

The influence of the physical therapist's clinical practice time on the perception of body stability of the traditional frontal plank exercise: a pilot study

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ABSTRACT

Background: The traditional frontal plank exercise has a greater demand for biomechanical stability and has been widely prescribed and used in the practice of health professionals and, verifying the influence of the time of clinical practice can contribute positively in the clinical, scientific and social scope.

Objective: To verify the influence of the physical therapist's clinical practice time on the perception of body stability of the traditional frontal plank exercise.

Method: Individuals were selected in a non-probabilistic and intentional way, constituting a sample of young male adults, with a body mass index within the normal range, with a self-reported level of moderate to advanced physical activity and with at least six months of previous training experience. of resistance. The subjects were instructed to perform the frontal plank for 30 seconds, seeking to maintain all the items in the description of the technique. No verbal commands and encouragement were given during the exercise in order to direct only the influence of the different times of clinical practice of the evaluators. At the end of the exercise, the two evaluators self-reported their feedback through a control sheet prepared by the researchers. **Results:** The sample of this study consisted of 10 participants, with a mean age of 30.6 years (± 4.03). All were male, white, and had no history of trauma/injury. The evaluator with six months of experience pointed out that eight subjects performed the frontal plank with high stability, while the evaluator with six years of experience observed only three subjects with high stability in the execution of the exercise. **Conclusion:** The findings of this study showed that there is a tendency towards a difference in the proportions of perceptions of stability in the traditional frontal plank between physical therapists with six months and six years of clinical experience.

Keywords: Exercise; Physical therapy; Isometric exercise.

BACKGROUND

Clinical practice is recognized as the best way for health professionals to build knowledge and learn clinical reasoning⁽¹⁾ to enhance the development of professional skills⁽²⁾. Faced with experiences in clinical practice, health professionals use exercises extensively in their training and rehabilitation programs, and one of these exercises is the traditional frontal plank⁽³⁾. However, to date, the influence of the time of clinical practice of professionals on the perception of body stability during exercise is not known. They are performing the traditional front plank exercise.

The prescription and evaluation of the performance of mechanically correct exercises are goals of health professionals to achieve specific training and rehabilitation goals^(4,5). According to Oliva-Lozano (2020),⁽⁵⁾ the frontal board promotes the increase of the muscular strength of the center of the body, better known as the "core" and through muscular activation, it provides body stability⁽⁶⁾ and balance⁽⁷⁾ during its execution. In the traditional frontal plank exercise, the individual is instructed to remain in the prone position, with the spine in a neutral position, posterior pelvic tilt, and body weight supported on the forearms and feet, which must remain shoulder-width apart^(5,8).

The body stability produced by activating the muscles involved in the "core" allows resistance or

effective force production, having significant implications for activities of daily living⁽⁹⁾. In this way, exercises that seek to strengthen the central muscles of the hip, trunk, and abs, as is the case of the traditional frontal plank, help to prevent injuries and have the potential to improve athletic performance⁽⁸⁾.

Given this, this study becomes of great value as it verifies the influence of time of clinical practice of the professional in the perception of body stability, and may contribute positively to the clinical, scientific, and social scope, with the construction of strategies directed according to the level of knowledge, clinical reasoning and capacity of perception of the professional health care of mechanically correct biomechanical standards or not.

Given the above and the relevance of the topic, the present study aims to verify the influence of the physical therapist's clinical practice time on the perception of body stability of the traditional frontal plank exercise.

METHODS

This research is an observational and cross-sectional study, which will observe the exposure of individuals to the factor of interest in a defined time⁽¹⁰⁾.

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Sample

The individuals were selected in a non-probabilistic and intentional way, residing in Greater Florianópolis and constituted a sample of 10 young adult male individuals, with a BMI within the normal range, a self-reported level of physical activity from moderate to advanced, and at least six months of age of previous resistance training experience. In addition, individuals who did not perform physical exercise in the 24 hours before collection were included in the research.

Individuals with low back pain, and the presence of injury to the hip, spine, or lower limbs who required surgery in the last year were excluded from the study.

