

Prevalence of Rotary Instability Among Young Adults

Sri Shankar Marimuthu¹; Dr. Manoj Abraham Manoharlal²; Sruthi S³;
Chandrika M⁴

^{1,2,3,4}Department of Physiotherapy, KG College of Physiotherapy, Coimbatore, Tamil Nadu, India
Affiliated to The Tamil Nadu Dr. M. G. R. Medical University, Chennai

Publication Date: 2025/09/29

Abstract:

➤ **Background:**

Good movement quality is the capability to perform fundamental movements in a duly balanced and well - coordinated manner. One of the most dependable methods of preventing injuries is to identify the compensatory movement patterns and correct them for this reason the movement screening test is used, to assess physical insufficiency in active young adults.

➤ **Aim:**

To explore the prevalence of rotary instability among young adults.

➤ **Study Design:**

Cross sectional study.

➤ **Methods:**

One hundred and ten participants screened in the study. Rotary stability test was performed by the participants and it was scored, while the physical activity and flexibility were assessed using International Physical Activity Questionnaire and Sit and Reach Test.

➤ **Results:**

Out of 105 participants 39% Participants have a score of 1, 46% Participants have a score of 2, 15% Participants have a score of 3. Out of 32 males 90% of males have rotary instability. Out of 78 females 80% of females have rotary instability.

➤ **Conclusion:**

There is a high prevalence of rotary stability dysfunction and asymmetries among young adults.

Keywords: Dynamic Trunk Stability, Functional Movement Screen, Movement Dysfunction, Rotary Stability Test, Young Adults.

How to Cite: Sri Shankar Marimuthu; Dr. Manoj Abraham Manoharlal; Sruthi S; Chandrika M (2025) Prevalence of Rotary Instability Among Young Adults. *International Journal of Innovative Science and Research Technology*, 10(9), 1937-1942. <https://doi.org/10.38124/ijisrt/25sep1028>

I. INTRODUCTION

Movement is essential to human life which is a vital part of overall health and wellbeing. The ability to execute basic movements in a balanced and well-coordinated way is a sign of good movement quality. The definition of poor movement quality is the inability to execute basic movement patterns [1]. The identification and correction of compensatory movement patterns is one of the most effective ways to prevent injuries. In order to evaluate physical deficiencies in active young adults, movement screening tests are conducted. A screening tool for identifying movement deficiencies and

improper functional patterns is the functional movement screening test [2]. Establishing and maintaining ideal mobility and stability relationships along the entire kinetic chain is the foundation of functional movement. Functional movements are a complex interplay of cognitive, perceptual, proprioceptive and motor functions that includes muscular strength and endurance, flexibility, coordination and balance [3]. The FMS is an assessment tool used by physical therapist and other movement specialists to objectively assess an individual's fundamental and functional movement patterns, yielding a quantifiable score (0 - 3 scale) indicative of their overall movement quality. Seven movement patterns are

included in FMS: the in-line lunges, the deep squat, the hurdle step, shoulder mobility, the active straight leg raise, the trunk stability push-up, and rotary stability. The rotary stability test (ICC 0.96) tests the multi-planar box stability, examining the coordinated transfer of energy between upper and lower extremities, which is difficult to control accurately, and has been found to be most reliable for inter-rater reliability [4]. The multi-planar box stability, which measures the coordinated transfer of energy between the upper and lower extremities and is challenging to precisely control, is tested by the rotary stability test. Asymmetric upper and lower extremity movement necessitates asymmetric trunk stability in the sagittal and transverse planes. Compromised trunk stability may lead to the inefficient dissipation of kinetic energy, thereby contributing to impaired movement patterns and an increased susceptibility to musculoskeletal injury. Unstable trunk (core) stabilizers are the cause of poor performance during this test movement [5].

II. METHODOLOGY

➤ Study Design:

The study was a cross-sectional study. Participants were male and female college students (18-25 years).

