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Budo practice for post-stroke patients – reflections on historical and scientific issues

Kantaro Matsui¹, Agneta Larsson², Yoshimi Yamahira¹, Annika Näslund²

¹ International Budo University, Japan

² Luleå University of Technology, Sweden

Abstract

Background and Study Aim. While many persons who participate in Budo-based rehabilitation profess improvements in functional ability, and self-efficacy in daily life, it has been extremely difficult to collect quantitative scientific data on the effectiveness of Budo-based rehabilitation. This difficulty is due in part to the wide variety of disabilities. The aim of this present study, therefore, is the scientific data on the effects of Budo rehabilitation targeting post-stroke patients.

Material and Methods. The six post-stroke patients were subjected to a period of 4-months Budo practice. Participant data was measured according to Single Subject Experimental Design guidelines. The following tests were used to gather data: 5 repetitions of the sit-to-stand test, 6 meter timed walk test, and Test of Dynamic standing balance. Data was also collected through interviews and self-report regarding: fear of falling and general health.

Results. Data showed that post-stroke patients experienced improved muscle strength, balance, postural control, walking ability and performance of daily activities as a result of the Budo-based rehabilitation in this experiment. Patient self-reporting revealed a reduced fear of falling and indications of a healthier self-image as a result of Budo practice. Patient interviews suggest that the sociality and culture of Budo had a powerfully positive psychological effect aiding the rehabilitative process.

Conclusion. Data clearly showed that Budo-based rehabilitation effectively delivered general quantitative improvements as reported by post-stroke patients. Not only could the patients perform daily-life tasks better, they exhibited less fear, more self-efficacy, and a healthier self-image.

Key words: jodo • judo • karate/karatado • kendo • person who with disabilities/the disabled • physiotherapy/physical therapy/PT • SSED/Single Subject Experimental Design

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Corresponding author: Kantaro Matsui, Department of Physical Education, International Budo University, 841 Shinkan Katsuura city Chiba, Japan; e-mail: kantaro@budo-u.ac.jp

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INTRODUCTION

The body movements of Budo were made for the techniques in battlefields. On the battlefield in ancient Japan, there was no referee to say “Yame (= Stop)!”. When someone sustained an injury, that person had to keep fighting on the battlefield. For instance, in the situation when a warrior injured his arm he had to fight using the other. This way of thinking was an important consideration when Budo originally developed. Japanese warriors developed their techniques considering what would happen if they got injured and thenceforth what they could do to survive. This means that Budo has, from its early origins, been an open system for persons with limited body motor control - the disabled.

The Budo Charter [1], Budo kensho, said “*Seeking the perfect unity of mind and technique, Budo has been refined and cultivated into ways of physical training and spiritual development. The study of Budo encourages courteous behaviour, advances technical proficiency, strengthens the body, and perfects the mind*”.

When able-bodied people start to practice Budo, no one asks about the existence of the scientific evidence for these claims that Budo practice encourages courteous behaviour, advances technical proficiency, strengthens the body, and perfects the mind. But when people with disabilities start to practice Budo, many

people start questioning the existence of scientific evidence. For detractors and sceptics, like coaches or the families of disabled persons, spreading this message required scientific evidence.

For the last fourteen years, I, professor Matsui have organized over 70 lectures on the topic of Budo for the disabled, and I have worked with over 3000 participants in workshops and demonstrations. I have collected many personal testimonies from disabled participants regarding the rehabilitative benefits of Budo practice. While many persons who participate in rehabilitation treatments based on Budo practice profess improvements in functional ability, coordination, and self-efficacy in daily life, it has been extremely difficult to collect quantitative scientific data on the effectiveness of Budo-based rehabilitation.

In order to provide scientific evidence that Budo is good for the disabled, it is necessary to increase the number of the disabled who practice Budo. Initially I had envisioned a study which compared two large groups of disabled persons-those who practiced Budo and those who did not. However, this experiment was never realized.

These failures occurred due to 3 research problems: 1) The number of disabled people willing to subject themselves to Budo-related scientific studies is quite low.

