

Stroke and the Arts

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Abstract: Stroke is the second leading cause of death, and it is a significant cause of disability on a global scale. The incidence and prevalence of stroke are rising, including in younger populations. Art can be seen as a means of universal communication, and artistic production can be seen as an ultimate achievement of the human brain. Visual art production requires multiple processes such as basic motor skills and more advanced associative functions such as visuospatial processing, emotional output, socio-cultural factoring and creativity. Focal and non-focal brain damage caused by stroke may lead to either the de novo occurrence of artistic productivity or a change in an established artistic style. In this chapter, we look at the historical development of the understanding of the role of stroke and stroke therapy in changing artistic output. We also discuss various examples of previously art-naïve individuals changing into prolific artists after stroke and established painters evolving new artistic styles after stroke.

1. Introduction

Stroke is the second leading cause of death, and it is a significant cause of disability on a global scale. The incidence and prevalence of stroke are rising, which is related to the aging of the general population and increasing incidence of stroke in younger populations [1]. The global lifetime risk of stroke increased from 1990 to 2016 from 22.8% to 24.9%, with the risk of ischemic stroke being higher (18.3%) than hemorrhagic stroke (8.2%). There are significant geographical, ethnic and economic differences in lifetime stroke risk, which is the highest in East Asian countries (38.8%), followed by Central Europe (31.7%) and Eastern Europe (31.6%), and the lowest in sub-Saharan Africa (11.8%) [2]. The burden of stroke can be seen from the perspective of long-term symptoms. Up to 37% of stroke survivors may experience a reduction in mobility, 45% of female and 39% of male patients may experience decreased handgrip and 29% may experience reduced dual-task capacity; in the cognitive domain, 33% may experience reduced global cognition, 37% may experience a degree of impairment of executive function and 39% may experience a reduction in memory [3]. Cognitive impairment without dementia before stroke increases the risk of post-stroke dementia within two years of follow-up [4]. Post-stroke cognitive impairment, including memory, language, orientation and attention deficits, increases functional disability and the odds of dependent living (unadjusted OR of 2.4) [5].

The impact of stroke on motor, behavioral and cognitive functions is substantial. The human brain is our evolutionary gain, and many brain functions, despite the significant advances in neuroscience, cannot at this stage be attributed solely to anatomical structures [6]. Interpersonal variabilities in intellectual abilities, empathy, compassion and creative skills provide a platform for variable capacity to produce,

read and perceive art [6]. The role of art in conveying a universal message through expression and abstracting was assessed previously regarding the biological basis of this process and remote interactions between the artist and the art recipient [7]. Art can be seen as a dialogue platform between the expression of those interpersonal variabilities and the appreciation of the art product for its esthetic, emotional and intellectual meaning [7]. In this context, art serves as a timeless, supra-cultural and supra-religious connection between the artist and the art viewer [7]. The mechanisms underlying this unique interface are proposed to be based on symbolism with the exchange of unswerving and spontaneous expression between the artist and the viewer, reflecting a more profound biological information exchange related to survival and adaptation to the environment [7]. This information exchange was postulated to be related to the mirror neuron network interactions and frontoparietal bidirectional connections allowing for the sensory stimulus to trigger primary motor pathways [7].

The sensory attributes of the witnessed actions or emotions could activate the mirror neurons, triggering the motor depiction of the same activity within the observing brain [7]. The linking action of mirror neurons can connect perception and cognition as one domain. Hence, the first-person experience on the neuronal plane would be the same as the third-person experience, leading to a shared functional state [8]. The neurochemical pathways for artistic and creative activities were studied in healthy individuals challenged with divergent thinking tests that correlate positively with overall creativity. The subjects were assessed with positron emission tomography. The proposed transmitter was dopamine and its D2 receptor [9]. This study showed a negative relationship between divergent thinking and thalamic D2 receptor density, suggesting the importance of thalamic D2 receptors in creativity [9]. The decreased thalamic gating thresholds were suggested to play a role in increased thalamocortical information transfer, hence leading to increased creativity [9].

