



## Masking Tape Art-Work May Provide Beneficial Positive Effects

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### Abstract

**Background:** The authors and colleagues have been involved in treatment and care for the elderly with rehabilitation, Integrative Medicine (IM), art in hospitals for artworks using masking tape. Combined together, we conducted a pilot study for medical application of masking tape art-work for elderly subjects. **Subjects and Methods:** Subjects enrolled were 12 elderly patients with dementia regularly coming to day care center for rehabilitation (M/F 3/9, 78-100 years, 88.3±6.0 years). As methods, masking tape has been known as Washi Tape (wa=Japanese and shi=paper), which is adhesive tape easily to stick and peel off for decorative work. Protocol included i) working 2-3 times a week, ii) sticking masking tape on a rough sketch paper, iii) evaluation of several biomarkers before and after the intervention. **Results:** i) Artworks were performed satisfactory for each case, ii) grasping power (right) showed increasing tendency from 13.5±7.7kg to 14.8±6.8kg (p=0.11), iii) vitality test showed significantly increase (p=0.02). **Discussion and Conclusion:** Artworks of masking tape seem to be beneficial for improving grasping power and psychological condition. This study included other biomarkers such as Mini-Mental State Examination (MMSE), pinch power, language word test and Barthel index. We plan to develop further detail analyses in the future research.

**Keywords:** Masking tape art, Washi tape, Art in hospitals, Dementia, Grasping power, Elderly.

**Abbreviation:** MMSE-Mini-Mental State Examination, MHLW-Ministry of Health, Labour and Welfare, NIA-AA-National Institute on Aging-Alzheimer's Association.

### Introduction

Historically speaking, medicine and practice of medicine has developed with art and religion. One of the supreme physicians has been Sir William Osler, who was an eminent physician in Canada. He became one of the big four great doctors at Johns Hopkins Hospital. He emphasized the importance of bedside teaching and wrote down 2 famous textbooks including "the principles and practice of medicine" and "Aequanimitas". His famous comment included "medicine is an art based on science". From the perspective of a variety of art in medicine, there have been some changes in art in hospitals, practice of medicine and medical educations in many facilities. The interactive appreciation can make force of the sensibility of patients and medical staffs. Consequently, the ability to feel and find various matters may be developed in such circumstances [1-5].

Recently, art therapy has been in focus in the medical field. It can give positive influence to many patients not only physically but also psychologically. Authors and collaborators have continued the activity of art in hospitals for various opportunities. We have already completed comfortable feeling artworks on the walls of corridors and stairs at Tokushima University Hospital, in Japan. Furthermore, we

have performed four seasons' artworks in Komatsushima Hospital, Komatsushima city, Tokushima, including cherry blossom, flower, leaves, snowman and others. When drawing these artworks, we use not oil or water color paints but masking tape. It has become more widely used in recent years and is used for various purposes such as decoration, wrapping, and crafts. As part of our activities, we have already developed workshops for art in hospitals with masking tape. Among them, we observed that elderly people with less power can handle masking tape easily, associated with concentrating and working with interest [6-9].

The authors have long been involved in the treatment and care of the elderly medical and welfare facilities. Consequently, we presumed that masking tape could be used for outpatient rehabilitation to improve finger dexterity and attention. In this article, our trial for group rehabilitation using masking tape at day care center will be reported.

### Methods

The subjects are 12 elderly patients who are regularly coming to our day care center for various rehabilitation several times a week. Their background included male 3 and female 9, with the age of 78-100 years

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old. According to the standard guideline by the Ministry of Health and Welfare, Japan, their physical and psychological care level was evaluated from 2 degree to 4 degree for requiring support for daily life. Regarding the level of cognition, the rating of Mini-Mental State Examination (MMSE) was from 15 to 23 points, which means mild and moderate dementia [10].

Among them, target subjects were selected who could use both hands freely and could tear off the masking tape in the usual day service activities for aged people. The methods included were the active use of various types of masking tapes, where the authors have continued practice and research so far. The masking tapes are from Kamoi Company, Japan. Masking tape has been known as Washi Tape (wa=Japanese and shi=paper), which is adhesive tape easily to stick and peel off for decorative work [9].

The activity of masking tape group was conducted for rehabilitation in day care center. The detail and order content are shown in the following.

