Central European Journal of Sport Sciences and Medicine | Vol. 53, No. 1/2026: 5–15
ISSN (print): 2300-9705 | ISSN (online): 2353-2807 | DOI: 10.18276/cej.2026.1-01

THE RELATIONSHIP BETWEEN POSTURAL STABILITY AND DYNAMIC FUNCTION OF THE LOWER LIMBS IN UNIVERSITY STUDENTS WITH DIVERSE PROFESSIONAL FOCUSES

Rút Lenková[A, C, D, E]

University of Presov, Faculty of Sports, Presov, Slovakia
ORCID: 0000-0002-0713-2482

Stanislava Ivanová[A, B, C, D]

University of Presov, Faculty of Sports, Presov, Slovakia
ORCID: 0009-0009-0267-7035
E-mail: stanislava.ivanova@smail.unipo.sk

Eva Lukáčová[B]

University of Presov, Faculty of Health Care, Presov, Slovakia
ORCID: 0009-0008-3694-3103

Cyril Grus[B]

University of Presov, Faculty of Health Care, Presov, Slovakia
ORCID: 0000-0003-3051-7134

Iveta Boržíková[A]

University of Presov, Faculty of Sports, Presov, Slovakia
ORCID: 0000-0002-8441-1039

[A]Study Design; [B]Data Collection; [C]Statistical Analysis; [D]Manuscript Preparation; [E]Funds Collection

Abstract The aim of this study was to examine the correlation between postural stability and the dynamic function of the lower limbs in university students, and to identify differences based on their academic specialization. The sample consisted of 68 University of Presov students (age: 23.06±2.48; BMI: 22.81±2.50). The sample was divided according to students' academic focus: Faculty of Health Care students (FHC) (n=32; age: 21.88±0.71; weight: 67.44±12.37 kg; height: 1.72±0.08 m; BMI: 22.62±2.80) and Faculty of Sport students (FS) (n=36; age: 24.11±2.98; weight: 72.44±10.17 kg; height: 1.77±0.09 m; BMI: 22.99±2.23). For monitored parameters evaluating, we have used the Freemed baropodometric platform and Y balance test (YBT). The YBT scores of FS students were l.sin.=97.31±6.41; l.dx.=96.42±7.76, and of FHC students were l.sin.=87.49±7.24; l.dx.=86.50±8.10. No significant differences were found between the composite scores of the left ($p=0.48$) and right ($p=0.80$) lower limbs in both groups ($p<0.05$). The correlation between postural stability and lower limb dynamic function showed no significance (l.sin. $R2=0.017$; l.dx.=$R2=0.010$). The results of the study indicate a very weak correlation between postural stability and dynamic function of the lower limbs among the students tested.

Key words: Y balance test, baropodometric platform, balance, postural system

Introduction

In the human body, the lower limbs bear the greatest load during standing, and the distribution of this pressure across the feet directly affects the stability of the musculoskeletal system (Mounika et al., 2022). Foot pressure distribution analysis plays a significant role in healthcare, clinical rehabilitation, and sports training (Rajendran et al., 2021). Plantar pressure distribution is a key parameter that provides insights into an individual's postural changes (Żurawski et al., 2022; Serrato-Pedrosa et al., 2024). As a key structure involved in weight distribution and force transfer, the foot represents a fundamental component of the body's supportive function. Its condition has a direct impact on postural health and overall stability (Bendíková & Balint, 2023). Owing to its structure and arch system, it ensures the transmission of forces between the ground and the higher segments of the musculoskeletal system. When the function of the arches is impaired, a chain of muscular imbalances occurs, which may influence the alignment of the pelvis, the spine, and consequently overall posture (Myers, 2009; Véle, 2006). The stability and proper activation of the foot muscles also determine effective proprioception, which is crucial for maintaining balance and preventing overload. Therefore, foot health is considered a key determinant of postural stability and the functional integrity of the musculoskeletal system (Palaščáková Špringrová, 2018).

