Journal of Physical Education

Volume 38 – Issue (2) – 2026 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729

https://jcope.uobaghdad.edu.iq

The Effect of Static Stretching and Full Dynamic Stretching of Opposing Body Segments Using Elastic Resistance Bands on Motor Balance and Dynamic Flexibility in Youth Basketball Players

Omar Mohammed Majed [1]

[1] University of Baghdad, College of Physical Education and Sport Sciences.

DOI:
https://doi.org/10.37359/JOPE.V38(2)2026. 2445

Article history: Received 23/ February/2026 Accepted 18/ March /2026 Available online 28/ June/2026

Abstract

This study aimed to investigate the effect of static stretching and full dynamic stretching exercises using elastic resistance bands on the development of motor balance and dynamic flexibility in youth basketball players. The research sample consisted of (12) youth players from Al-Adhamiya Sports Club basketball team, who participated in a training program utilizing elastic resistance bands alongside their regular training for a duration of (8) weeks, with (3) training sessions per week. To measure the study variables, the Modified Bass Test of Dynamic Balance was used to assess motor balance, and a dynamic flexibility test was employed to evaluate movement flexibility. The results revealed statistically significant differences between the pre- and post-tests of the experimental group in both motor balance and dynamic flexibility, in favor of the post-test, indicating the effectiveness of the training program using elastic resistance bands in improving these physical abilities. The researcher attributes this improvement to the nature of elastic resistance exercises, which provide progressive resistance throughout the full range of motion, thereby enhancing neuromuscular balance and increasing joint range of motion. Furthermore, the findings showed that training opposing body segments contributed to improving muscular balance and reducing asymmetry between the two sides of the body, while static stretching exercises enhanced muscular stability and neuromuscular control, and full dynamic stretching exercises contributed to increasing functional range of motion associated with basketball skill performance.

Keywords: elastic resistance bands, static stretching, full range of motion, balance, dynamic flexibility, basketball.

[1] University of Baghdad, College of Physical Education and Sport Sciences.
omar.m.m@cope.uobaghdad.edu.iq, https://orcid.org/0009-0001-5573-8681 .

Journal of Physical Education
Volume 38 – Issue (2) – 2026 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Introduction

The field of sports training is witnessing continuous development in the methods and tools used for athlete preparation, as coaches and researchers strive to adopt modern training programs that contribute to the enhancement of physical and motor abilities in line with the performance demands of various sports. Physical preparation is considered a fundamental basis for improving players' skill performance (Abdulhussein et al., 2026). Basketball is among the sports that require a high level of physical and motor efficiency due to the nature of its diverse movements, such as sprinting, jumping, and rapid changes of direction. Therefore, the development of motor balance and dynamic flexibility is regarded as a key factor in improving skill performance and movement efficiency among players (Abdulkareem et al., 2017).

Resistance exercises that use elastic bands have emerged as a modern alternative to traditional methods, in the same context, as this new training pattern produces progressive resistance over the entire range of motion, which is beneficial for promoting neuromuscular adaptations and improving dynamic balance and functional flexibility (Amer Abdulhussein et al., 2025). Thus, this study utilized exercises that combine static stretching and full dynamic stretching for different segments of the body in a way that matched the requirements of basketball. Measurements of the study variables were carried out by utilizing the Modified Bass Test of Dynamic Balance and a test of dynamic flexibility, both established as classic measures in various aspects of sports research (Hassan & Abdulkareem, 2025).

The importance of this research in its significance is to demonstrate the role and effect qualitatively with the addition of various elastic band resistance exercises carried out to improve motor balance and dynamic flexibility on youth basketball players, which will eventually help improve neuromuscular adaptation and increase movement efficiency. In addition, this study presents a training program that coaches can use to develop these physical qualities and improve skill performance as well as decrease the chances of sports injuries among players.