➤ Participants:

A Prevalence study performed assessing the dynamic trunk instability (Rotary stability dysfunction) among younger adults. This study involved screening of 110 college going students (78 girls and 32 boys) from KG College of Physiotherapy, Coimbatore.

➤ Inclusion Criteria:

In Inclusion criteria both male and female age groups of 18-25 years' college students who are willing to participate were included.

➤ Exclusion Criteria:

In Exclusion criteria participants with Low back pain, recent injuries, who have undergone surgery and participants who are not willing to participate were excluded.

➤ Protocol:

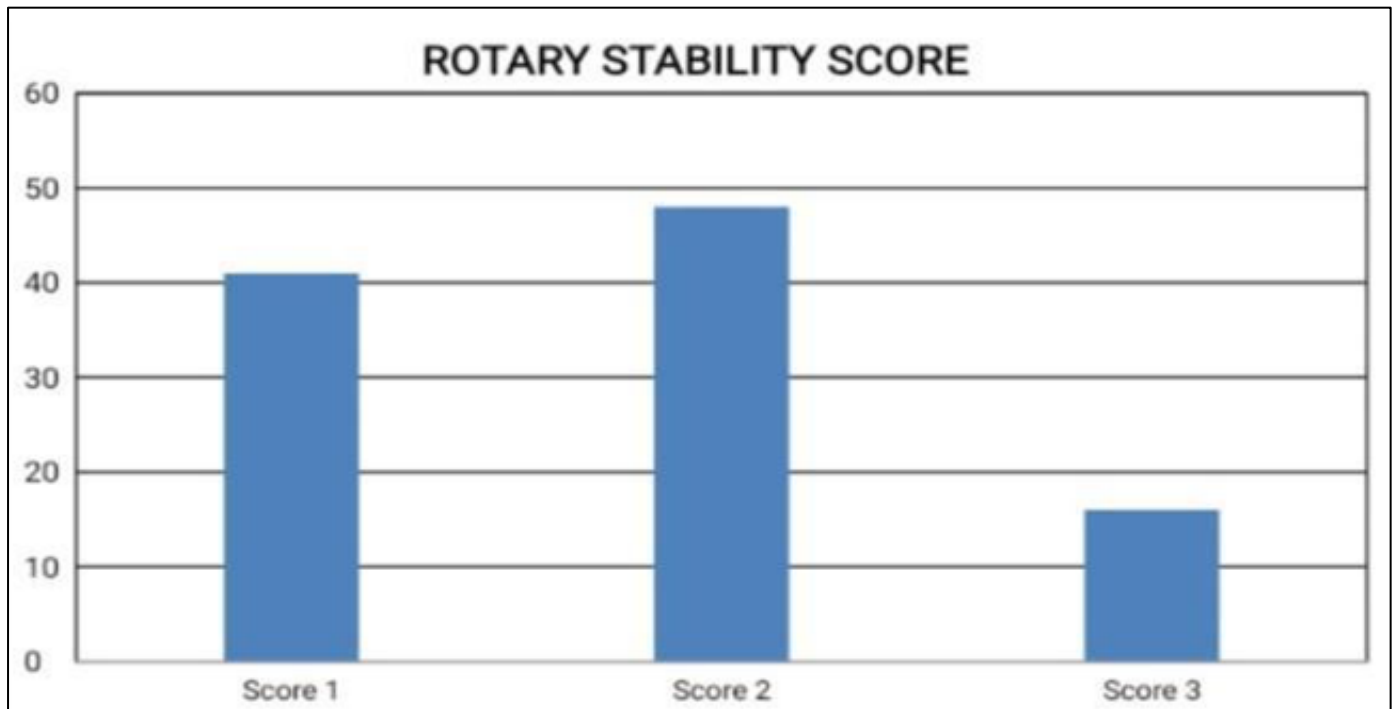
This research was carried out at the KG College of Physiotherapy Coimbatore. This research was carried out fully in consonance with ethical standards of the Helsinki statement. Informed consent of the participants was sought before study participation.