Postural stability is fundamentally defined as the ability to maintain an upright posture within the body's base of support and reflects the efficiency of neuromuscular control during various activities (Lee & Lin, 2007). Its quality is influenced by factors such as muscle co-activation, joint stiffness, and external loading conditions (Shabani, 2016). These mechanisms highlight that postural stability is not merely a reflexive process but a complex skill based on the interaction of dynamic sensorimotor processes. This perspective is in line with Horak's (2006) conceptualization of postural control as an integrated, adaptive system. Postural stability and balance are therefore central to optimal movement and functional performance in daily life and sports. They determine the ability to maintain the body's center of mass within the base of support in both static and dynamic tasks (Nusseck & Spahn, 2020).

The educational environment provides an opportunity for the systematic implementation of exercises aimed at correcting posture and supporting lower limb function. Physical and sports education, when designed with an emphasis on postural health, can contribute to the elimination of muscular imbalances, enhancement of proprioception, and consolidation of proper movement patterns (Bendíková, 2018). Appropriately selected sensorimotor and balance exercises promote the automatization of correct motor patterns and positively influence both trunk and foot stability (Biancalana et al., 2020; Palaščáková Špringrová, 2018). Their regular inclusion in the educational process represents an effective tool for the prevention of musculoskeletal disorders and supports the development of an active and healthy lifestyle among university students (Bendíková, 2020; Bendíková & Balkó, 2022; Bendíková et al., 2024).

Postural control imbalances are relatively common among university students, with static impairments occurring more frequently than dynamic ones. The primary risk factors include high body mass index (BMI) and physical inactivity (Khanzada et al., 2024). Based on this theoretical background, the aim of this study was to examine the relationship between postural stability and the dynamic function of the lower limbs among university students and to identify differences based on their professional field.

Methods

This research was approved by the Ethics Committee of the University of Presov in Presov (No. ECUP062024PO). All participants provided written consent and were made aware that there would be no financial cost or incentive for participation at the time of enrolling in the study. The research carried no risk of violating ethical principles.

Participants

The study sample consisted of 68 participants (N=68) with a mean age of 23.06±2.48 years. The average BMI of the sample was 22.81±2.50. The participants were divided into two groups: group S1 included respondents from the Faculty of Health Care (FHC) at the University of Presov (n=32; 28 female and 4 men), and group S2 included respondents from the Faculty of Sports (FS) at the same university (n=36; 10 female and 26 men). The average age of group S1 (physiotherapy students) was 21.88±0.71 years, with a mean height of 1.72±0.08 m, mean body weight of 67.44±12.37 kg, and an average BMI of 22.62±2.80. Group S2, composed of physical education students, had a mean age of 24.11±2.98 years, mean height of 1.77±0.09 m, mean body weight of 72.44±10.17 kg, and an average BMI of 22.99±2.23. All the specific values, including standard deviations, are presented in Table 1. Numerical data are rounded to two decimal places.

Table 1. General characteristics of the study sample

Parameter	S1_FHC (x̄±SD)	S2_FS (x̄±SD)	Total (x̄±SD)
Age	21.88±0.71	24.11±2.98	23.06±2.48
Body height (m)	1.72±0.08	1.77±0.09	1.75±0.09
Body weight (kg)	67.44±12.37	72.44±10.17	70.09±11.45
BMI	22.62±2.80	22.99±2.23	22.81±2.50
n	32	36	68

Notes: SD – standard deviation; x̄ – mean, BMI – Body mass index; n – sample size

The Physiotherapy study program is characterised by lower overall physical intensity and a predominance of therapeutic and rehabilitative movement activities. In the first year, students complete approximately 8 hours of practical classes per week, focused on physical therapy, basic massage techniques, clinical practice and introductory therapeutic procedures. A substantial portion of the curriculum consists of extensive theoretical preparation (anatomy, physiology, pathology, kinesiology, diagnostics), complemented by specialised practical subjects such as kinesiotherapy, rehabilitative exercise, therapeutic interventions, diagnostic methods and ergotherapy. As a result, the movement profile of physiotherapy students is primarily health-oriented and rehabilitative, with comparatively lower physical load. In contrast, the Physical Education Teacher Training program is defined by higher levels of physical activity and sports-related demands, as students engage in the development of motor abilities, sports preparation and instruction of physical activities. Already in the first year, they complete around 8 hours of practical sports classes weekly (gymnastics, athletics, sport specialisation, health-oriented physical education). The core of the program consists of sport training, sport-specific didactics, practical courses in various sports, and teaching practice. Overall, the two programs demonstrate distinct movement profiles, physiotherapy emphasises therapeutic, health-oriented movement with lower physical intensity, whereas physical education training emphasises sport performance, high physical activity levels and practical movement load. Data on physical activity and extracurricular activities were not collected.