Basketball also includes multidirectional movements, including many repeated jump-landing sequences and physical contact between players throughout the performance; thus, it calls for a high degree of both motor balance and dynamic flexibility. Poor motor balance or reduced joint range of motion could result in decreased performance efficiency for youth players' skill level and a greater risk of sports injury. However, as previously mentioned the significance of physical abilities such as the functional development (agility) score card and some applied training programs which relate directly to youth basketball players do not provide enough attention to their motor balance and dynamic flexibility used with help of modern movement apparatus like an elastic resistance band. Accordingly, the research problem is concretized in the following question:

Journal of Physical Education
Volume 38 – Issue (2) – 2026 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Do static stretching and full dynamic stretching exercises using elastic resistance bands have a significant effect on developing motor balance and dynamic flexibility in youth basketball players?

Research Objectives

1. To identify the effect of static stretching exercises using elastic resistance bands on developing motor balance in youth basketball players.
2. To identify the effect of full dynamic stretching exercises using elastic resistance bands on developing dynamic flexibility in youth basketball players.
3. To identify the differences between pre- and post-tests in motor balance and dynamic flexibility among the study sample.

Research Hypotheses

1. There are statistically significant differences between the pre- and post-tests of the experimental group in motor balance in favor of the post-test.
2. There are statistically significant differences between the pre- and post-tests of the experimental group in dynamic flexibility in favor of the post-test.

Methods and Materials

Research Design and Participants

The research methodology represents the fundamental approach selected by the researcher to obtain results, as phenomena can be studied through scientific methods that align with the nature of the research problem. Accordingly, the researcher employed an experimental method using a one-group design due to its suitability for the nature of the study problem. The selection of the sample is closely related to the characteristics of the population from which it is drawn, as well as to the nature of the research problem, since it represents the model upon which the study is conducted. Using a purposive sampling method, the research sample was selected from players of Al-Adhamiya Sports Club to implement the experimental procedures related to the study topic. The sample consisted of (12) players, who were chosen due to their regular attendance in training sessions, the availability of the training facility, the proximity of the training center, and the ease of access for the researcher. The researcher also conducted a homogeneity test for the research sample, as presented in Table (1).

Journal of Physical Education
Volume 38 – Issue (2) – 2026 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Table 1. *Homogeneity of the Sample in Variables (Age, Training Age, Height, and Body Mass)*

No.	Variables	Unit of Measurement	Mean	Standard Deviation	Skewness
1	Height	cm	180.13	1.26	0.194
2	Body Mass (Weight)	kg	70.56	1.46	0.153
3	Chronological Age	years	17.06	0.85	0.13
4	Training Age	years	2.75	0.78	0.49

Equipment Used

First: Exercise Implementation Tools

1. Elastic resistance bands of different colors (varying resistance levels).
2. Exercise mats for static stretching.
3. Training markers or cones.
4. Large flexible exercise balls (optional).
5. Stopwatch.
6. Measuring tape.
7. Medical scale for body weight measurement.
8. Stadiometer for height measurement.
9. Exercises Used

Static Stretching and Full Dynamic Range Exercises

These exercises involve isometric contractions of muscles—meaning, the length of the muscle remains unchanged during exercise because there are no visible movements at a specific joint or body segment. This means that in its active (contraction) and passive (elongation) phases, the movement occurs through the joint's full range of motion under opposing resistance. Covering the whole dynamic range of potential joint motion, these exercises develop strength along with stability and flexibility, improving neuromuscular coordination by generating force through a complete range of motion. They work toward muscular stability and joint control through the entire range of motion, enhancing neuromuscular regulation as well. In addition, they promote stability in the body's center of mass during movement and from one position to another for improved

Journal of Physical Education
Volume 38 – Issue (2) – 2026 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

athleticism. These exercises work because they strengthen stabilizing muscles on one side while lengthening the opposing muscles on the other, and therefore foster what is called dynamic flexibility — which is a joint's ability to move through a wide range during true motor performance with adequate muscular control. This is different from static flexibility that is functionally associated with the nature of movement.

First: Measurement Tools and Tests

Modified Bass Test of Dynamic Balance (Halabchi et al., 2020)

Used to determine someone's capacity for both accurate jumps as well as maintaining balance during and post-movement. Test is a valid measure of dynamic balance, especially in activities that combine movement and postural control.

