

# Effects of Art Therapy Using Color on Purpose in Life in Patients with Stroke and Their Caregivers

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**Purpose:** Patients with stroke suffer from physical disabilities, followed by mental instability. Their caregivers also suffer from mental instability. The present study attempted to address the degree and the change of the level of Purpose in Life (PIL) in patients with stroke and caregivers by applying art therapy using colors.

**Materials and Methods:** Twenty-eight stroke patients with a good functional recovery or a moderate disability and their 28 caregivers were selected and evaluated. The period of the study between the stroke and color therapy was more than 6 months. Patients and caregivers were divided into the color therapy (28) and control groups (28). A questionnaire, which measures the level of PIL was conducted separately for patients and caregivers prior to the first session of color therapy (2 hours per week, total 16 sessions). The final examination was performed 5 months after the last color therapy session. **Results:** There was significant difference between before and after color therapy when the level of PIL was measured both in patients and caregivers ( $p < 0.01$ ). These were the same between the color therapy group, compared with the control group ( $p < 0.01$ ). As color therapy progressed to the late phase, patients and caregivers applied increasing number of colors and color intensity. **Conclusion:** These results prove that color therapy will improve PIL of the patients with post-stroke disability and caregivers. Furthermore, color therapy would be a useful adjuvant for improving the quality of life of the patients with stroke and their caregivers.

**Key Words:** Stroke, art therapy, color, purpose in life

## INTRODUCTION

Stroke is a serious and long-term leading cause of death and disability worldwide. Patients with stroke do not only suffer from physical dysfunction, but they also suffer from mental regression such as post-stroke depression, agitation, and frustration.<sup>1,2</sup> Moreover, due to altered character and aggressiveness of the patients, their caregivers also experience psychological distress, referred to as family burden.<sup>3</sup> In general, many patients with stroke and their caregivers suffer from poor quality of life and mental instability.

Art therapy has been shown to have positive effects on various disease groups

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such as cancer,<sup>4,6</sup> brain injury,<sup>7</sup> asthma,<sup>8</sup> dementia,<sup>9</sup> and cerebral vascular accident.<sup>10,11</sup> However, there is a significant lack of research into arts interventions in relation to stroke. So far, therapy using only two kinds of method, including art language in therapy (by means of pictorial projection and other artistic methods)<sup>12</sup> and making of visual images using clay<sup>11</sup> in patients with stroke, has been introduced. Furthermore, these results are primarily concentrated on a range of positive effects including neuropsychologic and cognitive status.

To our best knowledge, however, there is no on-going research on the outcome of art therapy, which uses colors to find out individuals experiencing Purpose in Life (PIL). Hence, the purpose of this research was to investigate the desire of the stroke patients and caregivers to pursue PIL and the transition before and after color therapy.

## MATERIALS AND METHODS

### Study subject

Twenty-eight patients who continuously received stroke therapy including rehabilitation at the Department of Neurosurgery and Rehabilitation Medicine in the university hospital and 28 caregivers were selected for the study sample. Patients and their caregivers were divided into two groups: color therapy group (28) and control group (28). Patients in the control group didn't receive any special interventions except comprehensive rehabilitation. The caregivers were the person on whom patients were most dependent and whom they regarded as their immediate next of kin. The criteria for the subject of the study were: 1) patients with stroke for more than 6 months with mild neurologic deficits of Glasgow Outcome Scale 4 or 5<sup>13</sup> and showing no more improvement, 2) patients without history of congenital or acquired brain disease, 3) patients without history of psychiatric disease, 4) patients who fully understood the purpose of the study and agreed to sincerely follow the checkups and therapy program required for the study. Patients with serious cognitive dysfunction and physical disability caused by stroke who were unable to follow and continuously participate the therapy program were excluded. Three patients were taking antidepressants in therapy group and two patients in control group.

The patients' clinical progress was referred to the hospital record, and their clinical characteristics were examined based on the clinical record. This study was approved by the IRB

of author's Hospital.