The complexity of artistic creation based on the involvement of multiple cortical areas and functioning white matter connections can be affected by focal damage caused by stroke. Most of the neurological deficits related to stroke leading to artistic changes are described in the context of focal symptoms of hemineglect, apraxia, perceptual agnosia, visual field deficits and focal damage in the regions of right-sided parietal and occipital areas, as well as dysphasia and left-hemispheric lesions [10]. These anatomic and clinical correlations of stroke involving the right cerebral hemisphere are linked to changes in spatial arrangements of the whole or part of a painting, and strokes confined to the left cerebral hemisphere are linked to abridgement of the painting details [10]. An exciting mechanism was observed in individuals with non-focal and stroke-unrelated conditions such as frontotemporal dementia, where predominantly left-hemispheric involvement would lead to decreased abilities to abstract, symbolize and enhance creative and emotional capacity [10,11]. In addition to the effects of a focal cortical function on art creation, one can also consider the networking within the brain and the role of interconnections

of proximal and remote cortical areas in creative processes. The role of the brain connectome in creative thinking was studied recently with the use of functional MRI [12]. The main finding pertains to discovering centralized, hub-like brain cognitive structures linked by high-information traffic connections that allow for higher creative thinking [12]. The brain hubs related to the high creative potential were those providing sensorimotor, executive control and memory-based processing; this elevated creative potential was magnified by integration through the high-information traffic connections [12]. An interesting non-lateralized left-to-right model of a tripartite system consisting of temporal, frontal and limbic cortices in creativity in health and disease states was discussed previously [13]. The subtle interactions between those three hubs were proposed based on the temporal lobe driving idea generation with the frontal lobe's control and mesolimbic regions' influences on novelty seeking and creative drive through dopaminergic transmission [13]. These models and findings are essential in establishing a functional basis for the effects of different types of brain injury, including strokes, on artistic ability beyond just anatomical deficits and partial alteration of creative output.

The change in artistic style may involve altered artistic output in established artists or the development of "de novo" creative abilities in otherwise art-naïve individuals. Only a small number of individuals can express extraordinary artistic creativity using unorthodox and innovative techniques and methods; hence, the disease process affecting these capabilities and, consequently, altering artistic output provides a better understanding of the neurophysiology of the art [14]. The insights from the effects of focal neurological damage caused by a stroke on artistic creativity may help to understand the role of the brain connectome, cortical areas and neurochemical transmission in stroke recovery. This chapter assesses the impact of stroke on various types of art and artistic production in established artists and art-naïve individuals.

2. Change of Artistic Creativity in Established Artists

We start this journey with a historical perspective and the turn of the 19th and 20th centuries, when the attention of neurologists was drawn to changes observed in artists with neurological disorders including stroke [15]. One of the most historical artists with stroke was Lovis Corinth (1858–1925), whose artistic style was focused on the exact depiction of colors and the authenticity of naturalistic, mythological scenes, landscapes and still lives [16,17]. In 1911, he suffered from a sudden onset of left-sided weakness and ipsilateral lower homonymous quadrantanopia. He partially recovered from the stroke and could walk with support. His neurological diagnosis was established much later based on his symptoms and recovery [17]. He resumed painting after the stroke, and left-sided omissions, spatial deformities and zig-zag lines embedded in his painting were noted, which were consistent with hemineglect and hemifield pseudohallucinations [16,17].

In a larger historical cohort of 13 professional artists with right-hemispheric strokes, the authors observed significant changes in artistic output mostly related to emotional sequelae and negative neurological signs [18]. One of the earliest reported artists from this cohort was Anton Rädersheidt (1892–1970), who was known for starting the artistic trend in the mid-1920s known as “Magischer Realismus” (Magic Realism) discerned by photographic portrait details and a reduction in emotional content [18]. His artistic style evolved after 1950 into abstract expressionism. In 1967, he suffered from a stroke with mild left-sided weakness, severe left-sided homonymous hemianopia, left-sided hemineglect, spatial disorientation and severe prosopagnosia [18]. A few years after his stroke, Rädersheidt produced an extensive series of autoportraits that demonstrated the progressive improvement of his left-sided neglect, and his further paintings revealed a significant change in artistic style with an overload of vividly colorful strokes, depictions of ecstatic, sexually loaded scenes and picturing of disfigured bodies [18].