- Elderly people usually visit the facility 2-3 times a week. Among them, a small group of 3-5 people was formed, and the training was conducted from November 1st to November 30th, about 30 minutes a day, 2-3 times a week.
- As for the specific content of the work, there was a rough sketch on a paper with an appropriate difficulty level. The subjects were explained to tear up the roll of masking tape by both hand and paste them onto the backing paper.
- The subjects chose the masking tapes of their favorite color and pattern from the masking tapes lined up on the desk and finished the work within a month.
- During the activity, there was an important rule. When cutting the masking tape, they did not use tools such as scissors, but used their own hands and fingers to tear up the tape.
- The rehabilitation staffs and care staffs around them were not able to participate the work. Only when the subject was unable to perform the work, staff can just advice by words.
- Before and after the above work, the subject's grip strength, pinch strength, MMSE, and Kana (Japanese alphabet) finding test (language word test) were conducted and compared. Their periods evaluated were later October and early December.

### Statistical Analysis

In this study, obtained data was analyzed by Wilcoxon signed rank sum test for the evaluation of significant difference. The calculation and analyze methods were performed using the computerized standard statistical tool [11].

### Ethical Considerations

This research was basically conducted along the Declaration of Helsinki, which was revised at the WMA Fortaleza General Assembly in 2013. Moreover, a comment was added along the ethical guidelines for human-based medical research. It was notified in Japan by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and also Ministry of Health, Labour and Welfare (MHLW). The detail study was fully explained to the related patients in advance. Authors have got the written document agreements from all patients. This investigation was discussed for the ethical committee. It included some kinds of professionals such as director, physicians, head nurses, pharmacists, nutritionists, and a person of legal specialty.

### Results

#### Artworks

The subjects visiting the day care center and participating this project were working on masking tape (Figure 1). At that time, all the subjects were having fun, choosing masking tapes of all colors and patterns according to their own ideas, and sticking them freely.



Figure 1: Actual scenes of masking art-work.

#### Biomarker Changes

The results of some tests before and after the intervention were shown in Table 1. They included grasping power (left and right), MMSE, kana (Japanese alphabet) finding test (Language word test), vitality test, Barthel index, pinch strength (left and right). The former 5 markers were shown before and after the intervention, and the latter 3 markers were shown only previous data. Among these, correlations between before and after the intervention were analyzed. Regarding the grasping power (right), it showed the increasing tendency due to the intervention. However, the correlation coefficient showed  $p=0.11$ , which was not enough for significant difference. In MMSE and word test, they showed a little increase of average data, which did not show significant difference. As to the vitality test, there was significant difference with  $p=0.02$ , where the distribution of the data was narrow. Except these two biomarkers, they did not show significant difference between before and after the intervention.

#### Clinical Effect

Among several biomarkers examined before and after the intervention, the changes in grasping power (right) were drawn in Figure 2. Out of 12 cases, 9 cases showed the stable and increased values of grasping power. Some of them showed remarkable elevation of grasping power. Their values of before and after the intervention were from  $13.5\pm 7.7$  kg to  $14.8\pm 6.8$  kg, where it was not enough to reveal significant difference statistically ( $p=0.11$ ,  $n=12$ ).

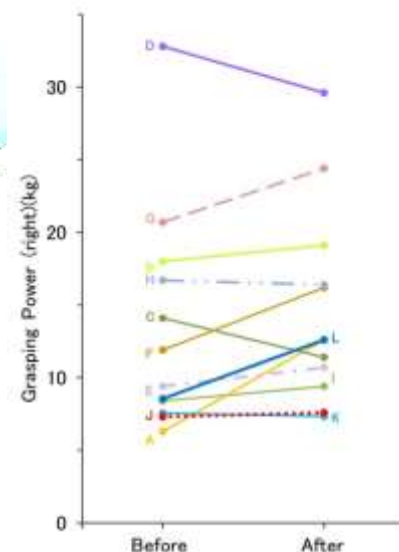


Figure 2: The changes in grasping power in the right hand after making art-work.



