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Research

The Effect of Soft Tissue Mobilization and Kinesio Taping on Sportive Performance in Athletes: A Randomized Controlled Trial

Yumuşak Doku Mobilizasyonu ve Kinesio Bantlamanın Sporcularda Sportif Performans Üzerine Etkisi: Randomize Kontrollü Bir Çalışma

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ABSTRACT

Objective: Instrument-assisted soft tissue mobilization (IASTM) and Kinesio tape (KT) applications were suggested in the context of athlete rehabilitation. This study aimed to examine the impact of IASTM and KT on the bilateral hamstring muscles of athletes' balance, agility, and lower extremity explosive power.

Methods: A total of 45 athletes who met the inclusion criteria participated in the study. The participants were allocated to the exercise or the control group using simple randomization with a sealed envelope method. The athletes were divided into three groups. All three groups' balance, agility, and jump-lower extremity explosive strength performances were evaluated in a single session using the single foot stance test, agility t-test, and standing long jump test, respectively, before, immediately after, and one month after the intervention.

Results: There was a significant difference between the IASTM and KT groups for the agility t-test ($p<0.05$). In the IASTM group, an important difference was observed in the duration of the single foot stance test ($p<0.05$). There was no statistically significant difference between the groups in the scores of the single foot stance test, agility t-test, and standing long jump test ($p>0.05$).

Conclusion: The application of IASTM has been demonstrated to enhance balance and agility, while KT has been shown to improve agility in athletes. However, no significant differences were identified between the two methods. IASTM and KT may be useful as complementary methods to existing training programs for athletes, but further research is recommended to determine which is more effective.

Keywords: Therapy, soft tissue, athletes, balance, Kinesio tape

ÖZ

Amaç: Alet destekli yumuşak doku mobilizasyonu (ADYDM) ve Kinezyo bant (KB) uygulamaları sporcu rehabilitasyonu bağlamında önerilmiştir. Bu çalışmanın amacı, ADYDM ve KB'nin bilateral hamstring kaslarına uygulanmasının sporcuların denge, çeviklik ve alt ekstremite patlayıcı gücü üzerindeki etkisini incelemektir.

Gereç ve Yöntem: Çalışmaya dahil edilme kriterlerini karşılayan toplam 45 sporcu katılmıştır. Katılımcılar kapalı zarf yöntemiyle basit randomizasyon kullanılarak egzersiz veya kontrol grubuna ayrıldı. Sporcular üç gruba ayrılmıştır. Her üç grubun denge, çeviklik ve sıçrama-alt ekstremite patlayıcı kuvvet performansları sırasıyla tek ayak duruş testi, çeviklik t-testi ve durarak uzun atlama testi kullanılarak müdahaleden önce, hemen sonra ve bir ay sonra tek bir seansta değerlendirilmiştir.

Bulgular: Çeviklik t-testi için ADYDM ve KB grupları arasında anlamlı bir fark vardı ($p<0,05$). ADYDM grubunda tek ayak duruş testi süresi içinde önemli bir fark gözlendi ($p<0,05$). Tek ayak duruş testi, çeviklik t-testi ve durarak uzun atlama testi puanlarında gruplar arasında istatistiksel olarak anlamlı bir fark yoktu ($p>0,05$).

Sonuç: ADYDM uygulamasının denge ve çevikliği artırdığı, KB'nin ise sporcularda çevikliği geliştirdiği gösterilmiştir. Ancak, iki yöntem arasında anlamlı bir fark tespit edilmemiştir. ADYDM ve KB, sporcular için mevcut antrenman programlarını tamamlayıcı yöntemler olarak faydalı olabilir ancak hangisinin daha faydalı olduğunu belirlemek için daha fazla araştırma yapılması önerilmektedir.

Anahtar Kelimeler: Terapi, yumuşak doku, sporcular, denge, Kinezyo bant

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INTRODUCTION

Athletics is the most prevalent sport in both the Olympic and Paralympic Games (1). As is the case in all branches of sport, optimal sporting performance is a prerequisite for success in athletics. The optimal development of several physiological systems is necessary for successful performance in sports. These include the aerobic and anaerobic metabolic systems, muscle strength, endurance, mobility, balance, speed, and agility (2).

In athletes, balance refers to the ability to maintain postural control during dynamic movements (3). The capacity to maintain equilibrium is a fundamental prerequisite for numerous activities of daily living, including ambulation and functional mobility (3). It has been demonstrated that balance disorders are directly associated with sports-related injuries and reductions in overall athletic performance. The capacity to alter one's trajectory rapidly is a crucial determinant of success in the majority of field and court sports (4). It has been demonstrated that sports that demand a high degree of agility necessitate a change in movement approximately every two seconds. The ability to brake, change direction, and accelerate again is a prerequisite for agility (5). Agility represents one of the most significant physical factors influencing the performance of athletes. The discrepancy in agility test performance can significantly impact the outcomes of athletes in sports where agility is a crucial element (4). The standing long jump is a valuable indicator of lower limb muscle strength and is widely used because it is time-efficient and resource-efficient (6). During jumping activities, several muscle groups are engaged to varying degrees, with the hamstring muscle being one of the most significant contributors to overall performance (7).