Another painter, Otto Dix (1891–1969), was recognized for his early naturalistic style with a focus on the everyday subject matter, including war scenes. The caricatural depiction of dreadful figures characterized his portraits, and critics considered his art as “degenerate” [18]. In 1967, he suffered from a stroke with left-sided weakness, left-arm dyspraxia with proprioceptive sensory impairment, hemianopia, hemineglect and spatial disturbance. In the initial phase post-stroke, Dix was unable to draw. With time, he overcame his hemineglect; his painting style changed, focusing on autoportraits with a decomposition of lines and painting structure, over-exaggeration of facial features and depictions of supernumerous fingers [18].

Reynold Brown (1917–1991) was a left-handed artist known for his initial engagement in illustrations of service manuals, pocketbooks, comics and magazines; he later started illustrating movie posters and record covers and eventually shifted to oil paintings of landscapes and portraits [18]. Brown suffered from a severe stroke in 1976 with profound left-sided weakness affecting his dominant arm, hemineglect and left lower quadrantanopia. After a period of intensive recovery supported by his family, he started painting, and the immediate change in his style was the marginalization of the left lower side of the canvas related to his quadrantanopia, stretching the content from the top right to the lower left, but also a distortion of facial features [18]. Notably, Brown’s new artistic style carried a more emotional load than his initial realistic works by loosening the landscapes and using more colors [18].

Tom Greenshields (1915–1994) was a proficient sculptor and painter who had a dominant right-arm injury a few years prior to the onset of a stroke, which made him shift to using his left arm for artistic production [18]. In 1989, he suffered from a stroke with mild left-sided weakness, sensory impairment, hemineglect and lower quadrantanopia, and despite regaining left-arm function, his artistic output changed significantly with decreased structure, less extravagant drawings and an

apparent impact of his neglect, with distortions, deformations, missing details and exaggeration of the figures on the left side [18].

Overall, this series of artists with right-hemispheric strokes shows a pattern in changing artistic output mainly related to emotional and mood stroke sequelae and negative neurological signs, including visual defects, hemineglect, prosopagnosia and spatial perception disturbances.

The role of hemineglect in the change in drawing style is clearly depicted in Federico Fellini's (1920–1993) recovery after a stroke. Fellini is known as a prolific film director, winning multiple international awards, but less is known about his initial career as a journalist, playwright, cartoonist and caricaturist working for the comic magazine *Marc Aurelio* and drawing caricatures of American marines [19]. At 73, he suffered from an ischemic stroke in the posterior right middle cerebral artery territory with severe left-sided hemiparesis, sensory loss, left inferior quadrantanopia and severe ipsilateral visuospatial hemineglect and misoplegia (negative perception of the paretic limbs) [19]. In his post-stroke sketching, he showed clear signs of visual and spatial neglect by omitting and simplifying the left side of the drawings and completing them later, which was a sign of him being aware of his visual and spatial neglect (Figure 1) [19].