Case	Sex	Age	Grasping P. (rt)		Grasping P. (lt)		MMSE		Word test		Vitality test		Barthel index	Pinch (rt)	Pinch (lt)	
			before	after	before	after	before	after	before	after	before	after				
A	F	87	6.3	12.6	6.6	9.7	15	16	4	5	9	9	80	7	6	
B	M	90	18	19.1	18	18	23	23	11	7	9	10	90	11	11	
C	F	90	14.1	11.4	17	15	23	23	25	24	8	8	90	6	5	
D	M	84	32.8	29.6	29.3	26	17	19	8	2	7	8	85	15	15	
E	F	100	9.4	10.7	9.1	5.8	20	23	3	2	8	9	55	10	9	
F	M	89	11.9	16.2	13.3	13	16	16	5	7	6	6	55	8	6	
G	F	79	20.7	24.4	16.4	20	20	18	12	20	8	9	80	11	7	
H	F	78	16.7	16.4	12.3	12	24	28	16	22	8	8	85	10	9	
I	F	90	8.5	9.4	8.9	9.3	20	19	0	0	7	7	85	8	7	
J	F	92	7.5	7.5	8	6.2	15	19	7	5	6	6	60	5	5	
K	F	93	7.4	7.5	8.1	9.7	16	13	5	6	8	8	30	4	4	
L	F	88	8.5	12.6	6.3	9.6	21	25	5	8	7	8	55	4	3	
Average			88.3	13.5	14.8	12.8	13	19.2	20.2	8.4	9	7.6	8	70.8	8.3	7.3
SD			6	7.7	6.8	6.6	6	3.3	4.3	6.8	8.2	1	1.2	19.2	3.3	3.3

Table 1: General data of the subjects.

## Discussion

In this study, we planned to make a work using masking tape for elderly people, and measured grip strength and pinch strength before and after the intervention and compared them. As a result, there was a tendency for increased grasping power the right hand and improvement in the MMSE and language word tests. Regarding the intervention method in this study, the operation of masking tape involves several processes. Choose the color and pattern of the tape, pick it up, tear it up using both hands and fingers to the appropriate size and shape, and stick it to the paper. This process needs adequate judgments, hand and finger movements and concentration some subjects felt confused and frustrated to judge how to do it at first, but they got used to it and enjoyed it afterwards. This work seems to be useful and attractive for the cognitive elderly from medical point of view [12].

According to the results after intervention, there was a tendency to improve muscle strength such as grasping power. This was suggested to be from the movement and skill of the hands and fingers such as turning, tearing, sticking, and peeling off the masking tape. In particular, it was observed with right hand. On the other hand, there was a case in which the grip and pinch strength did not improve. The reason would be that the case could not understand the work, continue, or complete the artworks. When the cases can perform the work with enough comprehension and concentration in addition to hand movements, they have tendency to maintain and improve MMSE score. These seem to involve comprehensive cognitive functions such as the favorite color and pattern of the tape and the imagination of the background of the painting. In this study, subjects with mild to moderate dementia showed a tendency to improve finger dexterity and attention. Rehabilitation may be hindered due to decreased attention in patients with dementia. Appropriate ADL is related to preserved attention and judgment in addition to physical fitness. Current masking tape artwork may be beneficial for ADL training in the future [13-15].

Historically speaking, the diagnostic criteria for dementia were changed along the perspectives of medical practice. In the ICD-10 classification of mental and behavioral disorders (1993), dementia was described as a syndrome due to disease of the brain, usually of a chronic or progressive nature, and so on. After that, National Institute on Aging-Alzheimer's Association (NIA-AA) (2011) proposed several impaired abilities to acquire or remember new information, executive function, language functions, etc. Successively, DMS-5 (2013) provided a new concept of the criteria. They introduced a new perspective, and replaced the term dementia with major neurocognitive disorder. DSM-5 includes six cognitive domains, including i) complex attention, ii) executive function, iii) learning and memory, iv) language, v) perceptual-motor function, and vi) social cognition [16-18].

From six cognitive domains, the results of the research would be considered. The artwork of masking tape can lead satisfactory activation of the ability of instruction comprehension, ability to maintain attention, working memory, and selective concentration. The special aspect that we focused on was social cognition. By the active group work, participants increased their conversations about masking tape color, scheme, background, sticking method, and so on. Social exchanges and interrelationships have begun associated with their artworks. Even if there are some mistakes of sticking the masking tape, it can be repaired immediately. Such kind of working behavior may lead to a satisfying and successful experience for the patients with dementia. Concerning the brain function, this research includes the following aspects: i) By taking advantages of masking tape, the complex movements of hand and finger were conducted, which could stimulate the interrelationship of learning and perception-motor function, ii) By concentrating and working enthusiastically, the subjects had attended the artwork workshop more times than expected, which could stimulate the executive function and caution for complexity, iii) By continuing the learning the minute artwork, they can use their hand and finger better, which could stimulate the learning ability, memory and executive function [7,8, 19].