### Study Tool

A questionnaire was designed to measure the level of individual's life purpose. PIL is the attitude checkup questionnaire with 20 questions to evaluate the existentialism of the study subject group. The structure of all items in the questionnaire followed a seven-point scale pattern. Patients and their caregivers were supposed to mark from point 1 to 7 on each questions divided into the following three sub-criteria: measuring the meaning in life, life value selection, and aim of life. The lower number indicates low level of life purpose and the higher number indicates the high level of life purpose of the study subject group. If the score is higher than 91 points, the individual has relatively normal level of life purpose.<sup>14</sup> PIL questionnaire was originally designed by Crumbaugh and Maholick<sup>15</sup> for evaluating existential vacuum on the basic concept of meaningful therapy. The present study utilized the questionnaire that was translated by Namkung.<sup>14</sup>

The test measuring the level of PIL using the questionnaire was separately conducted for patients and caregivers prior to the first session of color therapy. This examination was repeated at the end of color therapy. The final examination was performed 5 months after the last color therapy session in both groups.

### Color therapy program

Patients with stroke and their caregivers were directed to familiarize with three primary colors used during color therapy program. After mixing black and white color, each individual was then directed to find their personal colors and conduct an expression process.

The Color Sample and the Color Chart were used for color therapy and interpreted after therapy. The Color Sample is composed of 329 different colors, intensity, and saturation. The color intensity and saturation chosen by patients are closely related to their psychological symptoms; the higher the color saturation the stronger psychological effect can be expressed. The Color Chart is designed to show the different color intensity phases based on rainbow and achromatic colors. The chart is divided into 9 phases, ranging from pale to dark, and each phase has its own title. The warm color, cold color, and neutral color expression corresponds to the psychological tendency which are 'extrovert', 'introvert', and 'neutral', respectively. Furthermore, the vertical layer in the ninth phase is composed of color tones. The order of the layers is from phase 1, the lowest satura-

tion and darkest tone, to phase 9, the highest saturation and intensity, and the mixture of the achromatic colors shows the emotional state of patients.<sup>16</sup>

Color therapy program (Table 1)<sup>17</sup> was restructured in a reference to Rubin's program<sup>18</sup> in translation in Korean version.<sup>19</sup> In order to increase the feasibility of therapy, we tried to explore each part of phase in the process of therapy. In the first phase, we analyzed how patients with stroke express their feelings of anger and sorrow with formation of rapport. In our next phase, we analyzed how emotional pain coming from constant drug treatment can be expressed through color therapy. For example, patients were encouraged to choose colors, which reflect their current feelings. Finally, our last phase is to relieve the psychological pain by planning positive emotions and purpose of life.<sup>20</sup>

Color therapy program was practiced once a week. Total 16 sessions were performed and each session took two

hours (13 sessions using color, 3 sessions for PIL questionnaire). A researcher with art therapist license and a research assistant majored in art therapy facilitated the program at the university hospital stroke center. Color analysis used in color therapy program was done by a researcher and two art therapists. Color therapy consisted of total 13 sessions and it was divided into three parts: the early phase (practice and expression through color), the middle phase (setup for future direction), and the late phase (empowering with psychological support). The process of each session and the contents are shown in Table 1.

#### Data process and statistical analysis

PIL test was given to the patients with stroke and their caregivers before and after color therapy program. Then, we compared the transitional differences between before and after color therapy program through Mann-Whitney U test.

**Table 1. Contents and Progress of Color Therapy Sessions<sup>17</sup>**

Session	Title	Progress	Purpose	Equipment	
Early phase	1	Questionnaire	PIL test	Pre-test	Pencil eraser
	2	Dizzy Picture	Paint water on blank drawing paper and blot with a pen	Rapport formation	Pen, brush bucket, drawing paper
	3	Today's mood	Picture with aura on a figure painting	Navigation of color	Colored pencil, pen
	4	Volcano	Picture of painted volcano	Radiation through colors (fury)	Colored pencil, pen
	5	Rain	Picture of rain	Radiation through colors (sadness)	Colored pencil, pen
Middle phase	6	Bird	Direction of the bird	Navigation of direction of ego	Colored pencil, pen
	7	House	Picture of creative commons	Stability, radiation through colors (longing)	Colored pencil, pen
	8	Shadow (human)	Figure painting	Look into the inside (face)	Colored pencil, pen
	9	Eye of butterfly	Only direction of the eye, determination of form of butterfly	Process of self-realization (determination of pen future direction)	Colored pencil, pen
	10	Tree	Painting tree symbolizing	Process of self-realization (integration of consciousness and unconsciousness)	Colored pencil, pen colored paper
Late phase	11	Color emotion	Distributing dotted drawing paper and paint with color	Expression of emotions recognized by patient and guardian objectively feelings	Pastel, drawing paper colored pencil, dyes
	12	Free expression	Randomly paint color on blank drawing paper	Process of self-realization (external character representation)	Colored pencil, dyes, pen
	13	My appearance in the living room	Self-portrait of the future	Process of self-realization (hopeful and positive emotions)	Drawing paper 4B pencil colored pencil, crayon
	14	Color I want to give me	Painting color on a drawing paper with people	Choosing colors giving me power and getting mental support	Drawing paper crayon
	15	Questionnaire	PIL test	Post-test	Pencil eraser
	16	Questionnaire	PIL test	Final examination	Pencil eraser

PIL, purpose in life.

