

## Alice in Wonderland Syndrome: an update of present data with a special view to body position, Traumatic and Genetic Aspects

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### Abstract

Alice in Wonderland Syndrome (AIWS) was named after the description of Lewis Carroll in his novel. In 1955, John Todd, a psychiatrist described this entity for the first time and results in a distortion of perception. Todd described it as „Alice's Adventures in Wonderland“ by Lewis Carroll. The author Carroll suffered from severe migraine attacks. Alice in Wonderland Syndrome is a disorienting condition of seizures affecting the visual perception. AIWS is a neurological form of seizures influencing the brain, thereby causing a disturbed perception. Patients describe visual, auditory and tactile hallucinations and disturbed perceptions. The causes for AIWS are still not known exactly. Cases of migraine, brain tumors, depression episodes, epilepsy, delirium, psychoactive drugs, ischemic stroke, depressive disorders, and EBV, mycoplasma and malaria infections are correlating with AIWS like seizures. Often no EEG correlate is found. Neuroimaging studies reveal disturbances of brain regions including the temporoparietal junction, the temporal and occipital lobe as typical localization of the visual pathway. A decrease of perfusion of the visual pathways could induce these disturbances, especially in the temporal lobe in patients with AIWS. Other theories suggest distorted body illusions stem from the parietal lobe. The concrete origin of this mysterious syndrome is to date not clearly defined.

**Keywords:** Alice in Wonderland syndrome; Child-update-body position; Genetics trauma

### Introduction

In young children, migraine attacks can cause Alice in Wonderland syndrome. It is named after the well-known children's book by the author Lewis Carroll and belongs to

the so-called migraine equivalents [1-4]. A genetic aspect is assumed [5]. Alice in Wonderland syndrome is a distorted perception of the environment that often causes anxiety and irritation in children [6]. Things and bodies suddenly appear too big

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Received Date: 11-25-2020

Published Date: 12-15-2020

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or too small in relation to themselves and space, or move in an abnormal way [2,3]. Emotional disturbances in hands and arms, speech disorders, disorders of tactile perception and visual disturbances such as flickering vision or flashes of light in front of the eyes are also described. Accompanying headaches, abdominal pain or nausea may occur. The children are confused, tired and withdraw. In addition to migraine, the syndrome can also be a harbinger of an epileptic seizure, drug use, encephalitis [7] or Epstein-Barr virus disease. Alice in Wonderland syndrome is a distorted perception of the environment and/or of oneself, which in most cases can be traced back to various underlying diseases such as epilepsy, infections with certain viruses, or drug abuse or physical abuse. An Alice in Wonderland syndrome, which is not considered a disease in its own right, usually manifests itself in the form of a metamorphopsia, through which objects are magnified (macropsy) or reduced (micropsy), further away (teleopsy, poropsy) or closer (pelopsis), distorted, deformed, spatially displaced (mirrored) In addition, an Alice in Wonderland syndrome can manifest itself through ego experience disorders (depersonalization, division of soul and body), a disturbed sense of time, ash patterns (disturbances of the body schema) as well as feelings of limbo and disturbances of the sense of hearing and touch [2,3] Anxiety and panic attacks, pronounced fatigue and headaches, dizziness, vomiting and nausea can be further symptoms of Alice in Wonderland syndrome.

### **Case 1: Alice in Wonderland syndrome and body position: Lying Position**

This report shed light on a 17yr old male living in Calgary, Canada, describing his personal experience as follows: In the last year I have noticed myself often having strange visual problems when going to bed. I felt incredibly tiny in my bed, a mere ant, and everything felt so far away. Yet, I somehow felt extremely big. My body felt very large, disproportionately so, but my mind somehow felt very far away. The condition of being very large (with objects far away) or being very small in a very large room, alternated depending on what I was thinking about. It was so rapid I usually got a headache as well. I did research into this and I felt fairly certain I have Alice In Wonderland Syndrome. These episodes have been happening for as long as I can remember but have become extremely common in the last year or so. It has gotten to the point that multiple nights per week I get the symptoms I described above and often cannot fall asleep for a very long time. This syndrome (I'm fairly certain I have) is causing me sleepless nights and, as a result, tiredness during the day. It has occurred once or twice during the day but almost always happens when I've been in bed for 10-20 min when trying to fall asleep. There doesn't really seem to be a trigger. I am just lying there and my eyes (or I guess the area right behind my eyes) feels almost sore and then the distortions start occurring and a headache follows. I usually sleep on my right side but I haven't noticed a specific position I always get the sensations in. It feels like I somehow perceive the world further back.