The test requires a stopwatch, a measuring tape, and eleven markers of size (1 inch × 0.75 inch), which are fixed on the ground in a specific arrangement. During the test, the participant begins by standing on the starting point using the right foot. Upon the signal, the participant jumps to the first marker using the left foot and attempts to maintain balance on the ball of the foot for as long as possible, with a maximum duration of five seconds. The participant then proceeds to jump to the second marker using the right foot, alternating feet with each subsequent marker while maintaining balance on the ball of the foot each time. It is important that the foot completely covers the marker during landing without any part extending beyond it.

Points are awarded both for the accuracy of their landing and how stable they can remain. For each time the participant correctly lands on a marker, they receive five points. As well, one point is given for every second the contestant remains on balance on the marker (max of five seconds). Hence the test has a maximum total score of 100 points.

If the heel or any part of the body except for the ball of foot touches ground after landing or if they are unable to stop, they do not score 5 points even if he markerclearly on ground. In these situations, the subject may regains balance on the ball of foot and tries to hold it for up to five seconds. In addition to that, if any balance error is made before the 5 second duration could also mean a loss of one point per second as well. If they lose balance completely, though, the participant has to return to the current marker and attempt a jump again at the next marker with the correct foot.

Journal of Physical Education
Volume 38 – Issue (2) – 2026 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

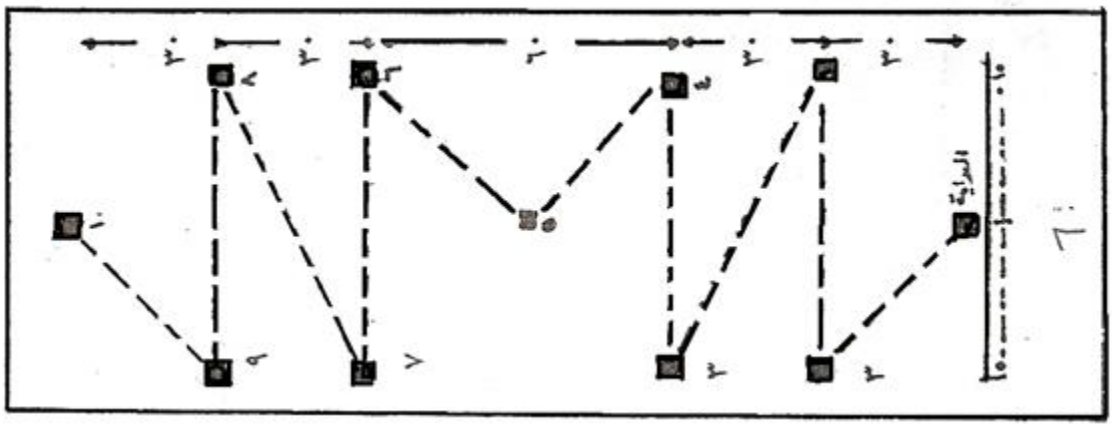

Figure 1. ***Illustration of the Modified Bass Test of Dynamic Balance***

Second: Dynamic Flexibility Test

Dynamic Flexibility (Movement Flexibility) Test (Mayorga-Vega et al., 2014)

This is a dynamic flexibility test that targets trunk flexion, extension and rotation. It assesses a participant's ability to execute controlled repeated movements through functional range of motion.

The test requires a stopwatch and a wall. Two marks (×) are drawn: one on the ground between the participant's feet, and another on the wall behind the participant at mid-back level. Upon the start signal, the participant bends the trunk forward and downward to touch the ground mark with the fingertips, then immediately extends the trunk upward while rotating to the left to touch the mark on the wall behind with the fingertips. The same movement is then performed to the right side.

Performance is recorded by counting the total number of correct touches made on both marks within a period of 30 seconds.

Main Experiment

After completing the pre-tests, the researcher initiated the implementation of the main part of the training program, which was specifically designed by the researcher. The program included static stretching exercises for one part of the body combined with full dynamic range movements

Journal of Physical Education
Volume 38 – Issue (2) – 2026 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

for the opposing body segments, performed using elastic resistance bands or without them, in order to examine their effect on motor balance and dynamic flexibility in youth basketball players under the age of 18. The program was applied to the experimental group, which consisted of (12) players.