Procedures and measurement

To assess the dynamic function of the lower limbs, we used the Y Balance Test (lower quarter), which is commonly applied in practice to measure dynamic stability and identify potential lower limb injury risk. It is a modified version of the Star Excursion Balance Test, designed to improve its practicality and accessibility.

Before testing, leg length was measured using a tape measure, as it is required to calculate the composite score (normalised values according to the length of the lower limb). Leg length was measured from the anterior superior iliac spine to the medial malleolus.

The Y Balance Test requires the participant to maintain balance, strength, coordination, and stability on one lower limb while reaching the other lower limb as far as possible along a Y-shaped measuring surface in three directions: anterior, posterolateral, and posteromedial. Each participant performs three test trials with each lower limb to master the correct execution. The formal testing began with three trials in the anterior direction, followed by switching the stance leg. The participant continues with three trials in the posteromedial and posterolateral directions. The best result from each direction was used for analysis. The composite score is calculated as the sum of the results from the 3 directions tested/3×limb length×100. The result is expressed as a percentage (Plisky et al., 2009).

Foot pressure distribution was analysed using a baropodometric platform (FreeMed Maxi, Sensor Medica, Italy). The assessment included the percentage load on the right and left foot, as well as the load distribution between the forefoot and rearfoot of both feet. The physiological distribution of load is defined as 50% of body weight on each foot (tolerance ±3%). For the anteroposterior distribution, the physiological load is 45% on the forefoot (tolerance ±3%) and 55% on the rearfoot (tolerance ±3%). Values outside these tolerance ranges are considered pathological foot loading. Before the test, participants were informed about the procedure and instructed not to adjust their stance, but to adopt their natural static posture. Each test lasted 5 seconds and was automatically evaluated using software provided by Sensor Medica (Italy).

Hypotheses

– Students of the Faculty of Sports will achieve better results in the Y Balance Test composite score compared to students of the Faculty of Health Care.
– There is a statistically significant correlation between plantar pressure and the composite score of the Y Balance Test in the tested students.
– There are statistically significant differences in plantar pressure distribution between students of the Faculty of Sports and the Faculty of Health Care.

Statistical analysis

The D'Agostino's K-squared test was used to verify the normal distribution of the data. Based on this result, we subsequently applied appropriate parametric statistical methods. A two-sample Fisher's F-Test for variance was used to evaluate the hypotheses. The relationship between total foot load and dynamic balance was analysed using simple linear regression.

Results

Analysis of the Dynamic Function of the Lower Limbs in University Students

Table 2 presents the Y Balance Test performance values for group S1 and S2 in all three tested directions (anterior, posteromedial, and posterolateral), as well as the composite score.

Table 2. Descriptive statistics of Y balance test

		S1					S2				
		x̄	Med	SD	Min	Max	x̄	Med	SD	Min	Max
Anterior	R	67.28	67.00	5.17	59.00	76.00	64.64	65.00	5.78	56.00	79.00
	L	67.03	67.00	5.65	55.00	75.00	65.81	65.50	5.83	55.00	80.00
Postero-medial	R	95.03	93.50	8.79	73.00	112.00	111.06	111.00	13.57	83.00	141.00
	L	95.31	94.50	5.77	88.00	110.00	111.39	110.50	10.90	90.50	140.00
Postero-lateral	R	90.56	89.50	8.29	78.00	107.00	107.79	106.00	12.72	83.00	140.00
	L	92.19	90.50	8.09	77.00	108.00	108.63	107.00	12.20	92.00	135.00
Composite score	R	86.50	86.28	8.10	74.92	110.21	96.42	96.21	7.76	74.33	114.43
	L	87.49	87.72	7.24	75.42	107.66	97.31	95.92	6.41	86.67	109.97

Notes: R – right lower limb; L – left lower limb; x̄ – mean; med – median; SD – standard deviation; min – minimum; max – maximum

Based on the results of the Y balance test, we can observe differences in the achieved values between S1 and S2 groups. On average, respondents from S2 group achieved higher values in two (posteromedial and posterolateral) out of three tested directions (anterior, posteromedial and posterolateral) as well as in the composite score. Better results in tested directions may indicate superior dynamic balance and stability in group S2.