➤ Assessment and Outcome Measure:

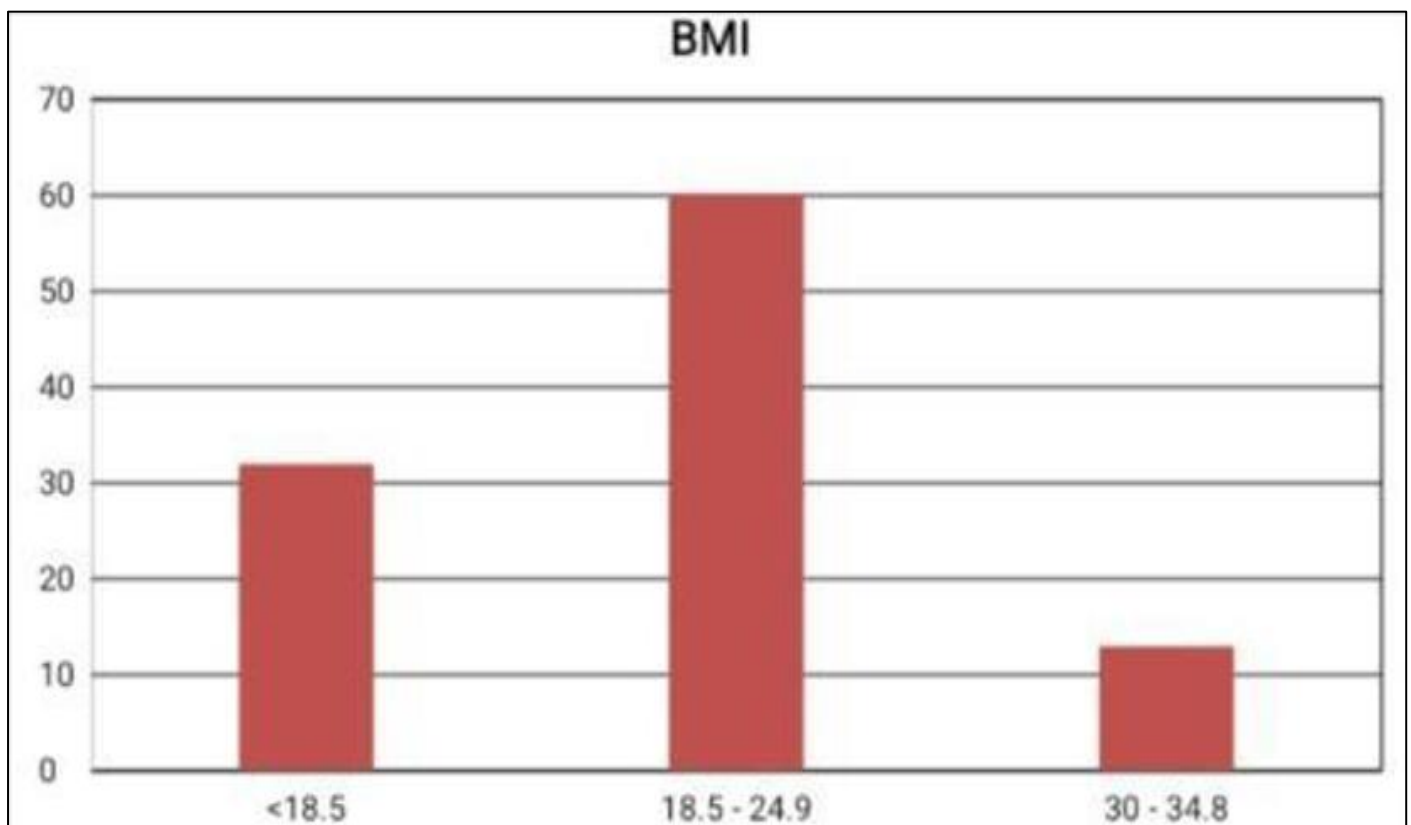
Participants in this study underwent a comprehensive assessment that included a demographic evaluation, rotary stability testing and flexibility testing. Additionally, the International Physical Activity Questionnaire (IPAQ) was administered. Demographic information gathered from participants included age, gender, height, weight and BMI. The Rotary Stability Test assesses integrated neuromotor control and multi-planar stability in the upper and lower body. The participant receives a "3" if they execute the proper unilateral movement pattern. The participant receives a "2" if they follow the diagonal pattern. The participant receives a "1" if they are unable to execute the diagonal pattern. After RST, a clearing exam is administered. The movement is a pain response that is observed and is not scored. The subject stands quadrupedally and rocks backwards while touching their chest to their thighs and their buttocks to their heels. They also extend their arms as far as they can during the spinal flexion clearing test. When a score of 0 is obtained, it means that this movement causes pain. A score of 0 signifies the elicitation of pain upon performing this movement. Flexibility was assessed by using Sit and Reach Test. Yardstick is placed on the floor and tape is placed across it at right angles to the 15 inches' mark. Each participant was instructed to sit with their legs fully extended at a right angle to a floor line, with a yardstick positioned centrally between their legs. Heels of the feet should touch the edge of the taped line above 10-12 inches apart. The participants gradually extended both arms forward, positioning on hand directly above the other with palmar surfaces facing downwards, achieving the greatest possible reach. The score is the most distant point reached with finger tips. The best of three trials are recorded. International Physical Activity Questionnaire short form was self-administered to participants to assess their physical activity levels. It is a 10 item questionnaire that can be self-administered it prompted participants to report the frequency and duration of their vigorous, moderate, walking, and sitting activities over the preceding seven days. Based on established guidelines, their overall physical activity levels were subsequently classified as low, moderate, or vigorous.