Results

Table 2. *Descriptive Statistics, Paired Differences, and t-Test Results for Pre- and Post-Tests*

Variables	Tests	Mean	Std. Deviation	Mean Difference	Std. Difference	t-value	Sig (p)	Significance
Modified Bass Test (Dynamic Balance)	Pre-test	54.9	0.875	5.50	0.84	20.466	0.000	Significant
	Post-test	60.4	0.516					
Dynamic Flexibility Test	Pre-test	48.3	0.823	6.70	1.33	15.841	0.000	Significant
	Post-test	55.0	0.816					

Discussion

The present study indicated statistically significant differences in both dynamic balance and flexibility, between the pre- and post-tests with a more favorable outcome for the post-test. Mean (54.90) and post-test (60.40) score for dynamic balance, mean pretest score on the dynamic flexibility variables increased from (48.30) to (55.00). The macht determined t-values demonstrated that all improvements were statistically significant ($p = 0.000$), and it has to be emphasized that the overall effectiveness of a specified training program in improving the motor abilities of participants is greatly expressed in this research.

Several studies have suggested that dynamic balance improvement may be related to neuromuscular adaptations from structured motor practice. Balance relies on the coordination of sensory receptors, working muscles and the integration of the central nervous system to control center of mass during movement. Previous literature shows that practicing balance can improve postural control and neuromuscular coordination, ultimately resulting in better dynamic balance task performance (Ringhof & Stein, 2018; Muehlbauer et al., 2021; Abdulhussein, 2025)

Journal of Physical Education
Volume 38 – Issue (2) – 2026 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Another type of exercise is one that challenges the perceptions of the sensorimotor system and increases a person's ability to stabilize themselves between different positions in movement. This has a positive reflection on dynamic balance performance. It has been confirmed by studies that youth and athletes have better motor control and postural stability if they participate in specialized balance training programs (Duquette et al., 2022; Sánchez-Barbadora et al., 2025; Abdulhussein & Al-Juboori, 2024).

The performance results were also clearly improved in the post test with regard to dynamic flexibility. This is due to the mechanical and muscular adaptations gained by performing stretching and movements exercises repeatedly in the training program. These exercises promote joint range of motion and positively affect the mechanical properties of muscles and tendons, leading to better dynamic flexibility (Alizadeh et al., 2023; Abd Alqader et al., 2025).

Alizadeh et al. (2023) suggests that consistent training, either through strength training or stretching exercises, leads to improved range of motion as a result of neuromuscular adaptations within the musculoskeletal system. Flexibility also benefits the overall motor function by minimizing muscular resistance while performing motion and increasing coordination efficiency (Donti et al., 2022).

Similarly, in physical education and related fields studies indicate starting the development of motor performance components such as flexibility and balance to promote skill (an important factor in performance) alongside being physically adept is essential at increasing both their scale performances (students and any athlete). Thus, these are the components that not only improve movement efficiency but also prevent injuries in performance (Pfeifer et al., 2022; Komatni, 2022).

Overall, we can assume that the training program has led to neuromuscular and mechanical adaptations following the practice performed by participants in both tests (post-test dynamic balance and post-test dynamic flexibility). Consistent interval training of structured exercises helps to achieve better control of movement and improvement in joint range of motion as part of a greater physical manifestation including performance motor skills.

Journal of Physical Education
Volume 38 – Issue (2) – 2026 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Conclusions

1. Static stretching and full dynamic range exercises with elastic resistance bands resulted in statistically significant improvements in motor balance of youth players, the study's outcomes show.
2. The exercises led to an improvement in dynamic flexibility, especially in the joints involved in basketball skill execution.
3. Training antagonistic segments (upper with lower limb, and right with left) improved neuromuscular balances (reduction of estimates between the two sides of the body).
4. In addition, static stretching exercises improved muscular stability with the result that efficient neuromuscular control was increased and reflected positively in both performance movement stability.
5. Because full dynamic range exercises were performed, the appropriate functional ranges of motion needed to appropriately execute skills as well as transitional and rotational movements within basketball were improved.
6. Elastic resistance bands issued progressive and safe resistance, whilst also activating deep muscles in the body that contribute to balance.
7. Static stretching with full dynamic range exercises were shown to be greater than either methods independently.

