The impact of Alzheimer's disease in William Utermohlen's self-portraits

El impacto de la enfermedad de Alzheimer en los autorretratos de William Utermohlen

O impacto da doença de Alzheimer nos autorretratos de William Utermohlen

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ABSTRACT: Alzheimer's disease (AD) triggers the progressive decline in cognitive function, particularly memory. The disease affects the frontal and temporoparietal cortex, affecting the patient's cognitive and motor skills. This article describes the changes in the visual style of self-portraits by American artist William Utermohlen produced after AD diagnosis, correlating them with skills analyzed with cognitive function tests in order to highlight the magnitude of the graphic expression for the understanding of this disease.
Keywords: Alzheimer's disease; Painting; Self-portraits; William Utermohlen.

RESUMEN: *La enfermedad de Alzheimer (EA) desencadena la disminución progresiva de la función cognitiva, particularmente de la memoria. La enfermedad compromete el cortex frontal y parietotemporal, impactando en las habilidades cognitivas y motoras del paciente. En este artículo, se describen los cambios en el estilo visual de los autorretratos del artista norteamericano William Utermohlen, producidos después el diagnóstico de EA, relacionándolos con las habilidades analizadas con pruebas de función cognitiva, a fin de destacar la magnitud de la expresión gráfica para la comprensión de esta enfermedad.*
Palabras clave: *Enfermedad de Alzheimer; Pintura; Autorretratos; William Utermohlen.*

RESUMO: *A doença de Alzheimer (DA) desencadeia o declínio progressivo da função cognitiva, particularmente da memória. A doença compromete o córtex frontal e temporoparietal, impactando nas habilidades cognitivas e motoras do paciente. Neste artigo, descrevem-se as mudanças no estilo visual dos autorretratos do artista norte-americano William Utermohlen, produzidas após o diagnóstico de DA, correlacionando-as com as habilidades analisadas com os testes de função cognitiva, a fim de destacar a magnitude da expressão gráfica para a compreensão desta doença.*
Palavras-chave: *Doença de Alzheimer; Pintura; Autorretratos; William Utermohlen.*

Introduction

Alzheimer's disease (AD) is a neurodegenerative illness marked by a progressive decline in cognitive function, with significant changes in the field of memory. It is characterized by impaired ability to learn new information or to recall newly acquired information, associated with changes of one or more cognitive functions. AD develops from the deposition of senile plaques on neurons (containing β-amyloid proteins) and phosphorylation of Tau protein (τ), triggering the formation of neurofibrillary tangles (NFTs). These mechanisms lead to neuronal death and loss of synaptic connections in brain regions responsible for cognitive functions such as cerebral cortex, hippocampus, entorhinal cortex and ventral striatum.

Cerebral atrophy predominates in the medial temporal lobes, also involving lateral and medial parietal lobes and lateral frontal cortex (Apolinário, *et al*., 2011; Hauser, & Josephson, 2013; Pressman, & Rabinovici, 2014; Kumar, & Ekavali, 2015).

In order to optimize the screening of this dementia, tests to evaluate cognitive function such as the Mini-Mental State Examination (MMSE) and the Clock Drawing Test (CDT) are used. These screening tools are easy to understand and require little time in clinical practice, which ensures their applicability in Primary Health Care environments (Rabin, *et al*., 2012; Paula, Miranda, Moraes, & Malloy-Diniz, 2013).

In the early stage of AD, there is amnestic presentation, which can be attributed to the typical consequences of aging, without concerning the family and the patient. In the intermediate stage, the patient evolves with impaired language, executive dysfunctions and visuospatial deficits. Concurrently, there is onset of apraxia, making it impossible for the patient to carry out sequential motor activities. In the advanced stage, the symptoms worsen globally. Discernment and cognitive reasoning are inevitably deteriorated and there are significant mood alterations. With the progression of AD, there are serious cognitive and physical disorders, and patients become rigid, aphasic and bedridden. Arising from the holistic degeneration of the neuromotor status of affected patients, the main causes of death are commonly related to aspiration, malnutrition, secondary infections and cardiopulmonary diseases (Apolinário, *et al*., 2011; Hauser, & Josephson, 2013; Pressman, & Rabinovici, 2014; Kumar, & Ekavali, 2015).