One of the most frequently employed therapeutic interventions for the prevention and rehabilitation of sports-related overuse injuries, as well as for the facilitation of optimal warm-up, is instrument-assisted soft tissue mobilization (IASTM). However, despite the widespread use of these techniques by sports therapists, the effectiveness of IASTM remains unclear due to conflicting research findings (8). IASTM represents a widely utilized treatment modality for myofascial limitation. Its principles are derived from those espoused by James Cyriax. This treatment technique is specifically designed to act on the body's deeper tissues (9). The IASTM technique uses instruments, which have been specifically designed to identify and treat myofascial restrictions. The diversity of instruments permits using disparate techniques for instrument movement, employing distinct treatment surfaces, and administering varying intensities of treatment (9).

Among the various techniques for improving athletic performance, Kinesio tape (KT) is a notable intervention method. The breathability, freedom of movement, and a smooth feel are specific features of KT that make it a popular choice for athletes (10). The application of an elastic band in a manner that stimulates the proprioceptors can facilitate improvements in range of motion and thigh muscle function during exercise (10). The potential benefits of elastic banding may include increased body or extremity stability, joint support or protection, correction of body or limb alignment, modification of biomechanics of movement, and support of sensor-motor functions such as proprioception and inhibition of irrelevant sensory input (11). It has been demonstrated that KT is an effective intervention for the prevention of injuries, facilitation of rehabilitation, and improvement of performance. Furthermore, it has been shown to decrease pain, facilitate joint exercises, increase muscle activation, and enhance muscle strength (12). Therefore, we hypothesized that the application of IASTM and KT to track and field athletes would result in improvements in balance, agility, and the explosive power performance of the lower extremity during jumps.

The objective of this study was to examine the impact of IASTM and KT, the bilateral hamstring muscles on balance, agility, and lower extremity explosive strength in track and field athletes.

METHODS

Study Design

This randomized controlled study was conducted between May and July 2024 at the İstanbul Provincial Directorate's of Youth and Sports-affiliated sports health center. Before commencement, ethical approval was obtained from the Üsküdar University Non-Interventional Research Ethics Committee (approval no: 2023-22, date: 31.10.2023) following the Helsinki Declaration. This study was conducted and reported following the Consolidated Standards of Reporting Trials statement. The protocol is registered with http://clinicaltrials.gov/ (NCT06407466). All participants provided written informed consent.

Determination of Sample Size

The statistical power of the sample size was calculated using G*Power version 3.1.9.6 (Heinrich Heine University, Düsseldorf, Germany). It was determined that a sample size of at least 30 is required, with an effect size of 0.95, a significance level of 0.05, and a power of 0.81. Although the minimum required sample size was 30, 45 participants were included to increase statistical power and account for possible dropouts. The research was conducted as a single-blind, randomized controlled study, following the ethical principles outlined in the Declaration of Helsinki and approved by the relevant ethics committee.

Randomization and Blinding

The study was conducted as a single-blind randomized controlled trial following the established principles of research design. The evaluation was conducted in a single-blind manner. Initially, 51 participants were assessed for eligibility. After exclusion due to not meeting the inclusion criteria, a total of 45 athletes, comprising short- and long-distance runners, long jumpers, and shot putters, were randomly assigned to one of three groups: IASTM group (n=15), KT group (n=15), and control group (n=15). This was accomplished using simple randomization. The concealment and randomization were carried out using the sealed envelope method. The physiotherapist recorded the names of all participants on individual pieces of paper and placed them in separate envelopes. Participants were randomly selected, and they were then assigned to either the exercise or control group following the order of selection by the physiotherapist. The study was ultimately concluded with 45 participants (Figure 1).

Participants

The following inclusion criteria were applied: participants must have been engaged in athletic activities for at least six months. They must have participated in regular training (at least three days per week). Additionally, participants must have been between the ages of 10 and 40 years and have volunteered to participate in the study. Informed consent was obtained from the participants above 18 years of age and legal guardians of participants under 16 years of age. Individuals who met any of the following criteria were excluded from participation: a history of injury or acute infection, systemic and metabolic diseases, chronic pain, unhealed or unstable bone fractures, allergies, illnesses, and open wounds on the skin.

Intervention and Procedure

The participants were randomly assigned to one of three groups, with stratification according to gender. All 3 groups continued a systematic training protocol consisting of warm-up, loading, and cool-down phases designed by their club or individual trainers, performed for at least 3 days a week for at least 60 minutes. The first group received IASTM, while the second group received KT. Group 3, the control group, did not receive any additional treatment. The balance, agility, and lower extremity explosive strength performance of all three groups were evaluated before, immediately after, and one month after the intervention in a single session using the single foot stance test, agility t-test, and standing long jump test, respectively. A three-minute rest period was allowed between the tests to prevent fatigue. All treatment procedures were performed by a relevant certified physiotherapist.