We assumed a statistically significant difference between the tested groups S1 and S2. To evaluate this assumption, a two-sample Fisher's F-Test for variance was used. We found out that the difference between the left lower limb composite score ($p=0.48$) and the right lower limb composite score in both groups ($p=0.80$) was not statistically significant ($p<0.05$). This means that the differences found between the test samples were not statistically significant.

Analysis of Plantar Pressure distribution in University Students

Table 3 presents the descriptive statistical variables obtained from the baropodometric platform for both groups. Analysis of the baropodometric data revealed differences in plantar pressure distribution between the groups. Higher mean values of total foot load were observed on the left foot in group S1, and on the right foot in group S2. In terms of forefoot loading, group S1 showed higher values for both the left and right foot. In contrast, the rearfoot load values were higher in group S2 for both feet.

Table 3. Descriptive statistics of plantar pressure distribution

		S1			S2		
		Global	**Forefoot**	**Rearfoot**	**Global**	**Forefoot**	**Rearfoot**
x̄	R	49.09	50.31	49.71	51.00	49.25	50.75
	L	50.91	53.01	46.99	49.00	47.31	52.69
SD	R	4.55	9.81	9.83	3.18	8.76	8.76
	L	4.55	9.78	9.78	3.18	8.58	8.58
Min	R	43.30	31.30	36.30	42.00	29.00	33.00
	L	40.70	37.20	28.40	43.00	32.00	38.00
Max	R	59.30	63.70	68.70	57.00	67.00	71.00
	L	56.70	71.60	62.80	58.00	62.00	68.00
Med	R	48.90	51.70	48.30	51.50	51.00	49.00
	L	51.10	53.05	46.95	48.50	45.50	54.50

Notes: L – left foot; R – right foot; x̄ – mean; SD – standard deviation; min – minimum; max – maximum; Med – Median

Fisher's F-test for variance showed a statistically significant difference between groups only in global plantar pressure on the left and right leg (p=0.04). Sample S1 demonstrated higher plantar loads on the left leg, whereas sample S2 demonstrated higher plantar loads on the right leg. For the other tested parameters (forefoot and rearfoot), the differences between the groups were not statistically significant (Table 4).

Table 4. Comparison of differences between S1 and S2 in plantar pressure distribution

	S1			S2		
	Global LF	Global RF	Forefoot LF	Forefoot RF	Rearfoot LF	Rearfoot RF
F	2.05	2.05	1.30	1.25	1.30	1.26
|F|	1.99	1.99	1.99	1.99	1.99	1.99
p-value	0.04	0.04	0.45	0.51	0.45	0.51
α	0.05	0.05	0.05	0.05	0.05	0.05

Notes: LF – left foot; RF – right foot; F – observed value; |F| – critical value; α – significance level

The relationship Between Y Balance Test Performance and Plantar Pressure

Simple linear regression was used to analyse the relationship between the total plantar pressure and the composite Y balance test score as the independent variable. We assumed that a higher foot load would correlate with a higher composite score. The data were processed by identifying the lower limb with the higher total load (left or right), and this value was used in the correlation with the corresponding composite score. Two participants with no difference in foot load between limbs were excluded from the analysis.