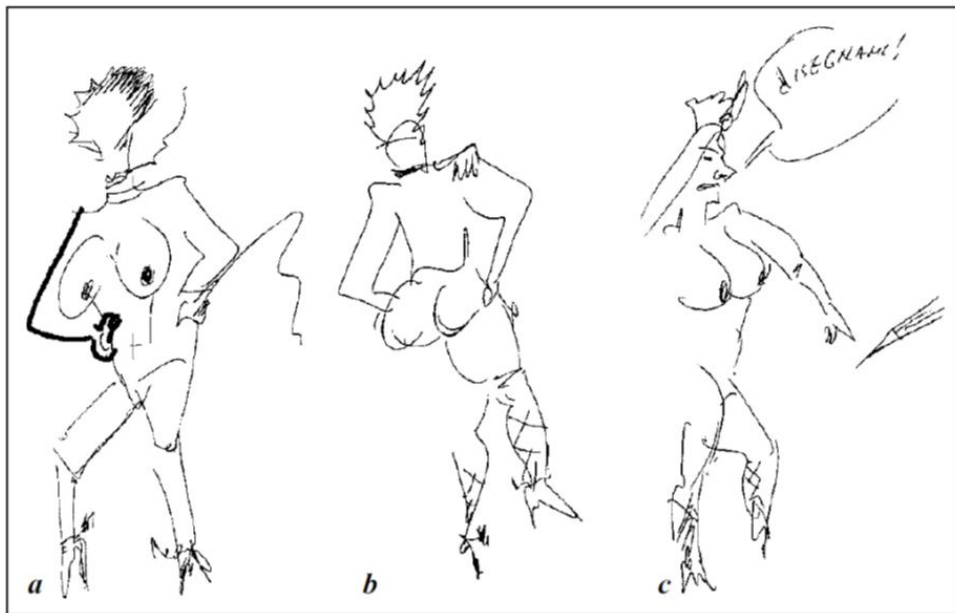


Figure 1. Fellini's drawing 25 days post-stroke of a female from different perspectives (front (a), back (b), profile (c)). Of note is the missing part of the drawings on the left side. In drawing (a), Fellini realized his left-sided deficiency and added a drawing of the right arm with a different pen. In drawing (c), he added the text "draw me!" (Source: Reprinted from Cantagallo and Della Sala, 1998, with permission) [20].

He recovered from his left-sided neglect within two months, and it is essential to note that he suffered from extrapersonal neglect, which he was aware of. After a few weeks following his stroke, his drawings revealed a complete perception of the sensorium and the disappearance of his neglect [19].

Another example is the case of Boris Krasnov (1961–2021), who was a world-known stage designer, prolific artistic producer, screenwriter, sculptor and painter [21]. Krasnov had a right middle cerebral artery infarction complicated by left-sided weakness and significant hemineglect. He drew a portrait sketch of his treating physician a few months after his stroke that clearly demonstrated left-sided neglect (Figure 2).

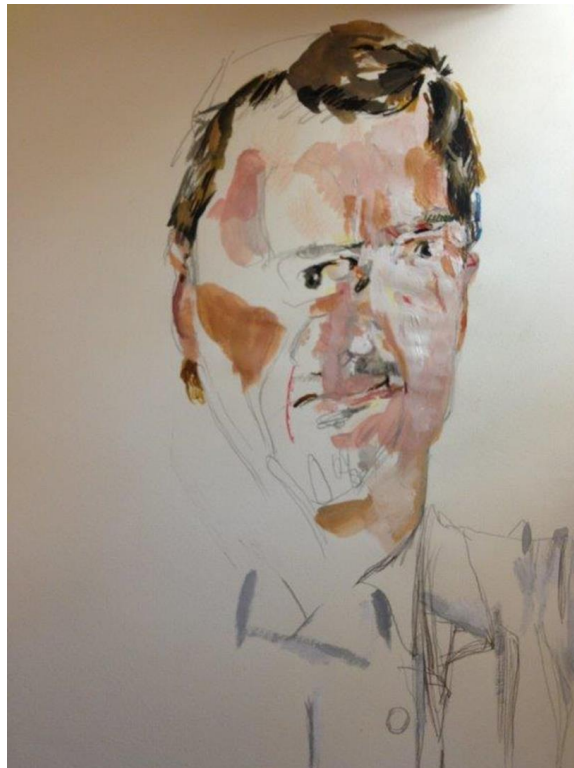


Figure 2. Credit: © Boris Krasnov's portrait sketch of Prof. Julien Bogousslavsky (used with permission).