Analyzing the history of artists affected by Alzheimer's disease, William Utermohlen (1933-2007) was diagnosed in 1995 but remained producing works during the stages of AD. He was an American contemporary painter born in Philadelphia, Pennsylvania, in 1933. His initial artistic style was marked by expressionism, with inclusion of Pop Art elements and vibrant colors. The main themes present in his works are groups of friends, his wife, human emotions and psychology. The murals in the Liberal Jewish Synagogue and in the Royal Free Hospital, both in London, are among his high-profile works (Crutch, Isaacs, & Rossor, 2001; Alzheimer’s Association, & New York City Chapter, 2006; Crutch, & Rossor, 2006; Konto, 2012; Buren, Bromberger, Miller, Potts, & Chatterjee, 2013).

Given the overview of AD and the initial knowledge of Utermohlen's biography, this study aims to describe the changes in the visual style of self-portraits produced by this artist during the progression of his disease in order to highlight the magnitude of the graphic expression to understanding this clinical condition.

Material and methods

A descriptive qualitative study of four self-portraits by artist William Utermohlen provided by the Chris Boïcos Fine Arts digital file was conducted. To do so, a literature review of scientific articles published in the 2000-2015 period indexed in PubMed, BIREME and SciELO was made, using the following descriptors: Alzheimer's disease, William Utermohlen and self-portraits, seeking an analytical approach of AD progression related to the works of the painter. Seventeen results were obtained and nine articles that analyzed Utermohlen's paints before and after Alzheimer's disease diagnosis were included: those that reported the artist's biography and studies on the technical and subjective analysis of Utermohlen's works. Such articles reported the description of works, contextualizing them regarding the artistic and biographical parameters.

Results

William Utermohlen obtained the AD diagnosis at the age of 61 years when he was referred to a neurologist suspected of depression and cognitive impairment. The symptoms of the disease had begun four years earlier, involving difficulty in tying his necktie and calculate household finances, failures in memory for day-to-day events, decline in writing skills, depressed mood and social withdrawal. The neurological examination revealed moderate degree of global cognitive deterioration (especially in abstract component activities), deficits in auditory memory and in the recovery of words, difficulties to perform mathematical calculations and decline in visuospatial and visual perceptual abilities. His performance in frontal lobe evaluation tests were also not satisfactory.

In the MMSE, the painter obtained score of 22/30, with greater delay in the recall of verbal stimuli compared to visual stimuli. Head MRI identified generalized brain atrophy (Crutch, *et al*., 2001; Crutch, & Rossor, 2006; Rose, 2006; Konto, 2012; Buren, *et al*., 2013).

Utermohlen remained working after the AD diagnosis, with changes in his visual artistic style, which accentuated according to the progression of the disease (Alzheimer's Association, & New York City Chapter, 2006). In the present article, four of his self-portraits elaborated from 1996 to 2001 were selected for this analysis, as shown in Figure 1.

Figure 1. Self-portraits of William Utermohlen. A - Work produced at the age of 62 years; B- It was painted at the age of 65 years; C - Drawn by the age of 66 years; D - Artwork made at the age of 67 years. Copyright permission obtained from Chris Boïcos Fine Arts

The progression of AD directly reflected on the artistic style of William Utermohlen's paintings, which became more expressionistic, with thick brushstrokes on raw surfaces. These paintings offer a unique visual narrative of the subjective experience of patients with AD, reflecting their emotions, perceptions and psychological journey (Crutch, *et al*., 2001; Alzheimer's Association, & New York City Chapter, 2006; Konto, 2012; Chancellor, Duncan, & Chatterjee, 2014).