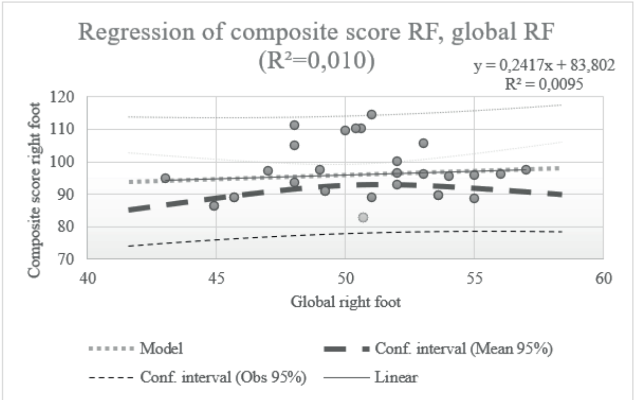

Figure 1. Correlation graph of the composite score and total load of the right foot

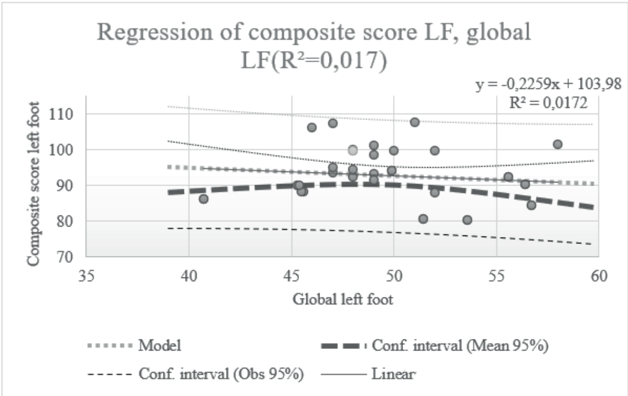

Figure 2. Correlation graph of the composite score and total load of the left foot

Analysis of the correlation between the total foot load and the composite Y balance test score showed a very low correlation for both lower limbs. This means that there is no clear relationship between higher plantar pressures and better performance in the Y balance test. These results suggest that the ability to maintain dynamic balance is not directly dependent on the distribution of plantar pressures but may be influenced by other factors.

Discussion

The study aims to verify the relationship between postural stability and dynamic function of the lower limbs of university students and to identify differences depending on their professional focus. The study employed standardized, validated, and reliable measurement methods to assess both postural stability and the dynamic function of the lower limbs, thereby minimizing the risk of subjective bias. By analysing both static and dynamic aspects of the locomotor system, the research provided a multidimensional perspective on lower-limb functional status. This approach enhances the value of the study, as it highlights the distinct nature of postural regulation and dynamic performance. Furthermore, the research brings new insights into the postural health of young adults – a population often perceived as “movement-healthy,” despite the increasing prevalence of sedentary behaviour in this age group. The study thus responds to a current societal need to monitor and better understand the movement health of university students.

A comparison of physical fitness between physiotherapy and physical education students reveals significant differences in fitness levels and health-related parameters. Although both groups are expected to maintain a high level of physical fitness due to the demands of their future professions, the findings suggest that physical education students generally demonstrate better physical fitness than their physiotherapy counterparts (Bello et al., 2016; Dutta & Ghosh, 2016; Juhkam & Vaher, 2020). Physical activity and athletic performance may influence an individual’s dynamic balance (Huang et al., 2023). For these reasons, we assumed that there would be a statistically significant difference in the Y Balance Test scores – representing the dynamic function of the lower limbs – between the tested groups, in favour of students with a physical education background. Although the Y Balance Test results showed differences between groups S1 and S2, with participants from group S2 achieving higher average values in two out of three tested directions and in the composite score, statistical analysis did not confirm the significance of these differences.

A statistically significant difference between the groups was found in total plantar pressure on the left and right foot, while the differences in the other tested parameters (forefoot and rearfoot) were not statistically significant. Current scientific evidence identifies several factors contributing to differences in plantar pressure distribution. Body weight, body composition, and factors such as height, shoe size, and BMI influence the distribution of plantar pressure. Older individuals tend to exhibit different characteristics compared to younger ones, and clear differences in pressure distribution have also been observed between males and females (Lin et al., 2023; Dikhtyarenko et al., 2024; Patel & Balaganapathy, 2024). Muscular imbalance also plays a significant role – greater strength of the knee flexors compared to the extensors leads to increased heel pressure, while greater strength of the knee extensors is associated with increased pressure on the forefoot (Akaras et al., 2024; Kozel et al., 2020). According to Kozel et al. (2024), differences in plantar pressure distribution may also be influenced by the type of sports activity and postural adaptations, particularly shifts in the centre of gravity.