III. RESULTS

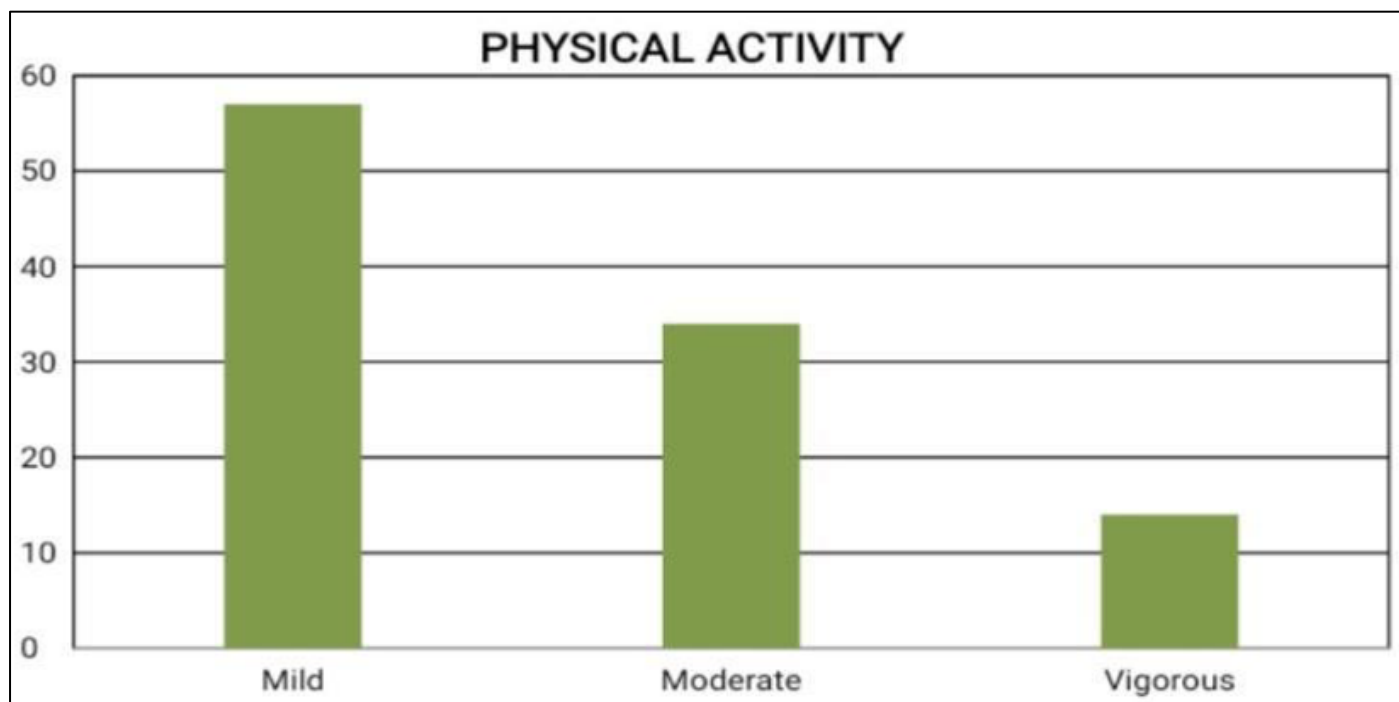
Out of 110 participants there are 78 females and 32 males. In that 5 participants were excluded from the study due to not meeting the pre-defined inclusion criteria.



