

# Conversion Disorder and Visual Disturbances in Children

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## Abstract

*Conversion disorder is a neurological disturbance in which systemic symptoms are unconscious, thus not under the control of the child. Conversion disorder is a manifestation of a stressful or traumatic event. Physical symptoms may occur with motor and sensorial disturbances, including visual reactions which may lead the practitioner to suspect an organic cause. Visual symptoms include visual acuity reduction in one or both eyes, visual field defects, intermittent diplopia, and disturbances with reading and writing.*

*Diagnosis of the conversion disorder may be difficult at the initial presentation because physical complaints are considered the primary issues that require resolution. The diagnosis is commonly made after consultation among a variety of practitioners such as the pediatrician, optometrist, neuro-ophthalmologist, and pediatric neurologist. Therefore, it is important for optometrists, especially for those who work in pediatric settings, to understand conversion disorder and the possible visual and systemic manifestations.*

## Key Words

*conversion disorder, emotional distress, motor disturbances, sensorial disturbances, visual disturbances*

## Introduction

Conversion disorder is a condition in which the patient presents with neurological symptoms without an apparent neurological cause. It is thought that this disturbance arises in response to psychological conflict in the child's life. It is considered a psychiatric disorder in the *Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV)*.<sup>1</sup>

Children with conversion disorder experience motor deficits such as poor coordination and paralysis. They may develop sensory problems that include visual disturbances, deafness, or loss of the sense of touch. Symptoms of conversion disorder are related to voluntary motor or sensory functioning and therefore are referred to as pseudo-neurologic symptoms. The onset may be acute or worsen progressively.

The diagnosis of conversion disorder in children and adolescents is often not easy because the expression of emotional distress in the form of physical complaints is developmentally appropriate in younger children. Conversion disorder seems to be one of the few mental disturbances that appear to be over diagnosed especially in emergency care settings. The diagnosis is typically made after excluding organic pathologies and identifying a relevant psychological stressor.

## Pathophysiology of conversion disorder

Conversion disorder refers to a group of neurological symptoms which lead the practitioner to suspect a neurological pathology but no organic cause is detected. In other words, the complaints and disturbances are essentially psychological. The term hysteria was used to describe this disorder, which the physician Hippocrates considered to be an affliction of women and brought on by the wandering of the uterus through the body. The term conversion originated with Sigmund Freud, who affirmed that anxiety and psychological conflict were converted into physical symptoms.<sup>2</sup>

Two studies demonstrate the epidemiological factors associated with conversion disorder. A study conducted in Austria estimated that the prevalence was of 2.3-4.2 per 100,000 patients seen in pediatric specialist practices.<sup>3</sup> Another study that investigated nonorganic visual field loss and associated psychopathology involved 973 children in an ophthalmology practice. The mean age was 8.93 years (+/- 2.61); 70% were girls. September was the most common month of presentation (26.7%). In 20% of cases, a psychosocial anomaly including attention and hyperactivity disorder, birth of a new baby, and attending a new school was present. Another 40% simply wanted glasses.<sup>4</sup>

Nimnuan et al.<sup>5</sup> and Snijders et al.<sup>6</sup> estimated that in neurological settings, the rate of people who complained of unexplained symptoms without any organic causes detected by neurological assessment, was between 30-60%. This type of disorder is two to six times more common in women than men.<sup>7</sup> A higher incidence in rural and lower socio-economic groups has been documented.<sup>8</sup>

Although the real causes of conversion disorder are still not well understood and the underlying brain mechanisms remain uncertain,<sup>9</sup> several studies have investigated the function of different areas of the brain which may be involved.<sup>10-13</sup> Voon et al.<sup>14</sup> evaluated the relationship between conversion disorder and affect using the functional magnetic resonance images (fMRI) to assess amygdala activity to affective stimuli. This was performed by using a block design incidental affective task with "fearful," "happy," and "neutral" face stimuli and comparing valence contrasts between a group affected by conversion disorder and healthy volunteers (control group).