The correlation analysis did not demonstrate any dependence between total foot load and the composite score for either the right or left lower limb. Since no statistically significant relationship was found in either case, our initial assumption, that greater plantar pressure would be associated with a higher Y Balance Test composite score, was not confirmed. Similar results were reported by Sikora et al. (2020), who concluded that Y Balance Test outcomes and baropodometric platform results are weakly correlated in adolescents. These findings suggest that the Y Balance Test and baropodometric platform assess different aspects of balance in this age group. Similarly, Meiners and Loudon (2020) found no significant relationship between dynamic and static balance tests. They concluded that dynamic and static postural assessments provide different types of information in the context of overall balance evaluation. Research also indicates that factors such as limb dominance and gender may play an important role in balance assessment. This suggests that a multidimensional approach is essential for a comprehensive evaluation of balance (Arin-Bal et al., 2023).

The findings support the need for systematic assessment of postural stability and functional performance in university students, regardless of their field of study. Since no clear association between postural stability and the dynamic function of the lower limbs was confirmed, it is recommended to approach these domains independently and in a targeted manner. Intervention programs should therefore distinguish between (1) training focused on balance, sensorimotor control, and postural regulation, and (2) training aimed at strength, speed, and dynamic lower-limb performance. In educational and practical settings, it is advisable to incorporate instruction related to ergonomics, posture, correct movement patterns, management of unilateral loading, and the prevention of musculoskeletal complaints. To support a deeper understanding of related functional relationships, diagnostic procedures should be expanded to include additional functional and behavioural variables such as posture analysis, muscle imbalances, flexibility, sedentary behaviour, and overall physical activity levels.

Limitations and future directions

The main limitations of the study include the measurement accuracy of the baropodometric platform, which may have been affected by slight movements of the participants or sensor sensitivity. Variability in static posture, despite instructions not to adjust body alignment, may have influenced plantar pressure distribution. The short duration of the test (5 seconds) may not have been sufficient to capture natural postural fluctuations. The homogeneity of the sample in terms of age limits the generalisability of the results to a broader population. Individual biomechanical differences, as well as the effects of fatigue or learning, may have affected performance in the Y Balance Test. Differences in physical fitness between the groups may have affected the comparability of the results. The results should be interpreted with these limitations.

Conclusion

Based on the data analysis, we concluded that there is only a very weak or almost no relationship between postural stability and the dynamic function of the lower limbs in university students with different professional focuses, as confirmed by a low correlation coefficient. We found that the variables do not demonstrate a strong enough interdependence to influence each other in a meaningful way. We assume that one of the limitations of the study, which may have influenced the results, was the heterogeneity of the sample, including differences in physical fitness levels among students. Long-term training may also have influenced the results, reducing the generalisability of the findings to the broader population of university students. In addition, the short duration of the study may have limited the capture of longitudinal relationships between variables.

Acknowledgements This article and research were supported by the Scientific Grant Agency of the Ministry of Education, Research, Development and Youth of the Slovak Republic within the project VEGA 1/0382/24 Prevalence and diversification of musculoskeletal disorders in university students in relation to their health-related behaviours.

References

Akaras, E., Güzel, N. A., Çobanoğlu, G., Ecemiş, Z. B., & Şimşek, B. (2024). The effect of hamstring/quadriceps muscle strength ratio on plantar pressure distribution: A pilot study. *Turkish Journal of Kinesiology, 10*(4). https://doi.org/10.31459/turkjkin.1576269

Al-Khlaifat, L., Al-yahya, E., Qutishat, D., Okasheh, R., Mohammad, M. T., & Muhaidat, J. (2024). Health and skill-related physical fitness of physiotherapy students: An observational study. *Journal of Human Sport and Exercise, 19*(2), 461–472. https://doi.org/10.55860/neesf573

Arin-Bal, G., Livanelioglu, A., Leardini, A., & Belvedere, C. (2024). Correlations between plantar pressure and postural balance in healthy subjects and their comparison according to gender and limb dominance: A cross-sectional descriptive study. *Gait & Posture, 108,* 124–131. https://doi.org/10.1016/j.gaitpost.2023.11.017

Bello, A. I., Bonney, E., & Opoku, B. (2016). Physical fitness of Ghanaian physiotherapists and its correlation with age and exercise engagement: A pilot study. *Archives of Physiotherapy, 6*(2). https://doi.org/10.1186/s40945-016-0016-2

Bendíková, E. (2018). Health-oriented education in Slovakia related to physical and sport education. *Hungarian educational research journal,* 8(2), 39–49.