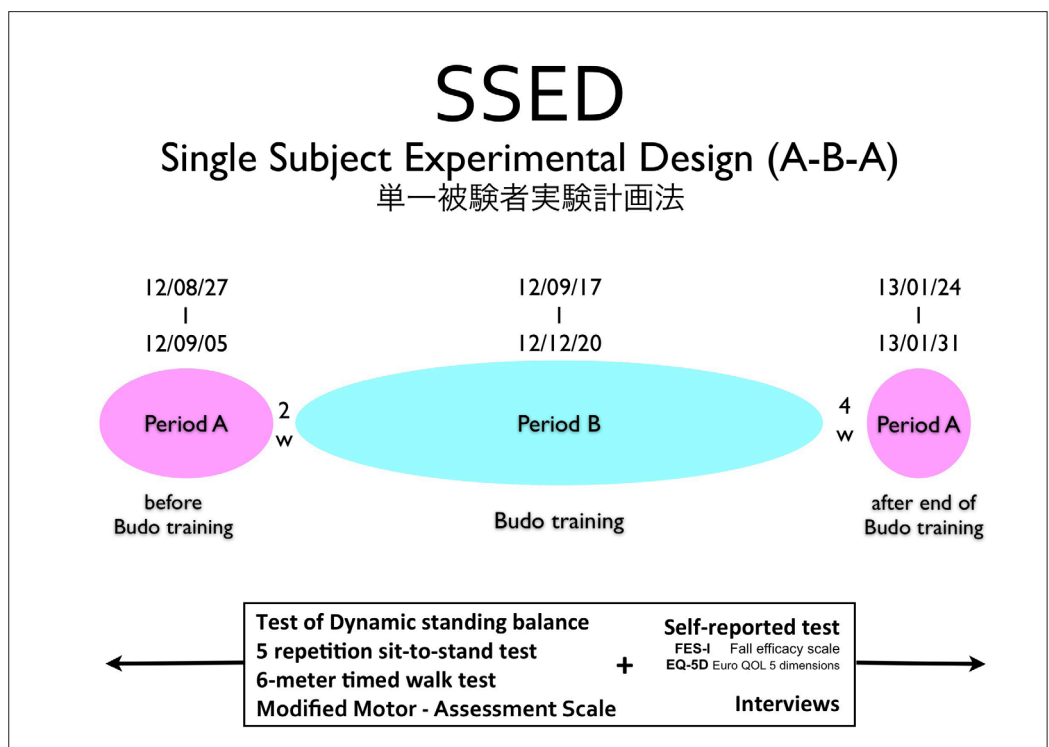


Figure 1. Single Subject Experimental Design

2) There is such a range of symptoms, conditions, and needs even for people suffering from the same disability. This makes designing large studies, which usually require certain homogeneity, practically impossible.

3) It can take a very long time for people with disabilities to see rehabilitation results. For instance, it took 6 years for one young man to learn how to raise his left arm [2].

MATERIAL AND METHODS

In collaboration with my two colleagues who have long experience in clinical physiotherapy research, Dr. Naslund, expert in motor control for disabled people [3] and Dr. Larsson, expert in clinical tests [4], from the department of Health Sciences, Luleå University of Technology, Sweden, a single subject experimental design (or SSED for short) was designed [5]. This research design makes it possible to analyse only one participant and we used a standard “A-B-A” experimental structure to collect our data (figure 1). That is, tests procedures were performed twice a week during the experiment’s three general phases: before (period A), during (period B), and after (period A) the Budo-based rehabilitation.

Period A, before the Budo practice phase, provides us with a lot of data on just a few willing participants. With less participants needed, it was possible to find subjects with the same kind of disability- in this case, all six of our participants were post-stroke survivors. Though the severity and nature of stroke varied considerably even amongst these 6 subjects, the benefit of SSED-type experiments is that we were able to modify the design of the experiment to address the progress of motor function of each subject.

Using this kind of experiment, we were able to identify and implement the optimum treatment for each research subject while also providing objective evidence regarding the effect of the Budo-based rehabilitation.

Baseline measurements were taken two weeks before the Budo intervention, during the 3-month Budo rehabilitation intervention, and then, final measurements were taken one month after the conclusion of the intervention. Tests included: “6-meter timed walk” test, “5 repetition sit-to-stand” test and “dynamic standing balance” or “step” test. This testing was supplemented with a few self-reported tests (for “Fear of Falling” and the “Health Status” of our subjects) as well as subject interviews[6,7].