From this research it emerged that the control group had greater right amygdala activity to fearful versus neutral stimuli compared with happy versus neutral stimuli. There were no valence differences in patients with conversion disorder

and no group differences were observed. Also observed was a higher right amygdala activity in patients with conversion disorder for happy stimuli compared to the control group, with a pattern suggestive of impaired amygdala habituation even when controlling for depressive and anxiety symptoms. However, the group with conversion disorder showed greater functional connectivity between the right amygdala and the right supplementary motor area during both fearful versus neutral and happy versus neutral stimuli compared to the control group. Atmaca et al.<sup>15</sup> suggested that patients with conversion disorder have smaller mean volumes of the left and right basal ganglia, a smaller right thalamus, and a trend toward a smaller left thalamus compared to healthy controls.

Concerning causes of conversion disorder, several studies reported long-standing psychological conflict on the child's life,<sup>16,17</sup> major depressive disorder (MDD), personality disorders, and borderline, histrionic personality disorders.<sup>18,19</sup> A recent review<sup>20</sup> confirmed that conversion and dissociative disorders are associated and are often present in children following physical or sexual abuse<sup>21</sup> and may lead patients to develop depression and anxiety disorders.<sup>22,23</sup>

### Physical disturbances

The child with conversion disorder can manifest a wide range of unexplainable physical symptoms which are not under voluntary control. Most physical complaints involve a functional weakness of a limb or the entire body and loss of sensation.<sup>24</sup>

Stone et al.<sup>25</sup> in a study of 42 patients with conversion disorder who were previously diagnosed as having a functional weakness and sensory disturbance, found that 35 (83%) remained symptomatic, distressed, and disabled as long as 12 years after the original diagnosis. In another paper, Stone et al.<sup>26</sup> followed 1144 of 3781 patients seen by 36 neurologists. The patients had a neurological evaluation and the practitioner indicated the likelihood as either 'not at all' or 'somewhat' that the symptoms could be explained by organic disease. The neurologists' initial diagnosis were: organic neurological disease without explanation of symptoms (26%), headache (26%), and conversion symptoms such as motor, sensory or non-epileptic attacks (18%).

During an 18 month follow up period, only four out of 1030 patients (0.4%) had acquired an organic disease diagnosis that was unexpected at the initial evaluation. Eight patients had died at follow up, five of whom had initial diagnoses of non-epileptic attacks. They did note that the patients presenting with unexplained symptoms tended to be younger and female. A descriptive study<sup>27</sup> on 110 children with conversion disorder reported that 45.5% of them had pseudoseizures and most of those patients had this disturbance for one to three months.

### Visual disturbances

It is important to understand that the visual reaction associated with conversion disorder is not under the control of the patient but is involuntary. The following are the main visual disturbances

#### *Binocular and monocular vision loss*

Langmann et al.<sup>28</sup> assessed 26 patients who complained of sudden reduction in vision. The visual change was bilateral in 50% of the patients. The causes were family problems (30%), school problems (25%), mild head trauma (4%), and unknown (41%). The treatment consisted of discussion and psy-

chological therapy, optical correction, and pharmacological therapy. In a period of one to three months, the visual acuity was re-evaluated, and 90% of patients recovered to normal levels, while only 10% needed to continue the psychotherapy.

Werring<sup>29</sup> used the fMRI to compare a group of patients who complained of unexplained vision loss versus a control group. Reduced activation was found in the visual cortex, but increased activation in left inferior frontal cortex, left insula-claustrum, bilateral striatum and thalami, left limbic structures, and left posterior cingulate cortex was documented. This study suggested the involvement of different cerebral areas in people with visual disturbance secondary to conversion disorder. It was also suggested that in terms of cerebral function, some areas of the brain are suppressed, perhaps for psychogenic mechanisms, while others are more active.