Data collection procedure

After approval by the Ethics and Research Committee with Human Beings of the Universidade do Estado de Santa Catarina (UDESC), under opinion number 5,085,280, participants were recruited, who were instructed on the research objectives and data collection procedure. After accepting to participate, the individual read and signed the Free and Informed Consent Form. For individuals who meet the established criteria to participate in the research, a meeting was scheduled and an evaluation was carried out.

The research was carried out on the premises of a Sports Training Center in Greater Florianópolis. Participants were instructed to wear comfortable, sporty clothes and not to wear shoes to avoid the influence of different types. Then, the evaluation form was filled out, and, afterward, the individuals performed a submaximal warm-up for three minutes on a stationary bicycle while observing an image with the instructions of the technique of execution of the exercise, to become familiar with it.

Then, the individuals were instructed to perform the traditional frontal plank exercise for 30 seconds, trying to keep all the items in the description of the technique and no command and verbal encouragement was given during the execution of the exercise to direct only to the influence of the different clinical practice times of the evaluators. During the exercise, two evaluators who graduated in Physiotherapy from the Universidade do Estado de Santa Catarina – UDESC/CEFID, one with six months of clinical practice and the other with six years, self-reported their perceptions of body stability through a control sheet prepared by the researchers.

The control sheet to record the professional's feedback regarding body stability consisted of the

participant's number, the description of the exercise according to Oliva-Lozano (2020)⁽⁵⁾ and Youdas et al. (2018)⁽⁸⁾, and by the following items, in which the evaluator must choose only one option about the execution of the board:

- Traditional frontal plank exercise performed with low stability, complying with the described items of the exercise for less than 50% of the time.
- Traditional frontal plank exercise performed with moderate stability, complying with the described items of the exercise for more than 50% of the time.
- Traditional frontal plank exercise performed with high stability, complying with all the described items of the exercise for the entire period.

At the end of the execution of the traditional frontal plank exercise, the two evaluators self-reported their feedback regarding the execution of the exercise, writing down their answers on the control sheet. It is worth mentioning that both remained facing the exercise at a distance of one meter each and did not have access to the other's answer. After performing the exercise and self-reporting by the evaluators, the data collection procedure was finally carried out.

Statistical analysis

The program used for the statistical analysis was the Statistical Package for the Social Sciences (SPSS) version 20.0 for Windows and, for all procedures, a significance level of 5% ($p > 0.05$) was adopted, with the two-tailed distribution. Descriptive statistics with mean distribution, standard deviation, and 95% confidence interval were used to characterize the analyzed variables. To identify differences in perceptions between evaluators about body stability during the performance of the traditional frontal plank exercise in healthy young adults, McNemar's exact test was applied.

RESULTS

The characterization of the sample is shown in Table 1.

The mean age of the participants in this study was 30.6 years (± 4.03). All were male, white, and had no history of trauma/injury. The mean BMI was 23.7 (± 0.65) and the participants remained, on average, for 84 seconds (± 27.57) performing the front plank. The average weekly physical exercise practice was 3.5 times a week and the average physical exercise practice in previous years was 4 years.

The influence of the evaluators' clinical practice time on the perception of body stability during the traditional frontal plank exercise is presented in Table 2.



McNemar's exact test showed that there is a tendency towards a difference in the proportions of perceptions of stability in the traditional frontal board, taking into account the time of physical therapy clinical practice of the evaluators ($p=0.063$). The evaluator with six months of experience indicated that eight subjects performed the frontal plank with high stability, while the evaluator with six years of experience observed only three subjects with high stability in the execution of the exercise.

Table 1. Sample characterization.

Variables	Total sample (n=10)
Age ^{X(DP)}	30,6 (4,03)
Sex ^{f(%)}	
Male	10 (100,0)
Feminine	0
Race ^{f(%)}	
White	10 (100,0)
Not white	0
BMI ^{X(DP)}	23,7 (0,65)
Weekly physical exercise ^{X(DP)}	3,5 (1,18)
Previous physical exercise (ages) ^{X(DP)}	4,0 (1,63)
Trauma history/Injury ^{f(%)}	
Yes	0
No	10 (100,0)
Maximum time on the board (seg) ^{X(DP)}	84,0 (27,57)

*Note: X=mean; OD= standard deviation= simple frequency; sec=seconds.