The Budo-based rehabilitation in a facility in Northern Sweden was instructed by Mr. Pontus Johansson, a former Swedish Paralympic swimmer, who suffers from cerebral palsy. The Budo-based rehabilitation in this experiment incorporates three kinds of Budo practices on rotation. Because stroke symptoms vary considerably from person to person, group exercises (based on judo, jodo, karate and kendo) were adapted on both the group and individual levels in order to meet every patient’s individual abilities and rehabilitation objectives. So that, for instance, the first day’s rehabilitation session is a jodo (kendo) style practice; the second day is a jodo style practice; the third day is karatedo practice; the fourth day, returns to jodo; and so on. In this experiment, the participants had a 45-minute practice, twice a week, (every Monday and Thursday). Two physiotherapy students assisted the participants during the Budo rehabilitation sessions.

The variety of different practice kept participants’ motivation engaged and allowed participants to work on different muscles and motor challenges from session to session. At the beginning of each practice session, the physical progress of all participants was tested by a team of physiotherapists.

The experiment was approved by the Ethical Board, Umeå University, Sweden, Dnr:2012-261-31M.

RESULTS

The diagram below (figure 2) features the combined results of all six patients for the sit-to-stand test. The numbers at the bottom of the graph indicate weeks of the experiment. During baseline measurements, some participants took up to 30 seconds to complete just five repetitions of standing and sitting. From the baseline to the end of the 3-month rehabilitation, the time was at least halved for almost all of the participants. These good results persisted, but reduced slightly after a month from the end of Budo-based training (figure 2).

The diagram (figure 2) illustrates the large individual differences between the stroke participants in their ability to perform the repeated tests. The intra-individual variation in the test results emphasise the importance of several baseline measurements. Keep in mind all participants did not reach steadiness in their baseline measurements.

Let’s take an in depth look at one of the subjects, represented by the blue line. Subject 5 was a 69 years old man. Four years ago, he suffered from a cerebral infarction which affected the right side of his body.