Munoz-Hernandez<sup>4</sup> in a study of 973 children with nonorganic visual loss found reduced monocular visual acuity in 3.3% while 80% had binocular vision loss. Other symptoms encountered included double vision (6.7%), blindness (3.3%), and loss of vision with dizziness associated (3.3%). Using what they refer to as the "confusing lens test" (This occurs by placing a +6.00 lens in front of the eyes and gradually reducing the power, either monocularly or binocularly, depending on the vision loss, and checking visual acuity with each lens change. The optimum visual acuity of each eye when the graduation is zero is obtained.), they found an improvement in visual acuity from 0.37+/-0.2 OD, 0.36+/-0.18 OS to 0.79+/-0.2 OD, 0.8+/-0.2 OS.

#### *Visual field loss*

Visual field loss without organic cause can be an expression of psychological disturbances.<sup>30</sup> Visual field defects can occur in one or both eyes as monocular hemianopia, bitemporal and binasal defects, ring scotoma, tubular constriction, spiral fields, and star-shaped fields. They are usually associated with symptoms of depression, panic attacks, and anxiety.<sup>31</sup>

However, in a study comparing patients with conversion disorder and those affected by organic diseases, both groups with visual field constriction (tunnel vision), were contrasted by evaluating cerebral function activation in different areas of the brain using the fMRI during the presentation of visual stimuli. Both groups were further compared with a control group. The control group showed highly coherent normal retinotopic phase mapping in V1 compared to the patients with conversion disorder. Those with conversion disorder showed activation to stimuli beyond their apparent field of view and in non-visual cortical areas. The subjects with organic disease showed limited activation. When separately analyzing activation to stimuli in the conversion disorder subjects' field of view as compared to beyond it, these subjects had more activation in posterior parietal areas. A similar finding was not seen in either healthy or organic disorder subjects. This research suggests that the pattern of posterior parietal activation in subjects with conversion disorder resembles lesion locations in patients with simultanagnosia.<sup>32</sup>

#### *Near vision disturbances*

According to a study by Yamazaki,<sup>33</sup> patients with psychogenic disturbances have reduced accommodative ability compared to normal subjects. In this study, the accommodative power was evaluated by visual evoked cortical potentials where it was recorded by increasing a minus-power lens in front of the eye in one diopter steps. The accommodative po-

wer revealed by this procedure was larger by approximately two diopters compared to the control group using the near point rule.

Convergence spasm, miosis associated with disconjugate gaze mimicking abducens palsy and deterioration in handwriting may be seen in these patients.<sup>34,35</sup> A clinical case described by Suzuki et al.<sup>36</sup> of a young female with convergence spasm as a manifestation of conversion disorder, recovered a normal status after treatment by psychotherapy.

### **Ocular motility disturbances**

Intermittent double vision in patients with conversion disorder is not typically an isolated symptom but is associated with other complaints that mimic a neurological manifestation such as seizures, paralysis, syncope, vertigo, pain, paresthesias, and blurred vision.<sup>37</sup> Abnormal ocular motility involves the extra ocular muscle innervated by sixth cranial nerve and is associated with diplopia, often intermittent, nausea or vomiting, and headaches leading the practitioner to suspect a brain stem lesion.<sup>38</sup>

Opsoclonus and intermittent facial tics are also described in children with conversion disorder even though the saccades, vestibular reflexes, smooth pursuits, and physiologic optokinetic nystagmus are normal.<sup>39</sup> Blepharospasm, both associated and not associated to myoclonus, as well as ptosis is also seen in children with conversion disorder.<sup>40-43</sup>

Establishing the differential diagnosis between myasthenia gravis and conversion disorder is crucial. Emotional disorders have been associated with prolonged myasthenic symptoms and with the increased anticholinesterase requirements. Further, psychic distress has also been reported to precede the onset of myasthenia gravis in some cases.<sup>44</sup>

### **Optometric treatment**

Once the optometrist, in conjunction with the consultant neuro-ophthalmologist and neurologist, have not found an organic cause which may justify the visual disturbances, an appropriate referral to a consultant psychiatrist / psychologist should be considered.

The optometric treatment of children with visual disturbances due to conversion disorder includes: optical correction, prism, added lenses, and vision therapy.