Recommendations

1. Youth basketball players should include static stretching and dynamic full range exercises utilizing elastic resistance bands in their training programs.
2. Training opposing body segments is needed to achieve muscular balance and decrease movement asymmetries.
3. These talents should be incorporated in both the general and exact segment of the training session, especially before mastering move abilities.
4. Progressive overload of elastic resistance Mechanical PropertiesThe principle of progressive overload must be applied for elastic resistance, either according to the players' training age or performance level.
5. Players' development can be monitored, through periodic assessments of motor balance and dynamic flexibility.
6. A particular focus on core stability exercise practice should be combined with elastic resistance band training.
7. Further training can be performed on other age groups to assess the training response through developmental stages.

Journal of Physical Education
Volume 38 – Issue (2) – 2026 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

References

Abd Alqader, H. A., Yousif Shabba, F. S., & Mohammed, K. S. (2025). Standard scores and levels for certain legal situations among first-class basketball referees. *Journal of Physical Education (20736452)*, *37*(1). https://doi.org/10.37359/JOPE.V37(1)2025.2180

Abdulhussein, A. A. (2025). Effect Of Interactive Video Analysis Training on The Acquisition of Dribbling Skills in Basketball Among Students at College of Physical Education and Sports Sciences Baghdad University. *Journal of Physical Education*, *37*(4). https://doi.org/10.37359/JOPE.V37(4)2025.2367

Abdulhussein, A. A., & Al-juboori, Z. A. (2024). Effectiveness of Kinetic Games and Their Impact on Learning Some Basic Basketball Skills for Middle School Students. *Journal of Physical Education (20736452)*, *36*(2). https://doi.org/10.37359/JOPE.V36(2)2024.2192

Abdulhussein, A. A., Kadhim, M. J., Abdulkareem, O. W., & Shehab, G. M. (2026). The effect of neurofeedback on free throw accuracy in female basketball players of Baghdad University. *Retos*, *75*, 496-507. https://doi.org/10.47197/retos.v75.118286

Abdulkareem, O. W., Hameed, H., & Al-Hussein, A. (2017). Analytical-Comparative Study of Some Kinematical Variables Of Jump Shot and Shooting in Youth Basketball Players. *Article in Journal of Physical Education*.

Alizadeh, S., Daneshjoo, A., Zahiri, A., Anvar, S. H., Goudini, R., Hicks, J. P., ... & Behm, D. G. (2023). Resistance training induces improvements in range of motion: a systematic review and meta-analysis. *Sports Medicine*, *53*(3), 707-722. https://doi.org/10.1007/s40279-022-01804-x

Amer Abdulhussain, A., Sinan Atiyah, H., Hussain Jaber, O., Ridha Ghanim, M., Hashim Hammood, A., & Mohammed Saleh, Y. (2025). The Impact of Jesko's Strategy with Sequential Exercises on Learning the Skill of Dribbling in Basketball. *Annals of Applied Sport Science*, *13*(4), 0-0. https://doi.org/10.61882/aassjournal.1550

Donti, O., Konrad, A., Panidi, I., Dinas, P. C., & Bogdanis, G. C. (2022). Is there a "window of opportunity" for flexibility development in youth? A systematic review with meta-analysis. *Sports medicine-open*, *8*(1), 88. https://doi.org/10.1186/s40798-022-00476-1

Duquette, A. M., Senia, M., van Wyk, P. M., Baker, J., Paquin, K. C., & Horton, S. (2022). Re-examining the relationship between measures of static and dynamic balance among young adults. *Current Issues in Sport Science*, *8*(1). https://doi.org/10.36950/2022ciss012