Table 2. Influence of the evaluators' clinical practice time on the perception of body stability during the traditional frontal plank exercise.

		6 year old appraiser		
		Moderate stability	High stability	Total
Appraiser with 6 months	Moderate stability	2	0	2
	High stability	5	3	8
	Total	7	3	

DISCUSSION

The objective of this study was to verify the influence of the physical therapist's clinical practice time on the perception of body stability of the traditional frontal plank exercise. The results showed that there is a tendency towards a difference in the proportions of perceptions of stability in the traditional frontal board, where the evaluator with six months of experience pointed out that eight subjects performed the frontal board with high stability, while the evaluator with six years of experience experiments observed only three subjects with high stability in the execution of the exercise.

In the traditional frontal plank, the muscle action is isometric, working in co-contraction to control the pelvis⁽¹¹⁾. The posterior tilt mechanism, created by the force coupling of the posterolateral chain of the hip and the abdominal musculature, is believed to have a particularly strong influence on core muscle activity and body stability⁽¹²⁾. In a qualitative analysis of the study evaluators, the main item in the description of the technique that the individuals had difficulty in keeping stable was the posterior pelvic tilt, where only the evaluator with six years of experience was able to detect this biomechanical misalignment.

Regarding the assessment of muscle activity during the traditional frontal plank exercise, there is still a lack of consistency and standardization in the studies⁽⁵⁾. Workman (2008)⁽¹³⁾, found that pelvic positioning has a strong influence on the activation of the abdominal muscles during exercise. Thus, it is understood that future studies are needed to assess and seek standardization of muscle activity, seeking to understand its pattern for maintaining body stability⁽¹⁴⁾, since the front board is widely chosen and used among professionals⁽³⁾.

The findings of this study showed that there is a tendency towards a difference in the proportions of perceptions of stability in the traditional frontal board between physical therapists with six months and six years of clinical experience. However, few studies have longitudinally and qualitatively investigated the learning and development of physical therapists during their initial and formative years of clinical practice⁽¹⁵⁾. Wainwright (2010)⁽¹⁶⁾, reports that the progression from one stage to another (novice/intermediate /expert) occurs with experience as the knowledge and skills needed to improve decision-making ability are developed. It should be noted that our findings when referring to the evaluator with six months about the one with six years of clinical experience, it was not possible



to accurately act on the visual perception of body stability, especially about pelvic stability.

It is known that the gluteus medius is a muscle situated between the gluteus maximus and gluteus minimus⁽¹⁷⁾, which plays an important role in stabilizing the pelvis during functional activity, and its muscle weakness is related to lower limb dysfunction and injury^(18,19). Therefore, early detection of pelvic instability is extremely important for the clinical, scientific, and social spheres to build specific and targeted strategies for rehabilitation and sports training.

In our sample, all individuals were male, since the variation of the female hormonal cycle influences joint stability during the motor performance, and this would negatively influence body stability. According to Canali (2001)⁽²⁰⁾, exercise practiced regularly can lead to menstrual alterations, and it is known that 10 to 20% of female athletes and 5% of non-athletes have alterations in their hormonal cycle. Participants were physically active and could perform the frontal plank for 30 seconds, with a mean length of stay of 84 seconds (± 27.57). In this sense, we suggest that future studies take into account the maximum length of stay of the subject with the proposal used in the method, as it may be below the individual's motor threshold.

Although physical therapists' clinical decision-making skills have been studied, there are still gaps in understanding how these skills develop. Therefore, further longitudinal studies of the developmental trajectories of beginning therapists must be carried out. Finally, it is understood the a great need to search for the greatest possible clinical experience at the time after training, so that the greatest and best professional development of physiotherapy students and beginner practitioners can occur⁽²¹⁾.

