Associated with Accommodative Spasm:** A 10-year-old child presented to us with complaints of blurred distance vision and double vision for the past one month. He also complained of sudden onset of inward deviation of his eyes. Cover test revealed right esotropia that was constant. General health history was normal and there was no recent history of fever or vaccination. There was also no history of head trauma or psychogenic ailments. The patient was a student and was accompanied by his parents who confirmed the history revealed by the patient. On examination he was found to have BCVA of 20/20 with -3.0 D. Pupillary reflexes were brisk and equally reacting to light in both eyes. Ocular motility was full. Measurement of the ocular deviation revealed 35 PD of esotropia for distance and near and in all gazes. On cycloplegic refraction, -0.50D was noted. Indirect ophthalmoscopy revealed normal fundus findings. Neurological investigation was reported to be normal with normal imaging findings of the brain by computed tomography (based on reports brought by the patient). The esotropia persisted even after cycloplegia without an apparent change in the amount of esodeviation. A diagnosis of spasm of near reflex was made because of the presence of acute comitant esotropia associated with accommodative spasm. Patient was

started on vision therapy for accommodative excess and after completing 13 sessions of in-office therapy, orthoptic parameters came to be normal and the BCVA came to be 20/20 OU unaided . On cover test, orthophoria was noted for distance and near. In this case esotropia got resolved with the treatment of accommodative spasm with vision therapy.

## DISCUSSION

The spasm of accommodation is a condition in which the ciliary muscle of the eye remains in a constant state of contraction. Normally, this contraction bends the lens to allow the eye to accommodate for near-vision. However in a state of perpetual contraction, the ciliary muscle cannot relax when viewing a distant object which leads to a blur when attempting to view objects from a distance. Though accommodative spasm has been associated with diverse organic causes, it more commonly occurs as an isolated functional entity, usually attributed to psychogenic causes. Although nonorganic AS can resolve spontaneously over time, treatment is usually indicated because of the severe symptoms. A variety of methods have been used for the treatment of accommodative spasm including cycloplegics, miotics, plus lenses, minus lenses, vision therapy and occlusion of nasal section of spectacle lenses with variable results. (Shanker, 2012) Common treatment modality is by prescribing bifocals with cycloplegic drops like atropine. Office based Vision therapy is effective in improving in symptomatic convergence insufficiency and accommodative dysfunction. (Scheiman, 2011) In view of the systemic side effects of atropine and the problem of weaning out of bifocal glasses, office based vision therapy using VTS software and orthoptic exercises has shown promising results in our case series without any eye drops or bifocal glasses.

The vision therapy program is based on the results of a comprehensive eye examination or consultation, and takes into consideration the results of standardized tests, the needs of the patient, and the patient's signs and symptoms. The use of lenses, prisms, filters, occluders, specialized instruments, and computer programs is an integral part of vision therapy. The length of the therapy program varies depending on the severity of the diagnosed conditions, typically ranging from several months to longer periods of time (American optometric association, 2011). In our case series, we gave the vision therapy according to the program described by Schieman (Scheiman, 2008). If improvement in signs and symptoms does not occur as expected when managing a case of accommodative spasm as in our case 2, it is prudent to reconsider the etiology of the condition. The organic causes are: Encephalitis, aromatic L-amino acid decarboxylase deficiency, tabes dorsalis, post-myelography, thyroid disease, primary failure of accommodation, vertebrobasilar ischemia, attempts to overcome vertical gaze palsy, metabolic encephalopathy, brain stem pathology and multiple sclerosis (Ghosh, 2014). Once the organic cause is treated, then the patient will show improvement with vision therapy. We diagnosed the cause to be thyroid related in our case 2 and treated for the same while continuing vision therapy. Then she showed improvement with the therapy. There are so many studies revealing the association of accommodation and myopia progression (Allen, 2006; Andrew Whatham, 2006). Whatever the pattern of accommodative response, it will affect the type and degree of retinal defocus being experienced over time, which will affect the axial length and myopia progression (Troilo, 2009). Myopic patients may be at higher risk for developing

accommodative symptoms or those with untreated accommodative disorders induce myopia progression (Mary Bartuccio, 2008). There are no studies which looked into the effects of accommodative spasm and myopia progression. Accommodative spasm would lead to retinal defocus, which would lead to myopia progression as seen in our case 3. Further studies are required to look into this association. Late-onset comitant esotropia, otherwise known as acute acquired comitant esotropia (AACE), has drawn considerable attention in the literature because of its varied presentations and natural history. Acute acquired comitant esotropia (AACE) is an unusual presentation of strabismus in older children and adults characterised by acute onset with diplopia, concomitance of strabismus, a large angle of deviation, absence of parietic element, and potentially normal binocular vision (Sturm, 2011). Burian and Miller (1958) first reported AACE and classified it into three types.

The role of accommodative spasm in causing the esotropia is not well defined in his classification. Spasm of the near reflex (SNR), as first described by Cogan in 1955, is a triad of intermittent convergent strabismus, accommodative spasm, and pupillary miosis. It is a functional disorder that has been attributed to hysteria, although it can have an organic etiology. The varied etiology including uncorrected hypermetropia, psychological disorders (Goldstein and Schneekloth, 1996), intermittent exotropia (Rutstein and Marsh-Tootle, 2001; Rutstein, 2010) and certain organic disorders like meningitis, pituitary tumour, head trauma and certain ocular/systemic drugs (Goldstein and Schneekloth, 1996). Our case 4, presented with a acute acquired comitant constant esotropia and accommodative spasm without pupillary involvement. So we diagnosed it to be a variant of SNR. Cycloplegic agents, typically atropine sulfate, in combination with reading glasses for near work, are recommended in the management of SNR. But in our case, we subjected the child to vision therapy for accommodative spasm directly. With the therapy, there was improvement in both the accommodative component and esotropia. After 13 sessions of In-office therapy, the accommodative spasm and esotropia completely resolved. So accommodative spasm need to be looked for in children presenting with AACE and it can be very well treated with vision therapy. Care should be taken in identifying and treating patients with accommodative dysfunction to remove any obstacles to learning especially in children. Providing our patients with single, clear, comfortable, binocular vision will have significant and far reaching consequences during the child's school years.

### Conclusion

There are few studies in the literature discussing Accommodative spasm. Our case series has added light in to the already existing knowledge of this relatively rare condition.

We have discussed about the varied presentation and the promising results with vision therapy. Accommodative spasm needs to be looked for in children presenting with AACE.

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