Vypasniak Ihor, Fedyniak Nazarii. Functional assessment of motor patterns in fitness practice of mature individuals. Journal of Education, Health and Sport. 2024;75:65704. eISSN 2391-8306. https://dx.doi.org/10.12775/JEHS.2024.75.65704
https://apcz.umk.pl/JEHS/article/view/65704
https://zenodo.org/records//17187370

The journal has had 40 points in Minister of Science and Higher Education of Poland parametric evaluation. Annex to the announcement of the Minister of Education and Science of 05.01.2024 No. 32318. Has a Journal's Unique Identifier: 201159. Scientific disciplines assigned: Physical culture sciences (Field of medical and health sciences);
Health Sciences (Field of medical and health sciences). Punkty Ministerialne 40 punktów. Załącznik do komunikatu Ministra Nauki i Szkolnictwa Wyższego z dnia 05.01.2024 Lp. 32318. Posiada Unikatowy Identyfikator Czasopisma: 201159. Przypisane dyscypliny naukowe: Nauki o kulturze fizycznej (Dziedzina nauk medycznych i nauk o zdrowiu); Nauki o zdrowiu (Dziedzina nauk medycznych i nauk o zdrowiu).© The Authors 2024;
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The authors declare that there is no conflict of interests regarding the publication of this paper.
Received: 21.10.2024. Revised: 17.11.2024. Accepted: 21.11.2024. Published: 23.12.2024.

FUNCTIONAL ASSESSMENT OF MOTOR PATTERNS IN FITNESS PRACTICE OF MATURE INDIVIDUALS

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Abstract

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Relevance. In the context of health improvement strategies for the adult population, the implementation of innovative technologies is a prerequisite for the introduction of advanced scientific ideas. Research shows that the assessment of functional parameters of movements is a determining criterion for the effectiveness of preventive health programs aimed at ensuring comprehensive physical development and improving physical fitness.

Research tasks. Systematization of data obtained by Ukrainian scientists on the development of physical qualities in mature individuals. In the methodological aspect, the Functional Movement Screen (FMS) system was used by specialists for an objective functional assessment of movements.

Research results. The relevance of modern health fitness practice determines the critical need for the development and implementation of specialized screening methods using a functional approach for the preventive detection of motor deficits. In this context, FMS is considered as a potential method for determining objective markers of the basic level of motor

competence. FMS is a standardized system for assessing the quality of motor patterns and screening motor competence in uninjured individuals. The system uses a simple ordinal scale that allows for the rapid identification of potential functional limitations and asymmetries. It is important to note that FMS is not a diagnostic tool and is not intended to detect pathologies. Its main goal is to identify functional limitations and dysfunctions in relatively healthy individuals, which allows for the implementation of proactive injury prevention strategies. This approach allows for a timely response to potential risks, helping to maintain optimal motor health and reduce the incidence of injuries.

Conclusions. In the current scientific discourse, it is emphasized that in the conditions of hypodynamia, which is a characteristic feature of the modern lifestyle, the importance of physical exercise increases significantly. Its use is considered a fundamental prerequisite for maintaining and strengthening health, as well as for achieving harmonious physical development of the individual. Screening of movements based on the analysis of fundamental movement patterns is a key tool for identifying hidden deficits in mobility and stability in asymptomatic but physically active populations. These functional limitations are often not detected by standard testing methods that focus on diagnosing existing disorders.

Key words: functional assessment of movements; screening; movement patterns; mature individuals; physical fitness; health fitness.

Statement of the scientific problem. The development and implementation of innovative technologies are critically important for the practical implementation of the latest scientific ideas in the strategy of improving the health of the adult population [3, 7, 9, 17]. According to scientific sources, the functional parameters of movements are a key factor in the effectiveness of preventive health programs aimed at promoting harmonious physical development [5, 8, 12, 13] and improving physical fitness [11, 12, 14, 16].

The purpose of the study is to systematize the data obtained by Ukrainian scientists on the development of physical qualities in mature individuals. In the methodological aspect, the Functional Movement Screen (FMS) system was used by specialists for an objective functional assessment of movements.

Research methods. To accomplish the set tasks, an analysis of scientific and methodological literature was used.

The FMS system is used for functional assessment of movements. This standardized methodology includes seven main tests that allow to evaluate the quality of movement patterns: squats (Deep Squat), stepping over a barrier (Hurdle Step), lunge (In Line Lunge),

shoulder mobility (Shoulder Mobility), straight leg raise (Active Straight Leg Raise), push-up stability (Rotary Stability). The testing procedure was carried out using standard equipment: a measuring board, tape measure, bodybar and a bar with variable height. Each test was assessed on a four-point scale [1, 2]: 3 points – ideal performance (without compensations and loss of balance); 2 points – performance with compensations or in a simplified version, 1 point – partial or unsatisfactory performance, 0 points – performance with pain. During testing, each participant performed three attempts for each test, with the best result recorded. In case of doubt in the assessment, the worst result was recorded, which ensured the objectivity of the assessment [1, 2].