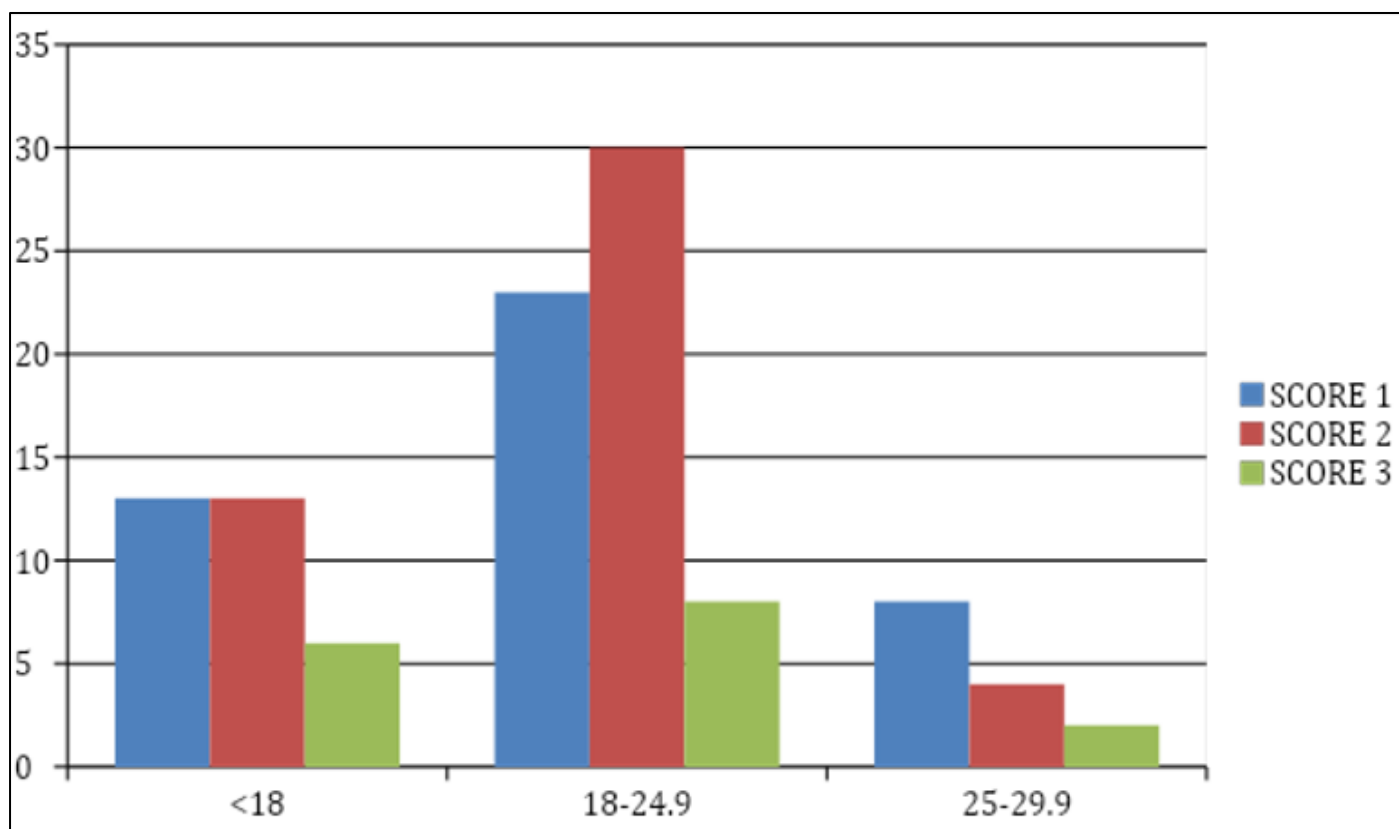
Graph 1 Out of 105 Participants 39% Participants have a Score of 1, 46% Participants have a Score of 2 and 15% Participants have a Score of 3. Out of 32 Males 90% Males have Dysfunction in Rotary Stability. Out of 78 Females 80% have Dysfunction in Rotary Stability.