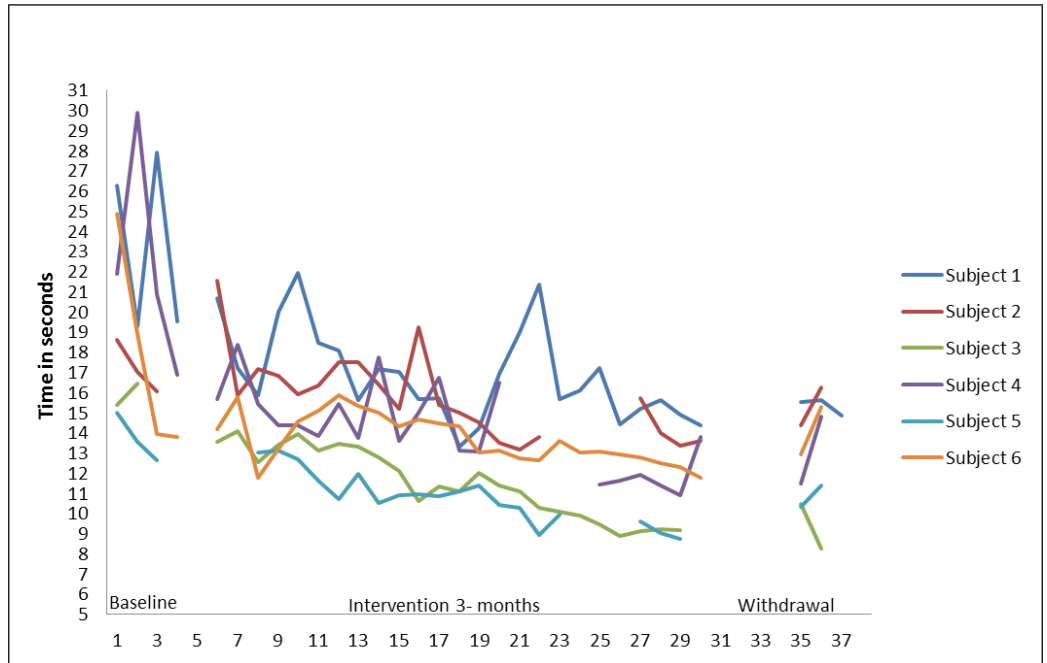


Figure 2. 5 repetition sit to stand test for the six participants

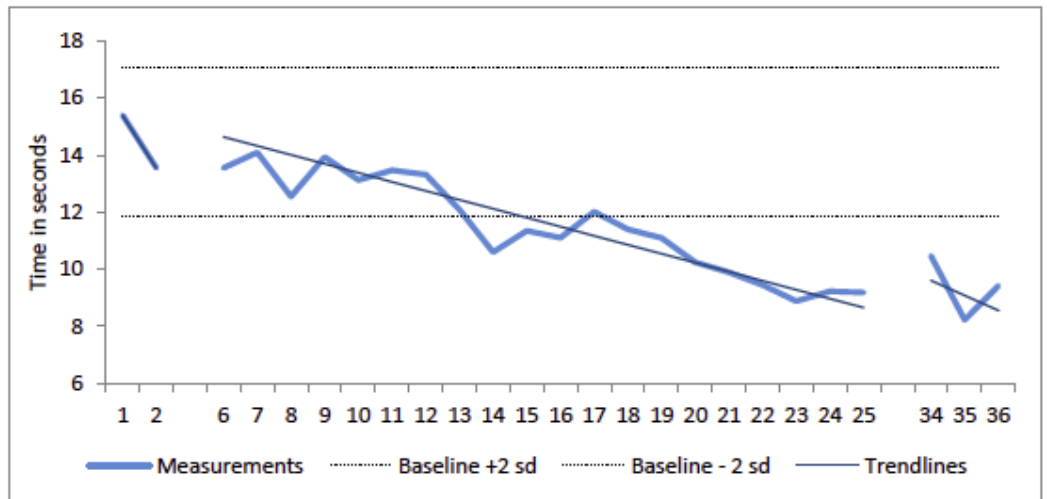


Figure 3. 5 repetition sit to stand test

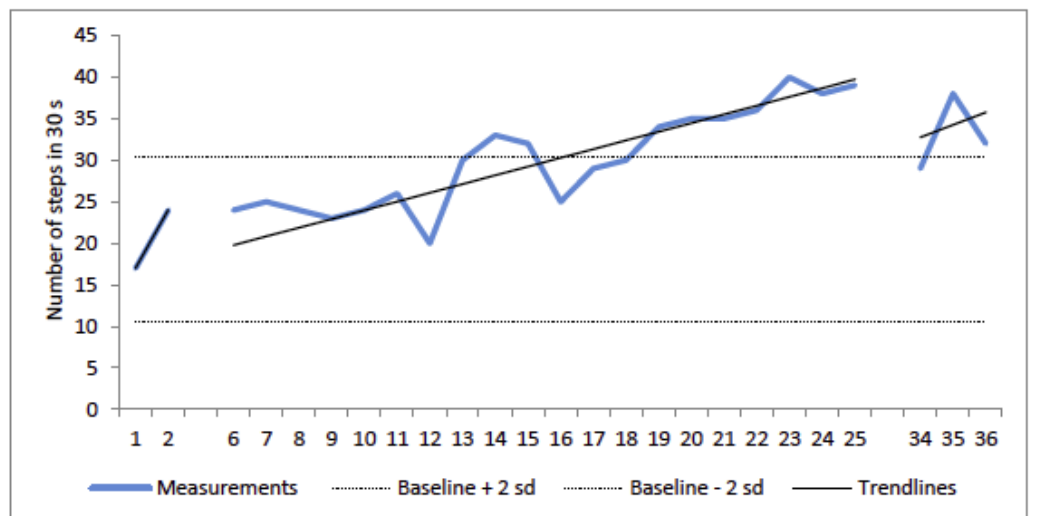


Figure 4. Test of dynamic standing balance (step test) standing on affected leg

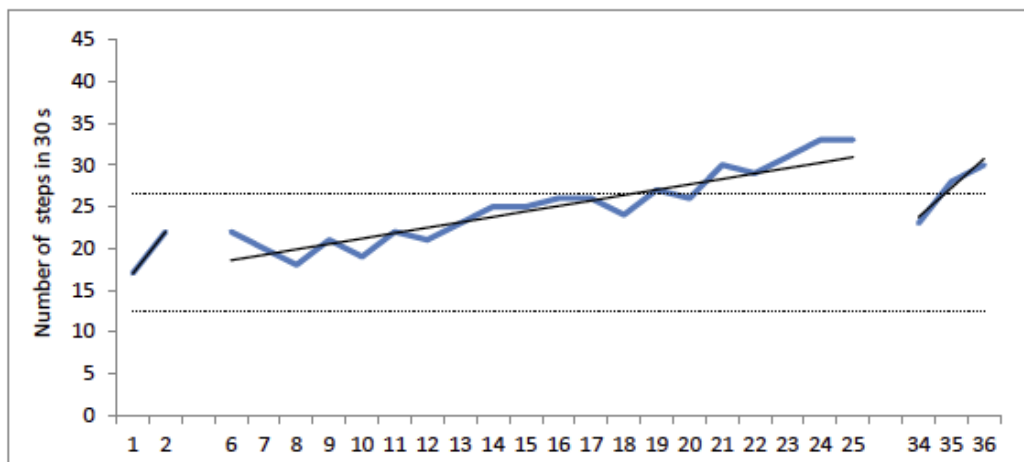


Figure 5. Test of dynamic standing balance (step test) standing on unaffected leg

