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Review article

Alice in Wonderland Syndrome: A real life version of Lewis Carroll's novel

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Abstract

Alice in Wonderland Syndrome was originally coined by Dr. John Todd in 1955. The syndrome is named after the sensations experienced by the character Alice in Lewis Carroll's novel *Alice's Adventures in Wonderland.* Alice in Wonderland Syndrome consists of metamorphopsia (seeing something in a distorted fashion), bizarre distortions of their body image, and bizarre perceptual distortions of form, size, movement or color. Additionally, patients with Alice in Wonderland Syndrome can experience auditory hallucinations and changes in their perception of time. Currently, there is no known specific cause of Alice in Wonderland Syndrome. However, theories point to infections such as the Epstein–Barr virus, medications such as topiramate and associated migraines. Neuroimaging studies have revealed brain regions involved with the manifestation of symptoms. These include the temporo-parietal junction within the temporal lobe and the visual pathway, specifically the occipital lobe. There are no current treatments for Alice in Wonderland Syndrome. Further research is needed to find better treatments for Alice in Wonderland Syndrome and to elucidate the exact cause or causes of Alice in Wonderland Syndrome.

Keywords: Alice in Wonderland Syndrome; Auditory hallucinations; Neuroimaging; Perceptual distortion; Visual hallucinations

Alice in Wonderland Syndrome (AIWS) was originally coined by Dr. John Todd in 1955. This syndrome has also been referred to as Todd's Syndrome. However, historically the first mention of the constellation of symptoms that constitute AIWS was made by Caro Lippman in 1952. Lippman documented that some migraine patients had an auras similar to Alice's in Lewis Carroll's novel [1]. In the story of *Alice's Adventures in Wonderland* by Lewis Carroll, Alice often experienced a sensation of being changed into being remarkably short or tall physically, as well as illusionary changes in size, distance and position of stationary objects [2]. It is interesting to note that Lewis Carroll suffered from migraines (like many patients with AIWS), and it has even been speculated that Carroll experienced this syndrome [3].

AIWS is characterized by many of those sensations described in Lewis Carroll's story. The symptoms that constitute AIWS consist of metamorphopsia (seeing something in a distorted fashion), bizarre distortions of one's body image, and bizarre perceptual distortions of form, size, movement or color [2]. Specifically, some patients may experience micropsia (perceiving objects smaller than they are), teleopsia (objects appearing further away than they are in relation to oneself), macropsia (objects seem larger than they are in relation to oneself), and pelopsia (objects appearing closer than they are in relation to oneself) [4]. A patient with AIWS

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can have a change in his/her perception of time; time can seem to pass either at a snail's pace or pass too swiftly [5]. Auditory hallucinations are often present which consist of distortion of voices in pitch and tone, hearing strange music or noises, and hearing indiscernible voices without psychosis [6]. Some associated symptoms of AIWS include nausea, dizziness and agitation [7]. The syndrome is more common in children than adults, with the average age being six years of age. It is worth mentioning that there are no case studies linking AIWS with synesthesia. Figs. 1–3 respectively depict the sensations of metamorphopsia, macropsia, and micropsia.

Fig. 1. An illustration depicting metamorphopsia by John Tenniel [23] as seen in Lewis Carroll's novel.

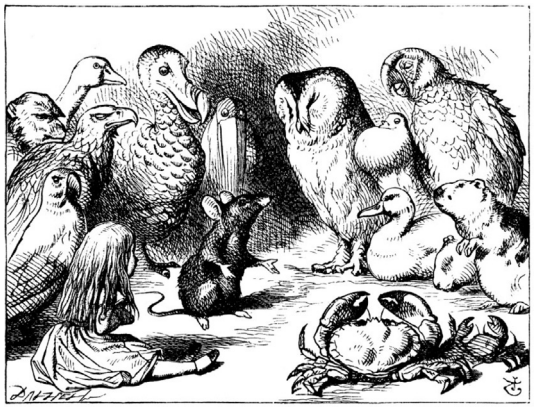

Fig. 2. An illustration depicting macropsia by John Tenniel [23] as seen in Lewis Carroll's novel.

Fig. 3. An illustration depicting micropsia by John Tenniel [23] as seen in Lewis Carroll's novel.

Under modern day nosology, specifically the International Statistical Classification of Diseases and Related Health Problems-10 (ICD-10), this disorder can be classified under "other symptoms and signs involving general sensations and perceptions", which has the code of "R44" [8]. Under "R44" there are subcategories which can be used for specific symptoms such as auditory hallucinations and visual hallucinations; which are "R44.0" and "R44.1", respectively [8]. For a diagnosis of AIWS psychosis needs to be ruled out. This is relatively easy as those with AIWS are aware that the distortions are not "real" and the patient not lost touch with reality. Interestingly, the symptoms of AIWS do not appear to change in severity over the course of the syndrome. The symptoms that form the constellation of AIWS are still the same as those originally described by Dr. Todd in 1955. AIWS can affect one's life acutely during symptoms; however, it is reassuring to know that this syndrome usually resolves itself within weeks or months [7]. Some patients may only acutely experience symptoms of AIWS transiently throughout the day for brief periods of time [9]. Most patients state that their symptoms last anytime from 10 s to 10 min [7]. Given