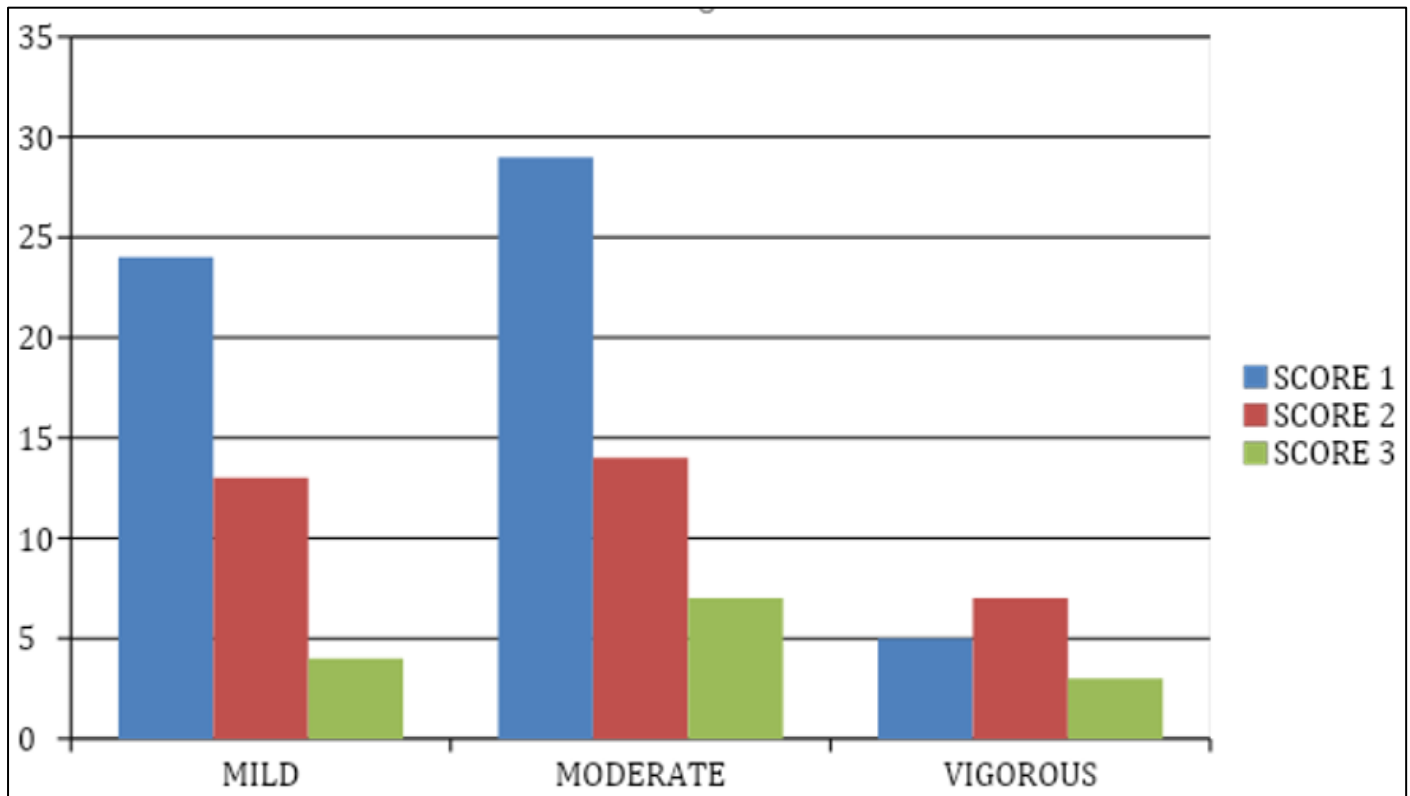
Graph 2 Out of 105 Participants 30% Participants are in Underweight Category, 57% Participants are in Normal Weight Category and 12% Participants are in Over Weight Category.