A further example of a 20th century artist is an ambidextrous female Polish painter and sculptor, Krystyna Habura, who was born in 1928 and died in 1994 [22]. She was an established artist, receiving multiple international awards and exhibiting her works in Poland and internationally; she was known for her expressive paintings using rich colors, abstractionism, figurative painting and relentless experimentation with her style and techniques [22]. She focused on portraits ranging from realistic depictions to surrealist symbolism (Figure 3).



Figure 3. Krystyna Habura pre-stroke painting (Elfik) (Credit: © Pachalska M., used with permission [22]).

Her artistic production was dynamic and came in intense waves of creativity, with days or weeks spent on painting, alcohol use, smoking, and poor sleep and food hygiene [22]. Together with her cardiovascular risks (hypertension), these creative spells led to an ischemic stroke in the right middle cerebral artery territory with left-sided weakness, Luria's dynamic aphasia and spatial orientation dysfunction [22]. Following her stroke, she needed multiple inpatient rehabilitation programs where she re-learned to walk and improved her speech, dexterity and ability to deal with activities of daily living [22]. The most disturbing symptom remaining after the stroke was, as defined by Habura, "creative aphasia", with the inability to paint and missing the drive she had previously to create [22]. During her expertly guided art therapy sessions, she started with right-hand sketching and then moved to support her left-hand movements with the right hand, allowing for the left hand to regain sufficient dexterity for independent drawing and painting [22]. After extended multistage therapy, her artistic creativity returned with changes in her style to a more sketch-like, simplified and logically detached pattern (Figure 4) [23].



Figure 4. Habura’s post-stroke painting “Grey Hawk, Chief of the Witkowice Tribe” (Credit: © Pachalska M., used with permission).

It is interesting to see opposite changes in the two individuals developing *de novo* artistic creativity and the established artist becoming unable to create at the previous momentum despite her neurological recovery of focal deficits. The previously mentioned interactions between the temporal and frontal cortices and idea and artistic drive control can explain some of these opposing developments in artistic creation.

Non-focal neurological deficits were shown to alter the artistic output in individuals with posterior circulation strokes. Annoni et al. [10] reported on a 57-year-old self-taught right-handed lithographer whose painting was focused on simplified figurative themes and geometric shapes and used a naïve and expressive style [10]. He presented with sudden-onset right superior quadrantanopia, with sparing of macular vision, difficulties with identifying complex objects in the upper right visual field and autoscopia—he saw his own body on the floor with his head turned to the left. Magnetic resonance imaging (MRI) confirmed an infarction within the visual cortex involving the primary and secondary sensory areas; his ancillary tests did not reveal the underlying etiology, and he was diagnosed with cryptogenic stroke [10]. During his recovery, the quadrantanopia evolved into recurrent photopsias and dyschromatopsia in the previously affected visual field

with a corresponding paracentral scotoma [10]. A long-term follow-up assessment revealed delays in visual detection tasks, veering off a discourse topic consistent with a dysexecutive syndrome, and elements of post-traumatic stress disorder (PTSD), but his overall functioning and activities of daily living returned to normal [10]. After resuming his artistic activity, changes were noted, such as simplification of details, painting thinner and more stylized extremities and the use of simplified colors; he also started inserting glowing shapes in the area of his persistent scotoma [10]. He also noticed changes in his inspiration, with it coming immediately prior to painting, but previous to his stroke, he would contemplate the production for a while ahead [10].

The second case is a 71-year-old ambidextrous artist who started his career after the age of 50 and gained a local and national reputation by producing figurative and impressionist paintings of Swiss landscapes [10]. He suffered from a left paramedian thalamic infarction and resolving symptoms of right-sided ataxia, hypoesthesia and weakness; the stroke etiology was cardioembolic (atrial fibrillation) [10]. In a long-term follow-up assessment, he was found to have mild to moderate dysexecutive symptoms with verbal and figural perseverations and decreased precision in imaginary tasks [10]. He regained the ability to paint a few weeks after the stroke and started using both hands interchangeably despite regaining full dexterity of the dominant right hand. His clients and art critics noted this a few months after, and he moved from a figurative style to a more detail-focused, spatially structured and color-realistic style; the artist himself commented on the change as becoming more sensitive to natural beauty and expressing the rawness of it in his paintings, shifting away from impressionism as it lacked the realism [10]. His left hand allowed him to discover stronger colors, express emotions better and become more creative [10].