The production of self-portraits is a means for checking the continuity and passage of time. Analyzing the selection of the artist's work, it was found that the self-portrait in illustration 1A represents a still reliable reference point of his usual style, despite having been created shortly after the AD diagnosis. This illustration, produced in 1996, is entitled "Self-portrait (With Easel - Yellow and Green)", having been executed with mixed technique on paper measuring 46x35 cm, in which one perceives defined realistic shapes, structured color scheme and detailed outlines. In this figure, Utermohlen fixed the image of himself, rescuing the experience of being present. The painting easel, instrument used as support for screens, frames his face and refers to the reality of living with AD, sharing the feeling of observing the world trapped behind bars (Crutch, *et al*., 2001; Alzheimer's Association, & New York City Chapter, 2006; Rose, 2006; Bogousslavsky, & Hennerici, 2007).

Figure 2B illustrates the "Self-portrait (With Easel)", oil on canvas, measuring 35.5x25 cm, produced in 1998. In this painting, a dramatic change in the painter's work is already observed, reflecting the neuropsychological alterations as a result of the disease. His head is well delimited in the painting easel rectangle. Red and yellow lines assign an aspect of limited head movements and they are used to separate it from the rest of his being, since neck and trunk parts are not shown, which refers to cognitive degeneration related to praxis and visuomotor skills. Furthermore, an apparent loss of precision and sharpness of eye shapes is perceived, not showing facial contours and eyebrows. The sense of proportion is changed in relation to the ear and the spatial arrangement of the face, revealing the commitment of visuospatial skills. Patricia Utermohlen, his wife and art historian, reported that the size of ears accentuated in his works is concomitant with the onset of hearing loss (Crutch, *et al*., 2001; Alzheimer's Association, & New York City Chapter, 2006; Rose, 2006; Konto, 2012).

In 2000, five years after the AD diagnosis, Utermohlen presented the intermediate stage of the disease when he produced self-portrait "Head" (Figure 1C), made in pencil on paper, measuring 36x31 cm. With no coloring elements and disproportionate forms, the painter expressed the difficulty in locating points and judgment of the relative position of the object, as the nose is shifted upward, the left eye is absent, and there is strong marking of the nasolabial folds with prolonged extension. This picture has been particularly blurred with fading aspect related to the loss of existential meaning. Another report of his wife denotes that the blurred painting is due to the painter’s frictions on the paper, indicating his frustration with the work outcome (Crutch, *et al*., 2001; Alzheimer’s Association, & New York City Chapter, 2006; Konto, 2012).

With style marked by abstraction, his paintings progressively became primitive in relation to shapes, colors and with a direct visual perspective. His expression is uncommonly dramatic and evocative, as seen in Figure 1D, self-portrait produced in 2001, representing elucidated emotions at the time of painting, including fear, sadness, anger and resignation. It is noteworthy that despite the distance from the realistic style of his previous works, his ability to produce with different resources and thematic indicates the preservation of his creative capacity (Crutch, *et al*., 2001; Maurer, & Prvulovic, 2004; Alzheimer’s Association, & New York City Chapter, 2006; Rose, 2006; Bogousslavsky, & Hennerici, 2007).

Discussion

The study of the neurological bases of visual artistic production is a complex process because it includes a descriptive analysis of components such as artistic style, drawings, shapes and scenes. The observation of a copy of a simple drawing made by patient with neurological damage can reveal the site of injury in the brain based on qualitative errors presented. The diffuse involvement of the left cerebral hemisphere is reflected in maintaining spatial relationships of form; however, it becomes simplified when the marking of details is neglected. Patients with damaged right hemisphere tends to reproduce the object with spatial distortions between its two parts or eliminate one of them (Crutch, *et al*., 2001; Maurer, & Prvulovic, 2004).

Patients with AD present a combination of these graphical changes, and their drawings are composed of a few angles, with no prospective marking, pronounced simplification of forms and less representation of spatial relationships, all observed in figures 1C-D. These changes are attributed to the neurological impact of agnosia to visual and visuospatial perception (Crutch, *et al*., 2001; Maurer, & Prvulovic, 2004; Alzheimer's Association, & New York City Chapter, 2006; Rose, 2006; Bogousslavsky, & Hennerici, 2007).