Graph 3 Out of 105 Participants 54% Participants do Mild Physical Activity, 32% Participants do Moderate Physical Activity and 13% Participants do Vigorous Physical Activity.



Graph 4 This Graph Shows Young Adults with Underweight and Overweight Categories Find it Difficult to Maintain a Unilateral Pattern of Dynamic Trunk Stability Compared to Normal Weight Category Participants.



Graph 5 This Graph Shows Participants with Good Physical Activity were Able to Maintain a Unilateral Pattern of Dynamic Trunk Stability Compared to Physically Inactive People.

IV. DISCUSSION

The study aimed to assess two key variables in young adults - movement quality and dynamic trunk stability. Our findings indicated a high prevalence of dysfunctional, asymmetrical dynamic trunk instability in young adults with reduced physical activity and overweight and obese adults. Rotary instability becomes most pronounced when the physical activity declines during the transition from youth to adulthood. This decline in PA levels is a cause for concern and requires attention [6]. The kinetic chain's compensatory movements, noticeable asymmetry, a decrease in range of motion, balance, posture, and motor control for a specific movement all point to less-than-ideal movement quality. Dysfunctional movement may be brought on by repetitive use of compensatory movement patterns or by a lack of exercise. Dysfunctional movement patterns can develop and be repeatedly practiced, which can later in life, cause injuries, postural abnormalities, movement pathologies, and orthopaedic abnormalities. Body structure, comprising elements such as body size, body composition and somatotype represents a key set of individual functional constraints. Numerous reviews have shown that adult obesity and overweight are linked to musculoskeletal pain, injury, and declines in muscle strength, gait, and balance, as well as impairments in function and performance of motor tasks. The rotary stability test evaluates an individual's ability to coordinate stability and mobility across multiple planes by assessing pelvic, core, and shoulder girdle function during combined upper and lower extremity movements. A score of 2 indicates optimal performance, characterized by smooth and controlled movement with maintained spinal alignment.

1 – point; scorers demonstrate increased shaking in the dominant side raised arm and compromised weight - bearing stability on the non - dominant side [7].

V. CONCLUSION

Young adults are highly prone to rotary stability dysfunction and asymmetries. The lower Rotary stability test scores along with their association with the Body Mass Index and Physical Activity emphasize the need for interventions that encourage physical activity to promote overall health and facilitate a timely return to normal. Early identification of dysfunctional movements in young adults is essential to the training and sustaining of functional movements.