A *p* value 0.05 or less was considered significant.

## RESULTS

### Clinical characteristics

The distribution of patients was 16 male and 12 female, and their mean age was 59.3 years old, ranging from 40 to 80 years old. The major occupation of patients and caregivers was agriculture, and there was four patients working in service industry and three jobless. Patients' and their caregivers' demographics including age, genders, occupation, and neurological status were very similar between two groups. Four patients had subarachnoid hemorrhage, four had cerebral infarction, and six had intracerebral hematoma in therapy group, and five had subarachnoid hemorrhage, two had cerebral infarction, and seven had intracerebral hematoma in control group.

### The results according to the PIL questionnaire

The initial score of PIL was very low indicating low level of life purpose, and was not significantly different between

two groups ( $p > 0.05$ ) (Table 2). After color therapy program, all the patients and their caregivers showed higher score of PIL test in all three sub-categories than before therapy, indicating positive effects of color therapy program. These were the same after color therapy, compared with the control group ( $p < 0.05$ ) (Table 2).

Moreover, the score of PIL test of the patients and caregivers rapidly improved through color therapy in the short study period; all scores of three sub-categories improved. However, the score of the questionnaire did not reach the level of normal people.

### The transition of colors after therapy

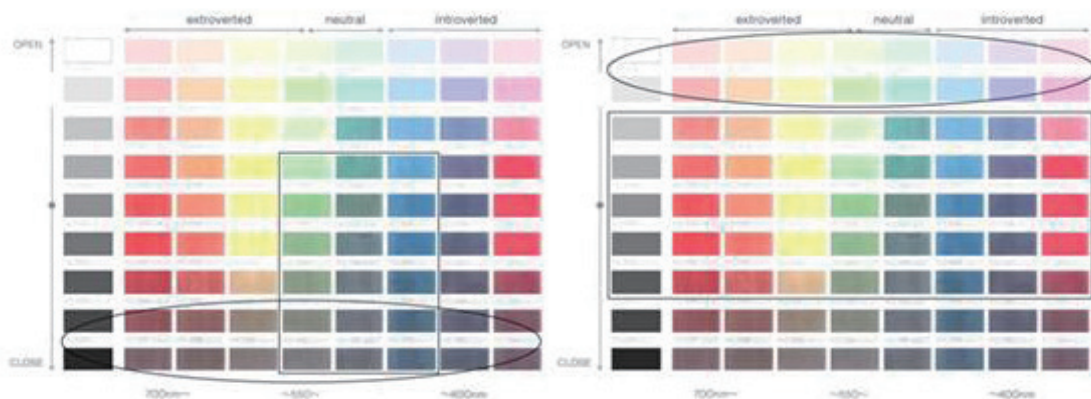
As shown in Fig. 1, at the early phase of color therapy, the patients with stroke chose the color tone from black to white, and the overall color intensity chosen was low. Also, when caregivers were directed to choose the color from dark green to cobalt violet, they had a tendency of mixing brown and dark black. At the middle phase, the color harmony performed by the patients and caregivers showed incongruity and their reactions to the colors and application did not vary. Also during this phase of color therapy, the patients

**Table 2.** The PIL Score in Patients with Stroke and Their Caregivers after Color Therapy

		Color therapy*		Control group	
		Patients	Caregivers	Patients	Caregivers
Meaning in life	Before	26.6±9.3	25.6±2.4	26.2±9.1	26.6±8.8
	After	40.3±3.6	37.4±2.1	25.9±9.3	26.7±8.2
Life value selection	Before	16.6±8.4	17.6±1.4	16.9±6.5	18.9±5.9
	After	24.6±4.9	24.6±1.6	17.5±6.1	19.1±5.6
Aim of life	Before	30.1±12.1	33.9±3.2	31.7±11.8	32.1±10.3
	After	45.6±5.9	42.7±2.2	31.4±12.0	32.0±9.2

PIL, purpose in life. All values are expressed as the mean±standard deviation.