Bendíková, E. (2020). Diversification of the physical and sport education syllabi and its effects on the musculoskeletal system in young female students. *Trends in Sport Science,* 27(3), 149–155. https://doi.org/10.23829/TSS.2020.27.3-5

Bendíková, E., & Balint, G. (2023). Selected factors influencing the qualitative level of postural health of students in Slovakia. *European Journal of Contemporary Education,* 12(3). https://doi.org/10.13187/ejced.2023.3.756

Bendíková, E., & Balkó, I. (2022). Acral coactivation therapy method in terms of improving the musculoskeletal system in pupils in physical and sport education. *Trends in Sport Sciences*, 29(3), 107–114. https://doi.org/10.23829/TSS.2022.29.3-4

Bendíková, E., Holgado, J. C., & Uvinha, R. R. (2024). Propriofoot Concept Implemented in Physical and Sports Education Classes with the Aim of Improving Foot Health and Body Posture in Female Students. *Central European Journal of Sport Sciences and Medicine*, *45*, 5–15. https://doi.org/10.18276/cej.2024.1-01

Biancalana, V., Massimo, M., Lucchetti, C., & Nart, A. (2020). Balance and posture: effects of proprioceptive training on a group of sedentary people. *Journal of Physical Education and Sport,* 20(S3), 2196–2204. https://doi.org/10.7752/jpes.2020.s3295

Dikhtyarenko, S., Forte, P., & Esteves, D. (2024). Correlation between body composition variables and plantar pressure and pain level. *Acta of Bioengineering and Biomechanics, 26*(3). https://doi.org/10.37190/abb-02437-2024-03

Dutta, S., & Ghosh, M. (2016, September). Health related physical fitness among physical education professional students: A comparative study. *International Journal of Physical Education, Sports and Health.* Retrieved March 4, 2025, from https://www.kheljournal.com/archives/?year=2016&vol=3&issue=3&part=G&ArticleId=482

Horak, F. B. (2006). Postural orientation and equilibrium: What do we need to know about neural control of balance to prevent falls? *Age and Ageing, 35*(2), 7–11. https://doi.org/10.1093/ageing/afl077

Huang, X., Yan, Z., Ma, Y., & Liu, H. (2023). The influence of different levels of physical activity and sports performance on the accuracy of dynamic lower limbs balance assessment among Chinese physical education college students. *Frontiers in Physiology, 14,* 1184340. https://doi.org/10.3389/fphys.2023.1184340

Juhkam, E., & Vaher, I. (2020). Physical fitness of physiotherapy students. *Acta Kinesiologiae Universitatis Tartuensis, 25,* 88–96. https://doi.org/10.12697/akut.2019.25.07

Khanzada, S. K., Asif, S. H., Jawad, S. M., Raffial, M., Haider, W., & Afraz, N. (2024). Prevalence of static and dynamic balance disturbance among university students, Islamabad, with associated factors. *Insights - Journal of Health and Rehabilitation, 2*(2), 205–212. https://doi.org/10.71000/ijhr119

Kozel, M., Nechvátal, P., Gajdoš, M., & Čuj, J. (2020). Monitoring the occurrence of functional changes and disorders of the postural system in active basketball and football players. *Zdravotnícke Listy, 8*(2), 22–27.