Another disorder manifested in AD that affects the production of artistic works is apraxia, which is defined as a higher-order movement disorder unrelated to elementary sensory or motor deficits. The three main types of apraxia are ideomotor, constructional, and dressing, the first two being more prominent in this study. Ideomotor apraxia is characterized by the difficulty in performing correct gestural movements in time, sequencing and spatial organization. Thus, the affected patient tends to use objects and tools conceptually improperly, being unable to perform serial actions. It is noteworthy that, in general, the difficulties related to artistic production process are included in constructional apraxia, when there is inability to perform combinatorial and organization activities in which details are to be valued and the relationship between components of object/shape must be seized. Consequently, there is damage in the performance of spontaneous drawings and copies of figures due to widespread reductions in the cerebral cortex volume, especially in areas related to the recognition and location of objects, as well as to the maintenance and orientation of spatial attention. This feature is best viewed in Figure 1C, showing the distortion of shapes projected on the face (Shulman, Shedletsky, & Silver, 1986*;* Emery, 2004; Maurer, & Prvulovic, 2004; Alzheimer's Association, & New York City Chapter, 2006; Petreska, Adriani, Blanke, & Billard, 2007; Serra, *et al*., 2014).

The MMSE evaluates temporal and spatial orientation, short-term memory, recall, calculation, language, praxis and visuospatial skills. Utermohlen obtained a score of 22/30 in this test when AD was diagnosed, pointing neurological impairment in the early stage of the disease, which when compared to Figure 1A shows the relative preservation of his cognitive abilities. CDT, a test also used in the screening of cognitive disorders, has good association with other cognitive measures such as MMSE. It is used in the investigation of cognitive impairment, covering visuoconstructive and visuospatial functions, symbolic and graphomotor representations, auditory language, semantic memory and executive functions.

Changes in these skills relate to the impairment in frontal and temporoparietal cortex. CDT also correlates construction apraxia tests with a global deterioration scale, in addition to analyzing visual impairment. The latter is noticeable in Figure 1C, in which one eye is missing and there is no representation of other body structures such as trunk and cervical region (Folstein, Folstein, & Mchugh, 1975; Shulman, *et al*., 1986; Crutch, *et al*., 2001; Rose, 2006; Rabin, *et al*., 2012; Paula, *et al*., 2013; Arevalo-Rodriguez, *et al*., 2015).

In relation to visual changes, patients with AD may be subject to the phenomenon of prolonged visualization of negative colors, i.e., when there is a fixed exposure to light wavelength (e.g. magenta) for a significant period of time, and when looking for other surface, its complementary wavelength will be seen, being green in this case, lasting from two to six seconds. This is due to the presence of selective cells of wavelength in occipital region V1, which respond to chromatic stimuli, being stimulated by certain wavelengths and inhibited by wavelengths immediately complementary to the previous one. The posterior cortical atrophy, which can occur in patients with AD, is related to the increase in the duration of this negative color phenomenon, reaching four hours. Thus, color expression in paintings and drawings of patients with AD is modified, as can be seen in the colors of Utermohlen’s paintings in figures 1A-D, in which the artist chooses vibrant primary colors red, green and blue and their complementary cyan, magenta and yellow, respectively (Chan, Crutch, & Warrington, 2001; Rose, 2006; Serway, & Jewett, 2013).

Conclusions and future prospects

It was observed that, in addition to the benefit of understanding the neurological processes involved in art making process, painting seems to be a tool for the patient with AD to express his emotions in experienced moments, increasing the scientific understanding of events tried by people with this disease.

This study showed the importance of valuing the sensitive artistic expression of patients with AD in their graphic performance in order to increase their chances of reporting emotions and reactions to circumstances lived.

The changes observed in Utermohlen's self-portraits such as impaired visuosensorial capacity, losses in the location of points and in the judgment of relative position of the object, are characteristics analyzed by CDT and correlated with the MMSE, and can be used as a support tool for these tests.

Thus, it was verified that the analysis of spontaneous graphic expression of patients with AD is presented as an additional element for the overall assessment of patients with the disease, with significant consistency to broaden the understanding of their subjective experience in the disease process. This fact encourages the promotion of art for patients with dementia in order to contribute to their expression of being, together with the ability to monitor their cognitive development.

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