Physiotherapy skills in the difference of years of therapists' experience and affiliations

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Abstract

In Japan, a physiotherapist is considered to be 'experienced' and having sufficient time in the field, regardless of their level, efficacy, or quality of training, after five years of practice. However, this definition is insufficient for establishing quality and uniformity among physiotherapists in Japan. The purpose of this study was to establish the groundwork for standardisation in education and evaluation. It aimed to evaluate physiotherapy skills by means of a Weight Shift (WS) practical assessment task. Participants of this study included 10 physiotherapists from two institutions. The WS task was repeated three times on a simulated patient. The ground reaction force (GRF) of the simulated patient was recorded during the task. The ratio of the centre of pressure (COP) displacement was calculated by dividing the COP displacement by the distance between the centre of pressure of both feet of the simulated patient to normalise. Correlational statistical analysis was used to confirm whether years of experience changes the degree of WS. The obtained data was compared between the institutions of therapists. The results of this study confirm that the correlation between the data obtained and years of therapists' experience is weak or absent. There were significant differences between each institution's ratios for COP displacement as well as for the maximum GRF. It was considered that years of therapists' experience does not necessarily correlate with physiotherapy skill, especially if participants had six or more years of experience. Greater differences were observed between institutions with regards to the characteristics of physiotherapy skill.

Keywords: physiotherapy education, practical training, weight shift, experience

Introduction

In Japan, physiotherapists who have approximately 5 years of work experience, qualify as 'experienced' and are recognised as someone with sufficient time in the field, regardless of their level, efficacy or quality of training (Ministry of health, Labour and Welfare, 2019). However, this definition is insufficient in establishing quality and uniformity among physiotherapists in Japan. In order to begin quantifying skill, it is first necessary to establish the feasibility of distinguishing between what the Japanese Physical Therapy Association (JPTA) considers 'experienced' from 'novice' based on basic physical therapy treatment technique and approach. The purpose of this study is to establish the groundwork for standardisation in education and evaluation.

Physiotherapy education in Japan began in 1963, and the JPTA was established in 1966. Undergraduate education for physical therapists in Japan consists of graduation from a three-year technical college, a four-year technical college or university programme, as well as passing a national examination to become a licensed physiotherapist. A total of at least 800 hours of practical training is required during the course of study, and educational methods vary depending on the facility where the training takes place, and who the instructor is. In addition, students may enter graduate school after graduation from training school. However, this is left to the decision of the individual, and not all physiotherapists go on to graduate school. JPTA considers lifelong learning to be important, and provides physiotherapists with opportunities to learn skills, knowledge, and various other subjects.

In the area of skills, more experienced physiotherapists teach those who are less experienced in clinical practice, and they teach based on individual therapists' experience in a work setting. Similarly, common skills should be taught equally in schools, but they are also taught based on the experience of the instructor. Therefore, physiotherapy education depends on the way of thinking of staff at each institution. In physiotherapy education, it is important to differentiate between experienced and novice, but firstly, it is necessary to define 'experienced'. As

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previously mentioned, these differences tended to be distinguished by years of therapists' non-standardised experience, where five years of practical experience permits the teaching of other physiotherapy students, with the approval of a governing association board (Ministry of Health, Labour and Welfare, 2019).

In Japan, both experienced and novice physiotherapists charge for physiotherapy at the same fee/rate under the public insurance system, which does not foster the desire to improve one's own skills. Due to the aforementioned points, it is challenging to secure a minimum quality of physiotherapy services. For that reason, it is important to objectively evaluate the teaching methods in undergraduate training, as well as physiotherapy skills pre- and post-education.

There are the basic physiotherapy skills: range of motion (ROM) exercise (Cleland et al., 2010), manual muscle testing (MMT) (Florence et al., 1992), muscle strengthening exercise (Fowler et al., 2001), weight-bearing (Suchak et al., 2008), weight-shifting (WS) (Pizzi et al., 2007) and others. It is considered that these basic physical therapies are major components of the quality of physiotherapy practice, and frequently used by physiotherapists. Therefore, helping to standardise knowledge in physiotherapy skills by quantifying the influence (positive and/or negative effect) on the patient during the treatment by a physiotherapist, is necessary.