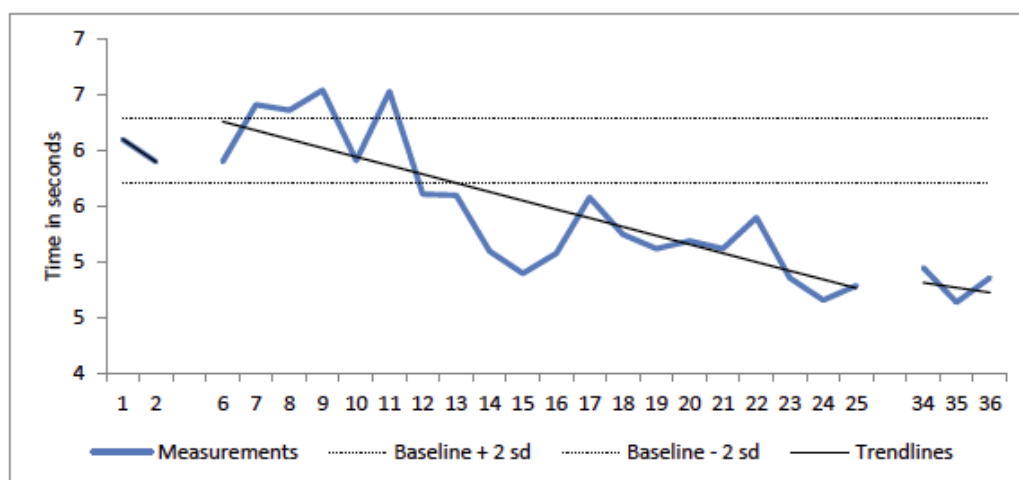


Figure 6. 6-meter timed walk test

The diagram above (figure 3) illustrates the subjects results for 5 repetitions of the sit-to-stand test. His baseline average for the test was 14 seconds. By the end of the experiment, he was completing the test in 9 seconds.

The above diagrams (figure 4 and 5) illustrate his results for the test of dynamic standing balance. In this test, the subject was standing on one leg and asked to move his other foot from the floor to the top of a box as many times as possible during a 30 second time period. The test was performed separately for each leg.

Before the Budo-based intervention, he could only step up on the box a total of 21 times in a 30 second period with his unaffected leg (figure 4). By the end of the intervention, he could step up on the box 38 times - an improvement of 55%. Lifting his affected leg showed similar improvement, from 19 steps to 34 steps in a 30-second period – also an improvement of 55% (figure 5).

In the 6-meter timed walk test (figure 6), the subject was timed walking a short distance. He began the experiment with a baseline average of 14 seconds. By the end of the experiment, his 6-meter walking time improved by 5 seconds.

Data showed that post-stroke patients experienced improved mobility, balance, muscle control, and walking ability and performance of daily activities as a result of the Budo rehabilitation.

Data was also collected by patient self-report: fear of falling (FES-I) and general health status (EQ5D). Interviews conducted with participants were designed to judge the psychological, social, and cultural qualities of improvement. According to FES-I tests, patients self-reporting revealed a reduced fear of falling after the Budo intervention. According to EQ5D, index improved self-reported health status indicates a healthier self-image as a result of Budo practice. Patient interviews suggest that the sociality and culture of Budo had a powerfully positive psychological

effect aiding the rehabilitative process. Interviews show that patients were intrigued and inspired by the cultural image of the Samurai, Japanese warrior, associated with Budo traditions. Furthermore, patients identified with the metaphors of combat and struggle in Budo. This identification improved the overall quality of rehabilitation.