The first step is to correct the underlying refractive condition with the appropriate optical correction. Refraction under cycloplegia is essential to exclude eventual interaction between ametropia, accommodation, and binocular vision abnormalities in children with a) anisometropia hypermetropia of over +5.00DS, b) manifest strabismus (especially esotropia)-for detection of the accommodative component. c) family history of strabismus, high hyperopia and amblyopia. d) presence of unstable esophoria and in case of esophoria associated with asthenopia and pseudomyopia.<sup>45</sup>

Prism is a useful optical tool to manage the patient with visual field loss. The approach to these patients is similar to those with partial vision.<sup>46</sup> Prism works by diverting the light radiation toward the prism's base whilst the image moves toward the prism's apex. The prism should be placed with the base toward the visual area which is not seen by patient. Prism is also prescribed for: a) moving the field of view of patient toward to the center, centralizing the area of view, b) correcting an unusual position of the head, and c) reducing the amplitude

of ocular movements, especially on those patients who have a homonymous hemianopic visual field defect.

When attempting to reduce the amplitude of ocular movement (case c) using partial Fresnel prism, it should be oriented with the base toward the visual area not seen by the patient. It is important that the prism lens does not interfere with the patient's vision. Weiss<sup>47</sup> advises placing the prism lens considering the patient's visual field; thus, it is commonly placed 15mm from the limit of the visual field, if it is five degree or less. Ferraro et al.<sup>48</sup> suggests placing the prism's apex toward and close to the pupil, paying attention that the prism lens does not interfere with the patient's vision. For patients with visual field constriction (tunnel vision), Fresnel prisms are fitted on the ophthalmic lens with bases orientated on the upper, inferior and temporal, nasal sectors. This leaves only a small part of central area of view available. Horizontal prisms can be prescribed during the therapeutic plan, mainly to relieve the patient's symptoms and to decrease the demand of fusional vergence on children with a horizontal phoria or in case of intermittent strabismus. Wick et al.<sup>49</sup> suggested that the small amount of vertical prescription that eliminates the vertical fixation disparity has a beneficial effect on the horizontal phoria.

It is also important to consider vision therapy when prism is prescribed since vision therapy may help reduce prism adaptation.<sup>50,51</sup> Vision therapy for children with conversion disorder who have complaints of near visual disturbances aims to: 1) improve the speed, accuracy and accommodative response ability,<sup>52</sup> 2) eliminate accommodative spasm, 3) increase both vergence fusional facility and amplitudes, and 4) improve the stability of fixation.<sup>53,54</sup>

Plus lenses are useful for those children affected by conversion disorder if the AC/A ratio is high, positive relative accommodation (PRA) is low, failure on the minus with accommodative facility, and/or a high monocular estimated method (MEM). A plus lens for a child with large phoria (high AC/A ratio) can have a beneficial effect on the binocular alignment. Minus lenses or less positive power should be considered in case of exophoria, and high AC/A ratio, and when the child during the procedure of accommodative facility fails with plus lenses.

### **Psychological treatment**

Psychological approaches used to treat conversion disorder may include individual psychotherapy and family therapy. Randomized clinical trials<sup>55</sup> report that cognitive behavioral therapy is a well established treatment for patients with somatoform disorders. Psychodynamic techniques may help a child gain insight into unconscious conflicts and to understand how psychological factors have helped them to maintain their symptoms. Pharmacotherapy is considered in the management of specific symptoms.<sup>1</sup>

### **Conclusion**

In this article, we have seen how stress and traumatic events are converted into physical and sensorial disturbances as a result of psychological conflict. The particular complaints of conversion disorder, which may simulate an organic disease in the central nervous system, can make it difficult for the practitioner to establish a correct diagnosis. This in turn increases stress on the child and his or her parents.

From an optometric point of view, it is important to rule out ocular disease that involves the posterior visual pathway. Therefore, a detailed examination, including an accurate history is crucial. Optometric treatment consisting of lenses, prisms, and/or vision therapy should be considered in conjunction with psychological treatment. Successful correlation of neurologic symptoms and signs, as well as complete optometric and medical assessment, including that neuro-ophthalmological consultation, can result in a proper and timely differential diagnosis between organic and psychological disorders.

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