The overlapping theme in both of these artists is a change in artistic drive, attention to detail and the use of colors. These transformations went in the opposite directions: the first artist turned to simplicity in colors and details, with an alteration in artistic drive; the other turned to more complex spatial arrangements, increased attention to detail and vivid colors, with increased artistic creativity. The artistic changes observed in these two artists are, in part, related to the dysexecutive syndrome. There was no correlation between the localization of the stroke and defined or reproducible changes in painting style.

The following report brings a greater understanding of the changes in artistic style after a posterior circulation stroke. An 87-year-old established artist presented with sudden-onset vertigo, horizontal diplopia with partial left oculomotor nerve palsy, dysarthria, right facial droop, right-arm weakness, and gait and truncal ataxia consistent with posterior circulation ischemic stroke; computed tomography of her brain showed previous symmetrical small vessel changes in the basal ganglia [24]. Her condition improved after her stroke, with resolution of gait ataxia and right-arm weakness and persistence of subjective diplopia despite the normal

neuro-ophthalmological evaluation; upon neuropsychological assessment, she was found to have significant constructional apraxia and attention deficit [24]. She resumed painting within four weeks of the stroke. Her premorbid paintings were dedicated to architectural objects and flowers, and all were painted from visual memory and modified before putting them on canvas [24]. The premorbid and two-year post-stroke paintings showed her ability to paint the whole image and center the object of interest accordingly. Her paintings developed during her stroke recovery; of note, however, is the fact that she did not remember painting any of these, showed a selective focus on parts of the work and was unable to develop the whole of the object, which was attributed to problems with simultaneous creativity and storage of visual memory [24]. In this artist, the unique combination of visual memory translation in her painting with the inability to translate the wholeness of her imagination and a selective focus on parts of the visual creation is suggestive of visual agnosia and asimultagnosia, possibly linked to dysfunction of the associative visual cortex function with an aberrant abstraction of visual input and interpretation of visual memories [24].

Another insight into artistic creativity and stroke comes from the case of Carl Frederik Reutersward (1934–2016), a right-handed multilingual (he was able to speak Swedish as a primary language, and English, French and German as secondary languages) sculptor and painter who suffered from an intracerebral hemorrhage within the left-sided lenticular nucleus and internal capsule, which caused right-sided weakness, sensory loss and subcortical aphasia affecting all four languages, with Swedish being least affected [25]. In a long-term follow-up assessment, he was found to have ongoing right-arm weakness, moderate dysexecutive syndrome, minimal visual agnosia and resolution of his dysphasia [25]. He attempted painting with the paralyzed right arm to stimulate recovery, but after a long period of intense rehab, he later started using his non-dominant hand, which he found beneficial to his artistic creativity. He described his new gift with the following words:

“... it's marvellous... it's not a handicap... the left hand is the dreamer... the soul is localized in the left hand” [25]

Following the change of creative side to the left arm, his artistic output changed, with a greater emotional load and artistic intensity. Art critics noted this and praised him for gaining expressiveness, freshness, vitality, psychic intensity and playfulness [25]. A great example is his premorbid sketch of a pistol (“Non-Violence”), which was drawn with hefty and decisive strokes. After his stroke, he drew the lethal pistol again, but the drawing was humoristic and pictured the weapon as a toy [25].

There is a parallel between the changes observed in Reutersward's style and the second case of posterior circulation stroke, as both artists switched from the right dominant to the left non-dominant hand. Both observed greater expressiveness, emotional load and creativity, but there were opposite shifts to playfulness and humor in the former and realism in the latter.