In the interview, subject 5 expressed that before the Budo practice he couldn't get up from the floor into a standing position without someone's assistance or a crutch and was not able to walk without them as well. Budo-based rehabilitation was fun for him. The image of being a Japanese warrior encouraged him and drove his motivation for training. After the intervention he could stand up from the floor to a standing position by himself. He no longer felt frightened to go outside or move independently. So he could also walk 1500 meters without any support. He eventually even took up swimming again.

DISCUSSION

It is incredible that these participants showed such improvement long after they had suffered a stroke. In the case of two subjects: 6 months to a year had passed since their stroke, for three subjects 3 - 4 years, and in the case of one subject, 15 years had passed since he suffered stroke. We can argue that there is a reason that Budo has been shown to be so remarkably effective in Sweden.

If the stroke victims don't show improvement in rehabilitation, they may believe that they will probably never improve. As a consequence, stroke survivors begin to fall into routines which reinforce these poisonous misconceptions regarding the limitations of their bodies.

The strength of Budo as rehabilitation method lies in the fact that it represents a new cultural context, outside Western people's experience. It is a new opportunity for people with disabilities to reassess and redefine what they can do. Every tyro who starts to practice Budo, must learn new movements. For disabled persons with poor motor control, this can be particularly challenging, and also enlightening, as they discover the abilities they never knew they had by being put in a context of a Samurai in a battle.

Falling is very scary for people with disabilities. Not only is it dangerous, it is a distressing moment of weakness and helplessness. Practicing Budo gives practitioners a familiarity with the floor, which, for the disabled, imparts an enormous feeling of self-efficacy and self-reliance. In Sweden, the common

rehabilitation does not include extensive practice moving on the floor and moving up and down from the floor. But for instance, in Judo, new students spend days and days practice "ukemi", falling technique, learning how to twist their bodies in order to fall correctly. Disabled Judoka, a person who practices Judo, must learn this too.

Those people with disabilities might look at this exercise and say: "I can't do that." However, this simple, repetitive falling exercise is incredibly helpful. It stimulates new muscles activities and improves coordination. More importantly, it reduces fear of falling by teaching disabled Budoka, a person who practices Budo, an essential life skill: how to get up again. The Budo concept of "Be a Samurai warrior" drive the patients' motivation.

Rehabilitation is not just a physical challenge but a mental one as well. Budo practice teaches us that the body and mind are one. For any physical improvement to take place, a person must learn to believe that such improvement is possible. Because the Dojo is a place removed from those habits and routines of everyday life that reinforce disempowering and debilitating ideas. Budo practice becomes an opportunity to develop a new mental paradigm to confront one's preconceptions. In the Dojo, Mr. Johansson, coach of Budo-based rehabilitation in this experiment, always said "Don't think about what you can't do, think about what you can do." This mental shift is a powerful rehabilitative tool.

The fact that Budo, from the perspective of the Swedish, is a Japanese cultural product also plays an important part in the success of Budo-based rehabilitation methods there. Not only does Budo practice share similar body movements and exercises to standard physical therapy and rehabilitation, it re-contextualizes the rehabilitation in a very powerful way. Unlike standard rehabilitations, the Budo Practice is through the Dojo context not a reminder of one's infirmity. The Dojo context challenges the disabled to push themselves in ways they did not think possible, but only if participants are sincere and respectful to Budo, to the Sensei (master of Budo), and to each other.

Of course, the Japanese have a more complicated understanding of Budo. Japanese people know Budo as exhausting, painful, and smelly... But to the Swedish, the Budo-based rehabilitation has none of these connotations. To them, (at least in the beginning, perhaps) practicing Budo means you can pretend to be a Samurai warrior. For the purposes of rehabilitation, identifying with such a figure, like a

Samurai, for instance-associated with self-reliance, resilience, danger, and mystery-can prove to be a powerful and helpful guiding motivation for the disabled in rehabilitation.

CONCLUSIONS

Data clearly showed that an individually-tailored Budo rehabilitation effectively delivered general quantitative improvements with reported post-stroke patients. Not only could the patients perform daily-life tasks better as a result of a Budo rehabilitation, they exhibited less fear, more self-efficacy,

and a healthier self-image. Interviews suggest that Budo-based rehabilitation is qualitatively different from other exercise-based rehabilitation. This is so because Budo uses a metaphysical approach in its holistic Budo tradition.

We conclude that adapted Budo practice, the Budo-based rehabilitation in this experiment, proved to be effective for post-stroke participants in Sweden. A similar system could be implemented as a rehabilitation method for other kinds of disabilities that have similar symptoms.

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