Presentation of the main research material. The conducted research using the FMS test system and assessment of the biogeometric profile of posture of men of the second period of mature age (36-45 years) revealed significant patterns. Using pairwise comparison of mean values (Duncan's rank criterion), it was found that the functional assessment of movements of men aged 36-40 years with a high level of posture is statistically significantly higher ($p<0,05$) compared to men with average and low levels. Similarly, the functional assessment of men aged 36–40 years with the average level of the biogeometric profile of posture is statistically significantly higher ($p<0.05$) compared to the group with a low level. It is important to note that no statistically significant differences ($p>0.05$) were found between age subgroups with the same level of the biogeometric profile of posture. The analysis of variance confirmed the statistically significant effect ($p<0,05$) of the state of the biogeometric profile of posture on the endurance of the abdominal muscles, mobility of the hip joint and lumbar spine. These results emphasize the need for an integrated approach to the development of corrective and preventive programs for men aged 36–45 years, which will take into account both the biogeometric profile of posture and the functional assessment of movements. The analysis of the FMS test results showed that the overall level of functional mobility of the participants was satisfactory or high. The best results were recorded in the "Trunk Stability Push Up" and "Rotary Stability tests", indicating a high level of core stability and rotational movements. At the same time, the study revealed deficits in tests such as "Shoulder Mobility" and "In Line Lunge". These results indicate potential limitations in the mobility of the shoulder girdle and hip joints [6, 10].

The obtained results [4] indicate that the overall level of functional assessment of movements (FMS) in the study participants was satisfactory or high. The best results were recorded in the Trunk Stability Push Up and Rotary Stability tests. At the same time, some participants had difficulties with shoulder girdle mobility (Shoulder Mobility) and

coordination (In Line Lunge). Comparative analysis found that men aged 26–28 demonstrated a better overall level of FMS compared to men aged 29–31. This trend may be associated with a decrease in physical activity with age [4].

The process of factor analysis, conducted on the basis of the matrix of intercorrelations of 19 indicators [4], revealed the structure of physical development and the relationship between motor abilities and anthropometric parameters in men aged 26-28. It consists of the following factors: general motor fitness: covers the main manifestations of general motor fitness, including the Rotary Stability and In Line Lunge indicators; body circumference: displays the relationship between circumference and the ability to perform movements with high amplitude and accuracy (Hurdle Step); body mass and its impact on posture: includes body mass indicators and related indices that affect the correct position of the body in the sagittal plane.

It was established that the factor structure of men aged 29-31 includes: the *factor of general physical fitness*: reflects general motor fitness and functional capabilities; *the factor of stability and muscle strength*: covers indicators of stability and muscle strength ("Hurdle Step"), which has a negative correlation with body weight; *the factor of distribution of fat mass and body position*: includes the ratio of waist to hips, waist circumference and goniometric characteristics that determine the general state of posture; *body mass to height ratio factor:* reflects the influence of indices determining the body mass to height ratio on the mobility of the shoulder girdle (“Shoulder Mobility”); *upper body strength and coordination factor:* assesses upper body muscular strength ("Trunk Stability Push Up") and the ability to maintain stability and control during rotational movements ("Rotary Stability").

The study [15] found that women in the first period of mature age performed best in the FMS tests "Deep Squat", "Trunk Stability Push Up" and "Rotary Stability". Somewhat worse results were recorded in the tests "Hurdle Step", "Shoulder Mobility" and "In Line Lunge". Correlation analysis showed that age had a negative effect on the results of the Deep Squat test ($p<0,05$), and the level of the biogeometric profile of posture was positively associated with the results of most tests. FMS: «Deep Squat», «Hurdle Step», «In Line Lunge», «Shoulder Mobility» and «Trunk Stability Push Up» ($p<0.01$) (Table 1).

In addition, postural disorders negatively affected the results of the "Hurdle Step" and "Shoulder Mobility" tests ($p<0,01$). It was statistically confirmed that the worst results in the "Shoulder Mobility" and " Hurdle Step" tests were shown by women with scoliotic posture. Women with normal posture demonstrated the best results in all tests, especially in "Rotary Stability", "Hurdle Step" and "Trunk Stability Push Up". In general, women with normal

posture had the highest level of physical fitness in both age groups. Women with a round back showed a moderate level, while women with scoliotic posture had the lowest level. Analysis of variance showed that the combination of posture type and its biogeometric profile level significantly affected women's physical fitness ($p<0,01$).

Table 1

Significant relationships between the results of physical fitness testing of women aged 25-34 years with age, posture condition and the level of the biogeometric profile of posture (n=36)

Indicators	Age	Posture	Level of the state of the biogeometric profile of posture
Test 1. Deep Squat	-0,385*	-	0,452**
Test 2. Hurdle Step	-	-0,519**	0,548**
Test 3. In Line Lung	-	-	0,386*
Test 4. Shoulder Mobility	-	-0,448**	0,452**
Test 6. Trunk Stability Push Up	-	-	0,514**
Test 7. Rotary Stability	-	-0,710**	0,860**

Notes: The table shows only statistically significant correlations; * - correlation is significant at the level of $p<0,05$; ** - at the level of $p<0,01$.

Women with normal posture and a high biogeometric profile demonstrated a significantly higher level of physical fitness compared to women with scoliotic posture and a low biogeometric profile level [15].

A promising direction for further scientific and practical research is the substantiation and testing of the “artificial control environment” toolkit in the process of health training for women in the second period of mature age.

Conclusions. It is generally recognized that in the context of widespread hypodynamia, physical activity is gaining priority as a factor in strengthening health and harmonious physical development. Functional screening of movements, focused on the analysis of fundamental motor patterns, is an effective tool for the preventive detection of hidden deficiencies in mobility and stability. This is particularly relevant for asymptomatic

individuals, as traditional testing methods are typically unable to identify these functional limitations in the early stages.

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