While there are many opportunities to practise ROM exercises, MMT, and muscle strengthening exercises in training school education, in Japan, WS is a skill that is often learned after going into clinical practice. The influence of undergraduate education can be disregarded because it is learned post-graduation. For this reason, WS was chosen as the intervention to be used in this study to confirm the difference in skill. In addition, only one element of WS was the primary focus in this study; loading to the lower leg of one foot from upright standing and returning to a neutral position for repetition in the WS technique. This technique is a therapeutic technique and force plates are not used in therapeutic situations. However, if it becomes clear that force plates can be used to confirm the technique, it will be possible to objectively evaluate and improve the technique in future undergraduate and clinical education.

It is meaningful to establish objective evaluation and instruction of physiotherapy skills in the training and post-institutional education of physiotherapists. The purpose of this study was to clarify the characteristics of physiotherapy skill using the centre of pressure (COP) and ground reaction force (GRF) of the simulated patient during WS. We also analysed the differences according to years of therapists' experience, and to which institution they were affiliated with.

Methods

Participants included 10 physiotherapists (six clinical physiotherapists and four physiotherapy educators) from two institutions, where the average number of years of therapists' experience was 14.5 ± 6.9 years.

Weight shift (WS) while standing (with the therapist guiding from behind) was repeated three times on a simulated patient where the speed of movement was determined at the discretion of the therapist (see Figure 1). All participants tried the task with the same simulated patient. Then, participants guided the simulated patient using bilateral manipulation from the posterior side at the lateral part of the pelvis. Next, participants guided WS to the right without the contralateral lower extremity lifting off the floor.

The GRF of the simulated patient was recorded during the task using force plates (AMTI), and the COP was calculated from the GRF. The ratio of COP displacement was calculated by dividing the COP displacement by the distance between both foot pressure canters of the simulated patient at the time to normalise.

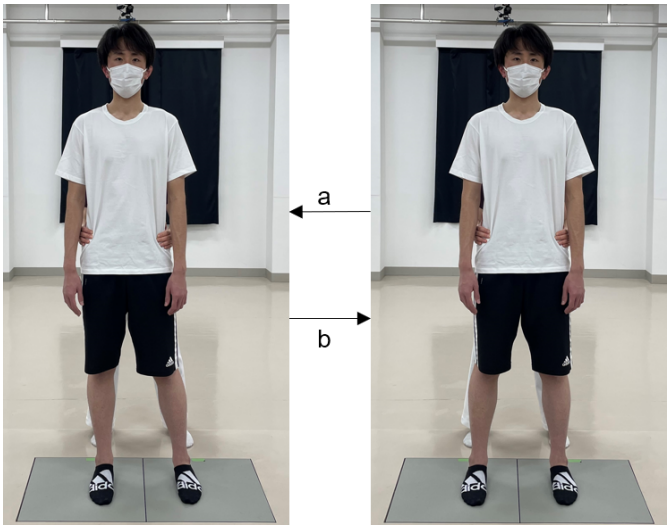

***Figure 1**. Weight-shifting as a basic physiotherapy skill. Starting position of simulated patient was upright. Participant shifted 'patient' from upright standing to the right (a) and back to upright (b). Repeated 3 times.*

First, participants shifted the weight of the simulated patient to the right, facilitating the movement from the pelvis. Second, participants shifted them to the left, back into the upright standing position. This was performed three times. This study focuses only on the frontal plane form of the walking motion.

The mean and standard deviation were calculated for the ratio of COP displacement and the maximum GRF. Normality was tested using a Shapiro-Wilk test (this method tests whether the data are normally distributed). Correlational statistical analysis was used to confirm whether years of experience

changes the degree of WS. In addition, it was compared by a non-paired t-test for statistical examination between their institutions. For the data analysis, SPSS software version 27.0 was used. The significance level was determined at 0.05.