3. De Novo Artistic Creativity in Brain Disorders

A fascinating insight comes from more contemporary examples of individuals developing a sudden artistic output due to cerebrovascular disease with predominantly non-focal cerebral involvement, emphasizing the role of networks and intercortical communication in artistic output. The first example is of a 35-year-old chiropractor, Mr Jon Sarkin (born in 1953), who in 1988 suffered from a left cerebellar hemorrhage and hypoxic brain injury caused by two heart arrests after an elective neurosurgical procedure for correcting a neurovascular conflict at the level of the acoustic nerve; he required decompressive surgery and partial cerebellar parenchyma removal [26,27]. Following his stroke, he remained in a coma, and during his recovery, he transformed from a quiet and reserved person into an unpredictable, uncontrollable, unconventional, creative artist. Part of his change was related to cognitive symptoms related to his hypoxic episode and impairment of fresh memory [27]. He did not have any formal artistic formation, but he had the drive to produce surreal and complicated artworks [28]. He commented on his transformation with the following words:

I do think it (art) was always latent inside me... But I did not suddenly feel motivated after my stroke. It was just what I did and do. It's a bit like asking you if you feel motivated to breathe? You just do it. It was an autonomic thing. [28]

Sarkin started his drawings initially with random doodling with curves, zig-zags and spiral lines portraying old cars, animals or plants. His artistic style progressed and became more advanced, and he was noticed as an artist after sending his work to the *New Yorker* magazine [28]. This sudden and constant burst of creativity transformed his life entirely. His artistic production took over all his previous activities and made him paint, draw, write poems and imbed words into his art [27] (Figure 5).

Sarkin described the urge for creation and the relation between his stroke and the drive to produce art in the following words:

"[My artwork is] a manifestation of what happened to me... I've learned how to visually represent my existential dilemma caused by my stroke." [29]

He became a very prolific artist, exhibiting his works in the best venues. Sarkin's transformation and journey through his disease and related disability, or rather new ability, are an excellent reflection of the human potential to recover and the brain's potential to regenerate and, despite ongoing cognitive symptoms, expand into new means of communication [27] (Figure 6).

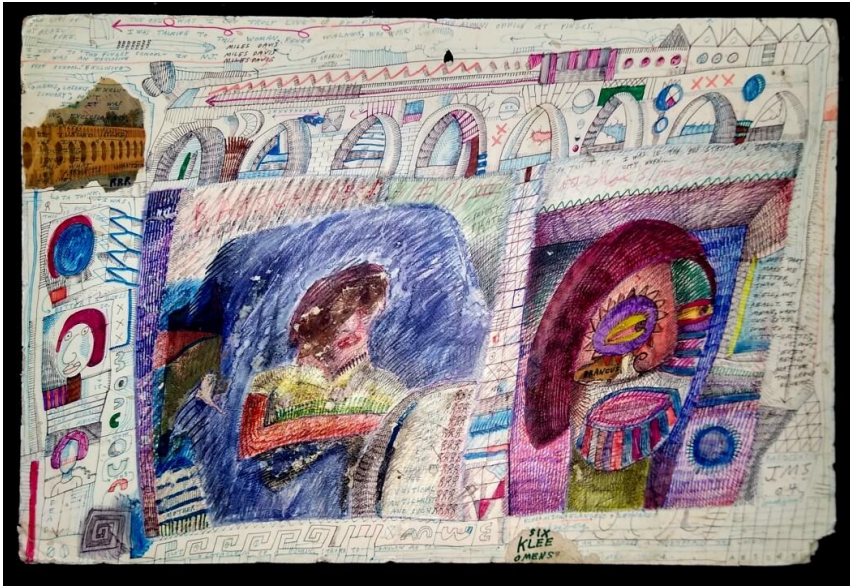


Figure 5. Sarkin's painting (Image 202_10925_135520_292_HDR-01), Credit: © Sarkin J., used with permission.



Figure 6. Sarkin's painting (IMG_20-210925_134719594_HDR-01), Credit: © Sarkin J., used with permission.