In this study, grasping power (right) and MMSE showed a tendency to improve after the intervention, but there was no significant difference. The main reason is considered to be that the number of subjects is small (n=12). At present, the P value is p=0.11 for grasping power, and p=0.18 for MMSE, and then it is expected that a significant difference will be observed as the number of cases increases. The masking tape artwork showed a tendency to improve in (i) physical aspect including finger movements and (ii) psychiatry aspect including cognitive function. The former (i) has complex actions of hand and finger such as flipping, pulling, tearing, pasting, and peeling, and the latter (ii) has functions such as selecting, thinking, deciding, executing, learning, and concentrating on colors and patterns. Consequently, it is expected that the skill of movement and the improvement of cognitive function would be expected and continued in the future [20].

Masking tape work has the potential to improve cognitive function. The factors are related to the work process. The following points can be considered: i) choose the color and pattern of the tape, which involves complexity attention, executive and perception-motor function, ii) continue group work while considering the surrounding situation, which involves social cognition and language function, iii) tear off and paste each tape with always thinking a better method, which involves learning and memory, complexity attention, executive and perception-motor function, iv) consider the size and shape of the tape so that it fits inside the frame, which involves complexity attention, learning and memory, executive and perception-motor.

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As a matter of fact, the former and the latter have already been reported to show relationship each other. A correlation has been found between finger dexterity and cognitive function. As a quantitative method, a magnetic sensing finger-tap device can be used. For suggesting the onset of future neurodegenerative diseases, the application of simple test of manual dexterity would be useful. Consequently, the study of manual dexterity may contribute to the evaluation of cognition at present and the prediction of deterioration of cognitive function in the future. Regarding this study, there are some limitations for the protocol of the investigation. The backgrounds of the subjects are patients with cognitive elderly people who are attending day service centers. The level of the cognition is heterogeneous. Then, it seems to set another study with patients with similar level of dementia in the future research. The number of the subjects was as small as 12 with wider range of ages. Consequently, current study is a pilot cohort study, and future study will be with enough number with similar quality of the subjects, the adoption of other markers, evaluation methods and comparison methods [21-25].

In summary, this study suggested beneficial positive effects of grasping power and cognitive situation by masking tape artwork for elder patients with dementia. Furthermore, the artwork may contribute various cognitive domains, especially social cognition. Consequently, authors would continue and develop the research of masking tape from physical and psychological points of view.