Halabchi, F., Abbasian, L., Mirshahi, M., Mazaheri, R., Pourgharib Shahi, M. H., & Mansournia, M. A. (2020). Comparison of static and dynamic balance in male football and basketball players. *Foot & ankle specialist*, *13*(3), 228-235. https://doi.org/10.1177/1938640019850618

Journal of Physical Education

Volume 38 – Issue (2) – 2026 Open Access

P-ISSN: 2073-6452, E-ISSN: 2707-5729

https://jcope.uobaghdad.edu.iq

Hassan, M. F. A., & Abdulkareem, O. W. (2025). Effects of an Integrated Balance and Muscle Tension Control Training Program on Kinematic Variables and Defensive Accuracy in Volleyball Players. *Journal of Sport Biomechanics*, *11*(4), 438-464. https://doi.org/10.61882/JSportBiomech.11.4.438

Komatni, A. (2022). Effect of learning approach and motor skills on physical fitness. *Journal of Physical Education and Sport*, *22*(9), 2273-2280.

Li, A., Sun, Y., Li, M., Wang, D., & Ma, X. (2024). Effects of elastic band resistance training on the physical and mental health of elderly individuals: A mixed methods systematic review. *PLoS One*, *19*(5), e0303372. https://doi.org/10.1371/journal.pone.0303372

Mayorga-Vega, D., Merino-Marban, R., & Viciana, J. (2014). Criterion-related validity of sit-and-reach tests for estimating hamstring and lumbar extensibility: a meta-analysis. *Journal of sports science & medicine*, *13*(1), 1. https://doi.org/10.4100/jhse.2014.91.18

Muehlbauer, T. (2021). Effects of balance training on static and dynamic balance performance in healthy children: role of training duration and volume. *BMC research notes*, *14*(1), 465. https://doi.org/10.1186/s13104-021-05873-5

Pfeifer, C. E., Ross, L. M., Weber, S. R., Sui, X., & Blair, S. N. (2022). Are flexibility and muscle-strengthening activities associated with functional limitation?. *Sports medicine and health science*, *4*(2), 95-100. https://doi.org/10.1016/j.smhs.2022.03.001

Plisky, P. J., Rauh, M. J., Kaminski, T. W., & Underwood, F. B. (2006). Star Excursion Balance Test as a predictor of lower extremity injury in high school basketball players. *Journal of orthopaedic & sports physical therapy*, *36*(12), 911-919. https://doi.org/10.2519/jospt.2006.2244

Ringhof, S., & Stein, T. (2018). Biomechanical assessment of dynamic balance: Specificity of different balance tests. *Human movement science*, *58*, 140-147. https://doi.org/10.1016/j.humov.2018.02.004

Sánchez-Barbadora, M., Moreno-Segura, N., Medina-Mirapeix, F., & Martín-San Agustín, R. (2025). The effects of a balance training program with and without transcranial direct current stimulation on dynamic balance in recreationally active young adults: a randomized controlled trial. *Applied Sciences*, *15*(4), 1807. https://doi.org/10.3390/app15041807

Stanković, D., Lazić, A., Trajković, N., Okičić, M., Bubanj, A., Vencúrik, T., ... & Bubanj, S. (2025). Effects of Elastic Band Training on Physical Performance in Team Sports: A Systematic Review and Meta-Analysis. *Journal of Functional Morphology and Kinesiology*, *10*(4), 402. https://doi.org/10.3390/jfmk10040402

Tabatabaee, R. A., Rahnama, N., Khayambashy, K., Dehkhoda, M. R., & Shahi, M. H. P. (2019). The effect of ankle theraband training on dynamic balance index among elite male

Journal of Physical Education
Volume 38 – Issue (2) – 2026 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

basketball players. *Asian Journal of Sports Medicine*, *10*(2). https://doi.org/10.5812/asjsm.82011

Yeun, Y. R. (2017). Effectiveness of resistance exercise using elastic bands on flexibility and balance among the elderly people living in the community: a systematic review and meta-analysis. *Journal of physical therapy science*, *29*(9), 1695-1699. https://doi.org/10.1589/jpts.29.1695