Everything in the room feels very far away, even my own body. I feel small because the room, which size I know, seems so big, but I feel large because my toes seem to be very far away which would make me very tall. If I am looking at myself I feel very large, like a giant. It sort of feels like I am a normal sized person controlling a giant robot body or something. If I am looking at the rest of the room I feel very small. I'm not sure because it usually happens when I'm in bed. I think there is probably no change in time perception; if there is a change then it would be a slowed time perception because I don't notice time going any faster. I do feel hyper alert though. I almost always get these episodes when in bed. I remember once when I was younger I got it sitting and I got another in August of this year when I was sitting playing a board game in the afternoon. They have always occurred when lying down besides those 2 times“. His visual sensations in times of seizure in detail were described as follows: „I'm lying there, trying to fall asleep, when I notice a strange sensation behind my eyes (almost like a headache but not really), then when I open them everything seems further away. The room, everything in it, my feet, just everything. It all seems further away. This makes me feel small when looking at the room because I know the size of my room so for it to look so far away, I must be very small. However, when I look at my feet I feel huge, like a giant or something, because I know how far away I think my feet should be but they seem much further away, which makes me seem very large“. Mostly the symptoms are visual; the only non-visual

sensations I can think of are noises seem more extreme and are not pleasant, looking directly at a light source feels good, I feel like my mind is more aware but at the same my body feels weird (I guess because it feels too big). In this case report, the patient realized the visual impairment only in lying position (I'm lying there, trying to fall asleep, when I notice a strange sensation behind my eyes, almost like a headache but not really, surprisingly recognized a „ strange sensation behind his eyes. The patient described it as like a headache“. Migraine episodes were denied, nor any drugs were taken. After this strange sensation the patient realized the objects in the room far away and sensations started. A trigger for the seizure was denied, but all these sensations were only found in lying position with a strange sensation before. Bittmann et al. described AIWS like-seizures also triggered by lying position in a meditation setting as first case in world literature [8]. This personal description of a 17 years old Canadian teenager shed once again light on the role of body position as a trigger for AIWS like visual disturbances.

### **Case 2: Alice in Wonderland syndrome like visual sensations and eye trauma**

The pregnancy of the boy was a light one, with a natural vaginal birth at 37 weeks and 3 days. The son was born with neonatal torticollis and physiotherapy fully corrected normal muscle function. He had a birthmark with a portion of hair was darker. He had milk protein intolerance until 2 years and in October 2018 on single major cold with hospital stay. At 5 years he had the diagnosis of inguinal hernia and repositioning of the

left testicle, which was floating. At 5 years he started speaking therapy for stuttering. The visual disturbances started one week after a kick against the right eye in age 5. The young patient started to develop visual sensations after traumatic injury of the eye in form of micropsia. These visual disturbances were put in correlation to Alice in Wonderland syndrome-like seizures with micropsia.

### **Case 3: Alice in Wonderland syndrome like visual sensations and genetic aspects**

In the third case, micropsia in a 5 years old son and concomitant telopsia of the mother in teenager age supposes a genetic origin in Alice in Wonderland syndrome. The mother had telopsia in teenager age in the evenings and it was like she could see the entire room where she was from far away, like through the window. So, both, mother and son, showed visual disturbances (micropsia and telopsia).

### **Discussion**

In 1955, British psychiatrist John Todd (1914-1987) described the state of micro- and macrosomatognosia, the altered perception of body image and body images, and called it Alice-in-Wonderland syndrome. In 1955 John Todd described the syndrome and gave it a literary name in his publication. The first description of the syndrome comes from Lippman et al. 1952. Alice-in-Wonderland syndrome includes false perceptions of the body image, the form of objects, the sense of time, and illusionary visual perceptions. Body perception denial of illusion feelings and frightened feelings, sometimes for many

years in the early childhood, and can affect the normal development of the child in the family and in the environment [1]. AIWS was described in different publications in connection with many different infection illnesses like malaria, streptococcal tonsillopharyngitis, zicavirus, Varizella-induced optical neuromyelitis, Lyme-borreliosis, H1N1 influenza infection and mononucleosis. Moreover, AIWS was described in correlation with Creutzfeldt-Jacob disease, ischemic stroke, cluster headache, depressive disorders and as sertraline induced entity. It is obvious that all these different diseases play no role in the search for the true origin of Alice-in-Wonderland syndrome. Other entities such as complicated partial epilepsy, migraines, acute haemorrhagic encephalomyelitis, drug abuse such as LSD or montelukast (Mast Cell stabilizer) is other related drug correlations associated with AIWS-like seizures [2,3,8]. In addition, more recent articles describe AIWS seizures after ventricular shunt surgery in hydrocephalus postoperatively and in patients with brain tumor, in particular glioblastoma. More recent publications describe the curious aspect of AIWS seizures, which are constantly associated with physical abuse. In these publications, two elderly women aged 57 and 61 describe their terrible experiences with sexual abuse and have had AIWS seizures continuously correlated after many years [6,9]. These case studies shed light on aspects of physical and sexual abuse, by describing the entity that appeared many years after this unusual experience of two older women, who analyzed their experiences as children. In a

chronological case report, a 67-year-old woman described in detail her childhood experiences [9]. Normally, EEG disturbances were never found despite one interesting case report [10].

In this publication, we shed light on possible body position as a trigger, especially lying position. Moreover we present a familiar case report of a mother and his son, who had visual sensations like micropsia and telopsia in a concomitant way, but in different phases of life, the mother as a teenager and the son after getting a kick against his eye. Two different types of visual sensations were present in this two familials: the mother with telopsia, the son with micropsia. This shed

light on possible hereditary origin. Further research should perform to analyze the genetic origin of Alice in Wonderland syndrome and in special and genetic basis of optical pathway disturbances. This is the second publication in world literature suggesting a hereditary origin in Alice in Wonderland syndrome [5].

In conclusion, our results and experiences with 3 case reports shed light on relation of Alice in Wonderland syndrome with body position, the relation between AIWS seizures and traumatic injury of the eye and a possible hereditary transmission of AIWS from parents to their children. Further intensive research in this field is necessary.

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