\*Differences between before and after color therapy in patients and their caregivers were significant ( $p < 0.05$ ). These were the same after color therapy, compared with control group ( $p < 0.05$ ).



**Fig. 1.** The color aspect of patients with stroke (ellipse) and their caregivers' (rectangle) early phase (left) and late phase (right). The overall color intensity chosen by patients and caregivers was low and their reactions to colors and application did not vary at the early phase. As the color therapy progressed to the late phase, the color intensity and applied number of colors increased.

used colors mixed mainly with black, and their caregivers used cold colors. As color therapy progressed to the late phase, the patients and their caregivers applied increasing number of colors. The color intensity also increased due to the use of chromatic and primary colors (Fig. 1).

## DISCUSSION

The purpose of human life is to live in peace with mental stability, to design and follow the life goal, to believe that the past and the present are meaningful, to know the value of life why people live, and to promote personal growth through positive relationship with others. Indeed, PIL has been linked to the quality of life, including better mental health and happiness.<sup>20</sup> Thus, PIL may provide a new treatment target for interventions aimed at enhancing health and well-being. However, the association of PIL with stroke patients and their caregivers remains unknown. The present study proved that both patients with stroke and their caregivers lost the value and meaning of their lives in addition to physical disability of the patients. The caregivers of patients also had low desire to have life goal and lost the value of life due to futile frustration and the sense of guilt over patients for whom they could do better. The score of PIL test of the patients and caregivers rapidly improved through color therapy in a short study period; all scores of three sub-categories improved. However, the score of the questionnaire test did not reach the level of normal people.

Color is an expression of a subjective cognitive experience. People react emotionally to colors by stimulations to the visual cortex and generate psychological phenomena. Individual's emotions and sense can be influenced by different brightness, saturation, and changes in color coordination.<sup>21</sup> Thus, the purpose of color therapy is to eliminate patients' negative thoughts about themselves by allowing them to express their negative inner thoughts through coloring different kinds of complex geometric patterns.

At the early phase shown in Fig. 1, blue, black and white colors which reflect the expression of inner conflict of patients and caregivers reinforce the suppressed and passive life style. At the middle phase, the color harmony performed by patients and caregivers showed incongruity, and their reactions to colors and application did not vary because the patients with stroke and caregivers had inadequate motivation to pursue the life goal and life purpose. Thus, the middle phase is a concentrating period of therapy,

directing patients to restore their desire to pursue the positive life value. It was found in the present study that suppressed emotion, which cannot acknowledge the reality but reminisces the past and basic impulse loss, makes it difficult for patients with stroke and caregivers to apply various colors during the art therapy. However, as color therapy program progressed, the color choice of caregivers with improved intuition transited to rainbow color at the late phase, as shown in Fig. 1. In restoring the value and meaning of life, color therapy helps patients experience psychological transition from achromatic colors, which indicate unstable mental condition with low desire to pursue the life goal, to chromatic colors, which indicate better mental condition pursuing the life goal. The present results are similar to earlier results<sup>22</sup> which showed that patients experiencing severe psychosis are more restricted in their color usage, infrequently using yellow, green, blue, purple, and brown colors.

The results of the study showed that even though patients with stroke can recover physically and live independently, they showed declination of pursuing the life goal and life purpose. There was a meaningful transition of the level of PIL test of patients and caregivers before and after color therapy. As art therapy using colors progressed, patients and their caregivers applied various numbers of colors and increasing color intensity during therapy. As for the practical application of PIL measurements, the instrument used comprised 20 items, and therefore, may take some time to complete, which can be an obstacle to the use in research and clinical practice. Recently, shorter instruments have been developed.<sup>23-25</sup> A consensus regarding which instruments should be used to assess PIL in this field would advance this line of research. Furthermore, possible influencing factors in psychosocial aspect cannot be ruled out in the color therapy group, compared with control group which did not receive active intervention. A small number of cases frequently indicates problems in participant recruitment. Reason given for rejecting interventions is often a lack of interest in art ("I can't paint") or illness-related complications. It became clear, therefore, that future studies on the effectiveness of art therapy using color in stroke patients should use a larger sample size and randomized controlled design, to confirm a benefit.

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