CONCLUSION

The physical therapist's clinical practice time seems to influence the perception of body stability during the traditional frontal plank exercise, where the evaluator with longer clinical experience can perceive a greater amount of biomechanical changes. Furthermore, the limitations of this study are related to the small sample size and the need for a more accurate and detailed biomechanical assessment to detect body stability. The authors suggest that further research be carried out in this environment to assist in the construction of clinical and sports training strategies

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REFERENCES

1. Ryan S, Higgs J. Clinical reasoning in the health professions. Elsevier, Amsterdam. 2008.
2. Strohschein J, Hagler P, May L. Assessing the Need for Change in Clinical Education Practices. *Physical Therapy*. 2002;82(2):160-172.
3. Peterson DD. Proposed Performance Standards for the Plank for Inclusion Consideration Into the Navy's Physical Readiness Test. *Strength and Conditioning Journal*. 2013;35(5):22–26.
4. Trajkovic N, Bogataj S. Effects of neuromuscular training on motor competence and physical performance in young female volleyball players. *Int. J. Environ. Res. Public Health*. 2020;17(5):1755.
5. Oliva-Lozano JM, Muyor JM. Core Muscle Activity during Physical Fitness Exercises: A Systematic Review. *International Journal of Environmental Research and Public Health*. 2020;17(12):4306.
6. Escamilla RF, et al. Muscle Activation Among Supine, Prone, and Side Position Exercises With and Without a Swiss Ball. *Sports Health*. 2016;8(4):372-9.
7. Bird SP, Stuart W. Integrating Balance and Postural Stability Exercises into the Funcional Warm-up for Youth Athletes. *Strenght and Conditioning Journal*. 2012;34(3):73-79.
8. Youdas JW, Coleman KC, Holstad EE, Long SD, Veldkamp NL, Hollman JH. Magnitudes of muscle activation of spine stabilizers in healthy adults during prone on elbow planking exercises with and without a fitness ball. *Physiotherapy Theory and Practice*. 2018;34(3):212–222.
9. Behm DG, Colado JC. The effectiveness of resistance training using unstable surfaces and devices for rehabilitation. *Int J Sports Phys Ther*. 2012;7(2):226-241.
10. Thomas JR, Nelson JK. Métodos de pesquisa em atividade física. Artmed, Porto Alegre. 2012.
11. Van den Tillaar R, Saeterbakken AH. Comparison of Core Muscle Activation Between a Prone Bridge and 6-RM Back Squats. *Journal of Human Kinetics*. 2018;62(1):43–53.
12. Neumann DA. Kinesiology of the Hip: A Focus on Muscular Actions. *Journal of Orthopaedic & Sports Physical Therapy*. 2010;40(2):82-94.



13. Workman JC, Docherty D, Parfrey KC, Behm DG. Influence of Pelvis Position on the Activation of Abdominal and Hip Flexor Muscles. *Journal of Strength and Conditioning Research*. 2008;22(5):1563–1569.
14. Mok NW, Yeung EW, Cho JC, Hui SC, Liu KC, Pang CH. Core muscle activity during suspension exercises. *Journal of Science and Medicine in Sport*. 2015;18(2):189–194.
15. Black LL, Jensen GM, Mostrom E, Perkins J, Ritzline PD, Hayward L, Blackmer B. The First Year of Practice: An Investigation of the Professional Learning and Development of Promising Novice Physical Therapist. *Physical Therapy*. 2010;90(12):1758-1773.
16. Wainwright SF, Shepard KF, Harman LB, Stephens J. Novice and Experienced Physical Therapist Clinicians: A Comparison of How Reflection Is Used to Inform the Clinical Decision-Making Process. *Physical Therapy*. 2010;90(1):75–88.
17. Shah A, Bordoni B. Anatomy, bony pelvis and lower limb, gluteus medius muscle. *Stat Pearls*. 2021.
18. Semciw A, Neate R, Pizzari T. Running related gluteus medius function in health and injury: A systematic review with meta-analysis. *Journal of Electromyography and Kinesiology*. 2016;30:98–110.
19. Powers CM. The Influence of Abnormal Hip Mechanics on Knee Injury: A Biomechanical Perspective. *Journal of Orthopaedic & Sports Physical Therapy*. 2010;40(2):42–51.
20. Canali ES, Krueel LFM. Hormonal Responses to Exercise. *Revista Paulista de Educação Física*. 2001;15(2):141.
21. Hayward LM, Black LL, Mostrom E, Jensen GM, Ritzline PD, Perkins J. The First Two Years of Practice: A Longitudinal Perspective on the Learning and Professional Development of Promising Novice Physical Therapists. *Physical Therapy*. 2012;93(3):369–383.