Results

The correlation coefficient between years of experience and degree of WS was r = -0.24 for the ratio of COP displacement and r = -0.07 for the maximum GRF. The therapists' years of experience for institution A (n = 3) was 17.5 ± 5.0 years, and for institution B (n = 7) was 12.5 ± 7.8 years.

The ratio of COP displacement and the maximum GRF are shown in Table 1. Institution A (n = 3) was 0.49 ± 0.07 and institution B (n = 7) was 0.25 ± 0.10, and there were significant differences between each institution's ratios ($p < 0.05$). Institution A (n = 3) was 508.71 ± 1.53 N and institution B (n = 7) was 440.25 ± 51.00 N, and there were significant differences in the maximum GRF between institutions ($p < 0.05$).

	*The ratio of COP displacement **	*The maximum GRF **
Institution A (n=3)	0.49 ± 0.07	508.71 ± 1.53
Institution B (n=7)	0.25 ± 0.10	440.25 ± 51

*Table 1. The ratio of COP displacement and the maximum GRF at institution. Mean ± SD. * Difference between institution A and institution B is statistically significant, at p<0.05.*

Discussion and conclusion

In this study, the ratio of COP displacement and the maximum GRF of a simulated patient was examined by means of WS, which is a basic physiotherapy skill. Subsequently, correlation between the data and years of therapists' experience was explored. Weak negative correlation was confirmed between years of therapists' experience and the ratio of COP displacement, while no correlation was found between years of therapists' experience and the maximum GRF. There were significant differences in the ratio of COP displacement and the maximum GRF during WS when compared between institutions.

The results of this study confirm that the correlation between the data obtained and years of therapists' experience is weak or absent. These results suggest that there may be no difference in the therapist's command of this basic physiotherapy skill after their 6th year. Therefore, it was considered that the duration of years of therapists' experience was not necessarily related to physiotherapy skill, at least in the performance of the specific skill evaluated in this study.

However, the participants of this study had from 6 to 27 years of experience as therapists. Therefore, they all met the minimum of five years of therapists' experience as per the clinical practice supervisor requirement in Japan. In the future, it will be necessary to include physiotherapy students, clinical physiotherapists and physiotherapy educators in their first to fifth year, and increase the number of participants to examine the differences in skill regarding the basic physiotherapy principles between different years of therapists' experience. In addition, studies will need to include information from participants on how much additional training they have had, including which additional courses they have attended.

In addition, especially in WS which is not often seen in post-graduate skill training in the basic physiotherapy skills, it is possible that they may not recognise the difference in years of therapists' experience. For that reason, it is necessary to verify physiotherapy skills of all other basic physiotherapy principles by means of a practical evaluation or examination.

It was hypothesised that the factor linked to significant differences in the ratio of COP displacement and the maximum GRF between institutions would be the staff at each institution. WS is rarely taught at training schools of physiotherapy, unlike ROM exercises and MMT. Additionally WS is not often taught, even in clinical skill training at institutions. Some institutions are planning the education for new physiotherapists, due to the number of new physiotherapists increasing rapidly. But others are unable to provide this education, because there are too few physiotherapy educators. Consequently, physiotherapy skills training at these institutions are low, because experienced educators are not available.

In this study, it was clear that there were differences based on each institution regarding the characteristics of physiotherapy skill from the COP and GRF of the simulated patient during WS. Consequently, it was considered that the duration of years of therapists' experience does not necessarily correlate with their physiotherapy skills when they have six or more years of experience. In the future, it is necessary to verify that physiotherapy skills and teaching methods are dependent on individual therapists' experience (within a specific institution) as this in turn affects physiotherapy education.

Helping to gain knowledge in physiotherapy skills by quantifying and standardising the aspect of body movement during treatment by a physiotherapist or physiotherapy student is also expected to help educators in the development of teaching methods. This in turn will influence patient care.

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