There is another example of a sudden artistic output in a stroke survivor. This is the case of Tommy McHugh (1949–2012), who suffered from non-focal brain damage caused by a subarachnoid hemorrhage [30]. After his hemorrhage, he required aneurysmal coiling and clipping, and he remained comatose for ten days. McHugh

did not have any formal artistic training, and prior to the onset of his hemorrhage, he worked as a builder; in his youth, he served his time in prison, and he had a long history of substance abuse [30]. He described the sudden change leading to artistic production with the following words:

I suddenly felt an explosion in the left side of my head and ended up on the floor. . . . Then the other side of my head went bang! I woke up in hospital and looked out of the window to see the tree was sprouting numbers. 3, 6, 9. Then I started talking in rhyme. . . [30]

With his creative compulsions for poetry and pictorial activity, McHugh made the following remarkable statement:

I just plough into it, finish it, move away and then go and maybe make a clay head. I finish that and go and play with a bit of stone, come back and do another picture, sit down and write a poem, get up and make a butterfly out of birds' feathers. [31]

He volunteered to be examined by prominent neurologists, and based on his neuropsychological assessment, he was diagnosed with frontal lobe dysfunction with verbal disinhibition and impaired multitasking [30]. He described his outpour of creative impulses with the following words:

"It's like Mount Etna exploding. Fairy liquid bubbles of intelligence and they are popping around me all the time—grabbing one and trying to remember it before it floats away, popping." [30]

The uninhibited drive to create made him paint on the walls, ceilings and floors; in addition to this, he noticed changes in his personality, with excessive emotionality, and discovered the feminine aspects of his nature [30]. His poetry also showed references to the overflow of contextual expression in any available space and the endless need to find the meaning of the blindfolded creation ("I am climbing the mountains. . .") [32].

These examples of de novo artistic creativity show some similarities with stroke-related non-focal brain injury and more diffuse changes in the functional connectivity and brain function with the overflow of pictorial and verbal expressions that were transformed into art pieces. The lack of laterality in the brain injuries in these two cases sheds new light on the artistic changes related to stroke with de novo creativity. In addition, one may postulate the role of temporal and frontal cortical connections, with a relative switch in the balance to releasing idea generation from the temporal areas with less frontal inhibition.

Art therapy was mentioned above in the case studies of artists affected by stroke to improve stroke-related symptoms. Art therapy was discovered and named for the first time by Adrian Hill in 1942, who was recovering from tuberculosis; he discovered the therapeutic benefits of visual arts, such as the release of creative energy and resilience building. In addition to this, he recommended art therapy to

his peer patients [33]. Creative-art-based therapies focus on specific types of artistic output, including music, dance and visual arts such as painting and drawing. The diverse forms of therapy focus on various functions and deficit dipoles. However, the common goal is to deliver multisource stimulation and boost creativity to allow for functional restoration, psychological support, social engagement and spiritual experiences [34]. Visual-art-based therapies were shown to increase self-expression, enhance confidence and mood and allow for relaxation, distraction, encouragement and a sense of control [34]. In the case of visual art therapy, more focal deficits such as spatial awareness and extremity weakness are targeted, which may improve functional outcomes [35].

4. Summary

Art can be considered as a means of universal communication that is timeless and not limited by cultural constraints, and art production can be seen as an ultimate achievement of the human brain. Historical observations from established artists whose productivity was altered by stroke allow us to understand two patterns. The first includes loss of function that degrades the organization of the painting plane, omitting and neglecting a part of it or including representations of visual field defects as part of the production. The second pattern involves a loss of or change in artistic drive, with the spectrum ranging from “artistic aphasia” to mechanical creation, and alteration of the emotional content, from overload to complete dryness and distancing. The occurrence of de novo artistic skills in otherwise art-naïve individuals shows the great potential that sits in all of us. The trigger of the nascent artistic productivity discussed in this paper is related to focal and non-focal brain injuries, and increases in artistic drive can be attributed to the change in the balance of interactions among different cortical regions in the frontal–posterior relation rather than disruption of right- or left-sided function. The language of art and artistic production can both be used in helping stroke survivors recover through art therapy. They can also help to establish a non-verbal communication portal bypassing neurological disease.

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