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## References

1. Afshar A, Steensma DP and Kyle RA. Albert Schweitzer: humanitarian with a "reverence for life" (2019) Mayo Clinic Proceedings 94: 91-92. <https://doi.org/10.1016/j.mayocp.2019.05.009>
2. Bando H, Yoshioka A and Nishikiori Y. Medicine and philosophy with supreme humanity and achievement by great physicians, Schweitzer, Osler and Hinohara (2020) Int J Fam Commun Med 4: 74-76. <https://doi.org/10.15406/ijfcm.2020.04.00188>
3. Stone MJ. William Osler's Legacy and his Contribution to Haematology (2003) British J Haematol 123: 3-18. <https://doi.org/10.1046/j.1365-2141.2003.04615.x>
4. Seeman MV and Becker RE. Osler and the Way We Were Taught (2017) Med Sci Educ 27: 555-557. <https://doi.org/10.1007/s40670-017-0419-z>
5. Waller D. Group interactive art therapy: Its use in training and treatment (2014) Routledge publishing, New York.
6. Jones P. The arts therapies: a revolution in healthcare (2020) Routledge publishing, New York.
7. Tanaka K, Nagahiro S and Bando H. Beneficial Art in Hospitals with Masking Tape Initiated from University Hospital (2020) Asp Biomed Clin Case Rep 3: 202-205. <https://doi.org/10.36502/2020/asjbccr.6212>
8. Tanaka K, Nagahiro S and Bando H. Psychologically comfortable seasonal images for the project on the art in hospitals (2020) Art Human Open Acc J 4: 187-189. <https://doi.org/10.15406/ahoaj.2020.04.00169>
9. Kamoi company: masking tape (MT).
10. Folstein MF, Folstein SE and McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician (1975) J Psychiatr Res 12: 189-198. [https://doi.org/10.1016/0022-3956\(75\)90026-6](https://doi.org/10.1016/0022-3956(75)90026-6)
11. Yanai H. Four steps excel statistics (2015) Seiun-sha Publishing Co.Ltd, Tokyo.
12. Leisman G, Moustafa AA and Shafir T. Thinking, walking, talking: integratory motor and cognitive brain function (2016) Front Public Health 4: 94. <https://doi.org/10.3389/fpubh.2016.00094>
13. Quandt F, Bönstrup M, Schulz R, Timmermann JE, Zimmerman M, et al. Spectral variability in the aged brain during fine motor control (2016) Front Aging Neurosci 8: 305. <https://doi.org/10.3389/fnagi.2016.00305>
14. Metzger FG, Hobert MA, Ehrlis AC, Hasmann SE, Hahn T, et al. Dual tasking for the differentiation between depression and mild cognitive impairment (2016) Front Aging Neurosci 8: 235. <https://doi.org/10.3389/fnagi.2016.00235>
15. De Paula JJ, Albuquerque MR, Lage GM, Bicalho MA, RomanoSilva MA, et al. Impairment of fine motor dexterity in mild cognitive impairment and Alzheimer's disease dementia: association with activities of daily living (2016) Rev Bras Psiquiatr 38: 235-238. <https://doi.org/10.1590/1516-4446-2015-1874>
16. World Health Organization. International Statistical Classification of Diseases and Related Health Problems (1993) Geneva, Switzerland.
17. McKhann GM, Knopman DS, Chertkow H, Hyman B T, Jack CR, et al. The diagnosis of dementia due to Alzheimer's disease: recommendations from the national institute on aging-Alzheimer's association workgroups on diagnostic guidelines for Alzheimer's disease (2011) Alzheimers Dement 7: 263-269. <https://doi.org/10.1016/j.jalz.2011.03.005>
18. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (2013) American Psychiatric Association Arlington, United States.
19. Rodríguez-Aranda C, Mittner M and Vasylenko O. Association between executive functions, working memory, and manual dexterity in young and healthy older adults: an exploratory study (2016) Percept Mot Skills 122: 165-192. <https://doi.org/10.1177/0031512516628370>
20. Martin JA, Ramsay J, Hughes C, Peters DM and Edwards MG. Age and grip strength predict hand dexterity in adults (2015) PLoS 10: 0117598. <https://doi.org/10.1371/journal.pone.0117598>
21. Liou WC, Chan L, Hong CT, Chi WC, Yen CF, et al. Hand fine motor skill disability correlates with dementia severity (2020) Arc Gerontol Geriatric 90: 104168. <https://doi.org/10.1016/j.archger.2020.104168>
22. Suzumura S, Osawa A, Maeda N, Sano Y, Kandori A, et al. Differences among patients with Alzheimer's disease, older adults with mild cognitive impairment and healthy older adults in finger dexterity (2018) Geriatr Gerontol Int 18: 907-914. <https://doi.org/10.1111/ggi.13277>
23. Sugioka J, Suzumura S, Kawahara Y, Osawa A, Maeda N, et al. Assessment of finger movement characteristics in dementia patients using a magnetic sensing finger-tap device (2020) Jpn J Compr Rehabil Sci 11: 91-97. <https://doi.org/10.11336/jjcrs.11.91>
24. Darweesh SKL, Wolters FJ, Hofman A, Stricker BH, Koudstaal PJ, et al. Simple test of manual dexterity can help to identify persons at high risk for neurodegenerative diseases in the community (2016) J Gerontol Ser Bio Sci Med Sci 72: 75-81. <https://doi.org/10.1093/gerona/glw122>
25. Kobayashi-Cuya KE, Sakurai R, Suzuki H, Ogawa S, Takebayashi T, et al. Observational evidence of the association between handgrip strength, hand dexterity, and cognitive performance in community-dwelling older adults: a systematic review (2018) J Epidemiol 28: 373-381. <https://doi.org/10.2188/jea.20170041>

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