➤ Abbreviations

- **FMS** – Functional Movement Screen
- **RST** – Rotary Stability Test
- **IPAQ** – International Physical Activity Questionnaire
- **BMI** – Body Mass Index
- **PA** – Physical Activity

REFERENCES

- [1]. Borms D, Bautmans I, Van Hove K, et al. The relationship between functional movement screen scores and physical performance in healthy young adults. *Int J Sports Phys Ther.* 2023;18(3):737–745. doi: 10.26603/001c.74724.

- [2]. Zarei M, Rahmani N. The Relationship Between Dynamic Stability and Functional Movement Screening Test. *PTJ*. 2018;8(2):107-114.
- [3]. Vehrs PR, Uvacsek M, Johnson AW. Assessment of Dysfunctional Movements and Asymmetries in Children and Adolescents Using the Functional Movement Screen-A Narrative Review. *Int J Environ Res Public Health*. 2021 Nov 27;18(23):12501. doi: 10.3390/ijerph182312501.
- [4]. Cook G, Burton L, Hoogenboom BJ, et al. Functional movement screening: the use of fundamental movements as an assessment of function-part 2. *Int J Sports Phys Ther*. 2014 Aug;9(4):549–563.
- [5]. Yang F, et al. Association Between Physical Activity and Functional Movement Screening Among University Students in an Adaptive Physical Course. 2024:135–144.
- [6]. Lehnert M, et al. The Association between Fundamental Movement Skills and Functional Movement Screen Scores in School-Aged Children. *Children (Basel)*. 2021 Mar;8(3):184. doi: 10.3390/children8030184.
- [7]. Alizadeh S, et al. The effect of a 12-week core stability training program on functional movement screen scores in university students. *J Hum Kinet*. 2023 Apr;87:59-70. doi: 10.5114/jhk/161548.
- [8]. An Introduction to the Functional Movement Screen. Functional Movement. Published 2022. Accessed April 5, 2022. https://www.functionalmovement.com/files/Articles/572a_FMS_Article_NoBleed_Digital.pdf.
- [9]. Basar MJ, Stanek JM, Dodd DD, Begalle RL. The influence of corrective exercises on functional movement screen and physical fitness performance in army ROTC cadets. *J Sport Rehabil*. 2019;28(4):360-7.
- [10]. Holfelder B, Schott N. Relationship of fundamental movement skills and physical activity in children and adolescents: A systematic review. *Psychol Sport Exerc*. 2014;15:382–391. doi: 10.1016/j.psychsport.2014.03.005.
- [11]. Karuc J, Markovic G, Misigoj-Durakovic M, et al. Is adiposity associated with the quality of movement patterns in mid-adolescent period? *Int J Environ Res Public Health*. 2020;17:9230. doi: 10.3390/ijerph17249230.
- [12]. Okada T, Huxel KC, Nesser TW. Relationship between core stability, functional movement, and performance. *J Strength Cond Res*. 2011;25:252–261. doi: 10.1519/JSC.0b013e3181b22b3e.
- [13]. Cattuzzo MT, Henrique RD, Ré AHN, et al. Motor competence and health related physical fitness in youth: A systematic review. *J Sci Med Sport*. 2016;19:123–129. doi: 10.1016/j.jsams.2014.12.004.
- [14]. Lubans DR, Morgan PJ, Cliff DP, et al. Fundamental movement skills in children and adolescents. *Sports Med*. 2010;40:1019–1035. doi: 10.2165/11536850.
- [15]. Bushman TT, Grier TL, Canham-Chervak M, et al. The Functional Movement Screen and injury risk: Association and predictive value in active men. *Am J Sports Med*. 2016;44(2):297-304. doi: 10.1177/0363546515614815.
- [16]. Cook G, Burton L, Hoogenboom BJ, Voight M. Functional movement screening: the use of fundamental movements as an assessment of function-part 2. *Int J Sports Phys Ther*. 2014 Aug;9(4):549-