Kozel, M., Škrečková, G., Potašová, M., Kutiš, P., & Ondrušková, L. (2024). One-side weight sports and the impact of their load on the feet and the occurrence of posture disorders in professional football and handball players. *Applied Sciences, 14,* 10387. https://doi.org/10.3390/app142210387

Lee, A. J., & Lin, W. H. (2007). The influence of gender and somatotype on single-leg upright standing postural stability in children. *Journal of applied biomechanics,* 23(3), 173–179. https://doi.org/10.1123/jab.23.3.173

Lin, S., Zheng, R., Zhao, W., Cao, J., & Wang, W. (2023). Statistical analysis on multi-factors of dynamic plantar pressure to normal subjects. *Biomedical Signal Processing and Control, 84,* 104995. https://doi.org/10.1016/j.bspc.2023.104995

Meiners, K. M., & Loudon, J. K. (2020). Dynamic and static assessment of single-leg postural control in female soccer players. *Journal of Sport Rehabilitation, 29*(2), 174–178. https://doi.org/10.1123/jsr.2018-0072

Mounika, D., Dandumahanti, B. P., Park, S. J., & Subramaniyam, M. (2022). A study on balance and foot pressure distribution while carrying load in different postures. *AIP Conference Proceedings, 2405*(1), 020013. https://doi.org/10.1063/5.0072437

Myers, T. W. (2009). *Anatomy trains: Myofascial meridians for manual and movement therapists* (2nd ed.). Churchill Livingstone: Elsevier. https://www.academia.edu/43890178/Anatomy_Trains_Myofascial_Thomas_W_Myers

Nusseck, M., & Spahn, C. (2020). Comparison of postural stability and balance between musicians and non-musicians. *Frontiers in Psychology, 11,* 1253. https://doi.org/10.3389/fpsyg.2020.01253

Palaščáková Špringrová I. (2018). *Acral coactivation therapy.* ACT centrum s.r.o.

Patel, H. M., & Balaganapathy, M. (2024). Normative values of static-dynamic plantar pressure and its cutoff values. *Indian Journal of Medical Specialities, 15*(1), 4–11. https://doi.org/10.4103/injms.injms_35_23

Plisky, P. J., Gorman, P. P., Butler, R. J., Kiesel, K. B., Underwood, F. B., & Elkins, B. (2009). The reliability of an instrumented device for measuring components of the star excursion balance test. *North American journal of sports physical therapy : NAJSPT*, *4*(2), 92–99.

Rajendran, D., Ramalingame, R., Palaniyappan, S., Wagner, G., & Kanoun, O. (2021). Flexible ultra-thin nanocomposite based piezoresistive pressure sensors for foot pressure distribution measurement. *Sensors (Basel), 21*(18), 6082. https://doi.org/10.3390/s21186082

Serrato-Pedrosa, J. A., Urriolagoitia-Sosa, G., Romero-Ángeles, B., Urriolagoitia-Calderón, G. M., Cruz-López, S., Urriolagoitia-Luna, A., Carbajal-López, D. E., Guereca-Ibarra, J. R., & Murillo-Aleman, G. (2024). Biomechanical evaluation of plantar pressure distribution towards a customized 3D orthotic device: A methodological case study through a finite element analysis approach. *Applied Sciences, 14*(4), 1650. https://doi.org/10.3390/app14041650

Shabani, M. (2016). Computer Simulation of the Effects of Muscle Co-activation and Joint Stiffness on Postural Stability. https://www.semanticscholar.org/paper/Computer-Simulation-of-the-Effects-of-Muscle-and-on-Shabani/e5202fe10450e74f90cfbabdfd7a3018dfc79ade

Sikora, D., Pałac, M., Myśliwiec, A., Wolny, T., & Linek, P. (2020). Assessment of the relationship between Y-Balance Test and stabilometric parameters in youth footballers. *BioMed Research International, 12,* 6968473. https://doi.org/10.1155/2020/6968473

Véle, F.. (2006). *Kineziologie: přehled klinické kineziologie a patokineziologie pro diagnostiku a terapii poruch pohybové soustavy.* Triton.

Żurawski, A., Śliwiński, Z., Suliga, E., Śliwiński, G., Wypych, Ż., & Kiebzak, W. (2022). Effect of thoracic kyphosis and lumbar lordosis on the distribution of ground reaction forces on the feet. *Orthopedic Research and Reviews, 14,* 187–197. https://doi.org/10.2147/ORR.S344972

Cite this article as: Lenková, R., Ivanová, S., Lukáčová, E., Grus, C., & Boržíková, I. (2026). The Correlation Between Postural Stability and Dynamic Function of the Lower Limbs. *Central European Journal of Sport Sciences and Medicine*, *1*(53), 5–15. https://doi.org/10.18276/cej.2026.1-01