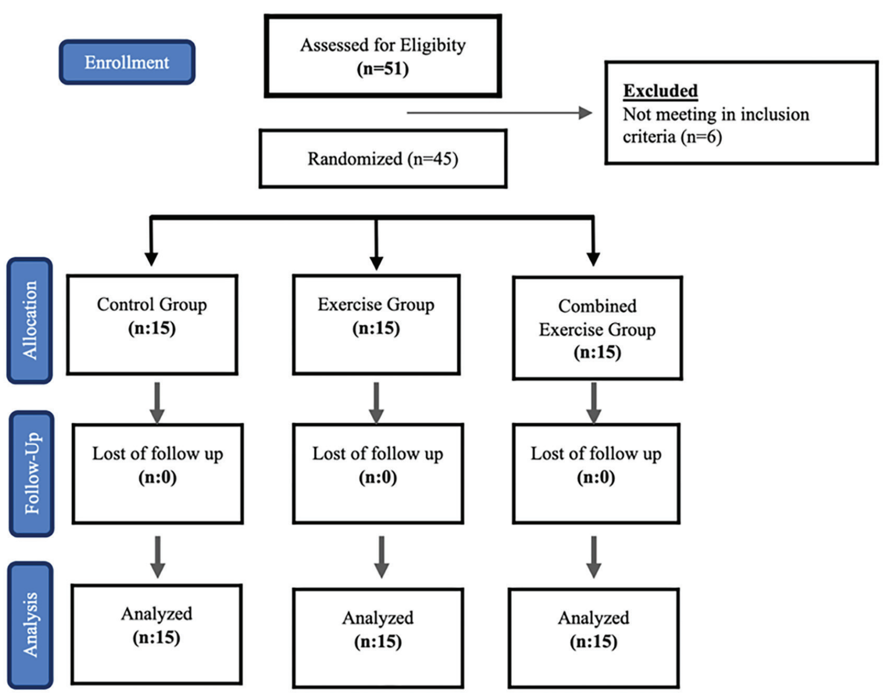

Figure 1. CONSORT flowchart of the study

IASTM (Graston Technique) Application

IASTM application was performed before training on a bed with the athlete in a prone position, with the lower extremities in a neutral position. A hazelnut-sized lubricant was applied to the working surface; and a muscle-appropriate shaped tool was selected and applied to the skin on the back of both upper legs for 5 minutes, targeting tissue structures (hamstring and deep fascia covering this muscle). The instrument was used at a 30° to 45° angle using sweeping strokes in all directions with moderate pressure. The pressure and speed were adjusted according to the participant's tolerance levels to avoid causing discomfort (Figure 2).

KT Application

The athletes were instructed to clean the area to be treated with KT and to refrain from using any topical substances, including creams, on the treated area for at least 24 hours prior to the application of the tape.

To induce both hamstring muscles before training in the group with KT application, both iliotibial bands (Kindmax Inc., Irvine, CA, USA) were applied to both legs, with 30% stretching from the medial and lateral sides, starting from the ischial tuberosity to the border of the popliteal fossa. This was done while the participant was standing and the trunk was flexed to ensure hip flexion (Figure 3).

Figure 2. IASTM application to hamstrings
IASTM: Instrument assisted soft tissue mobilization group

Outcome Measurements

The primary outcome measure of this study was the examination of the impact of IASTM and KT applications on athletes' balance. The secondary outcome measures assessed the effect of these treatments on athletes' agility and lower extremity explosive power. These outcomes were measured at the outset and conclusion of the study using the following questionnaires.

The Unipedal Stance Test

It is a static balance test. To complete the test, participants were required to adopt a unipedal stance, with one foot selected as the point of support. The other foot was raised, with minimal contact between the ankle and the floor, and the arms were crossed over the chest. During the test, the subject was instructed to focus on a point at eye level. Once the participant had lifted their foot off the floor, the time was recorded using a stopwatch. The time was calculated until the participant exhibited one of the following behaviors: using their arms (i.e., not crossing the arms), the raised foot, or the weight-bearing foot to maintain balance. The procedure was repeated on three occasions, and the best result from the three trials was recorded. A five-minute

Figure 3. KT application to hamstrings
KT: Kinesio tape group

interval was permitted between each set of trials to prevent the onset of fatigue (13).

Agility T-test

The agility t-test comprises four contact points arranged in a t-shape within an area measuring 10 meters in length and 10 meters in width. The objective is to complete a series of movements in different directions between the contact points in the shortest possible time. The distinguishing feature of this test is that the subject is required to maintain a fixed direction of gaze throughout. The subject may change direction by sliding steps to the right or left or by running backward. The test necessitates the completion of one 90° turn and one 180° turn, in addition to traversing a total distance of 40 meters (10 meters in a forward direction, 10 meters to the right, 10 meters to the left, and 10 meters in a backward direction) (14). If the subject failed to make contact with any of the designated cones, execute the required sideways movement, or change direction at the appropriate time, the trial was not recorded, and the subject was required to repeat the trial. The data were analyzed using the mean value derived from the three trials.

Standing Long Jump Test

The standing long jump test is an assessment of lower extremity explosive strength. The individual is instructed to jump from a bipedal standing position as far as possible in a forward direction (i.e., horizontally in the sagittal plane), and to maintain this position for functional purposes (15). The participant conducted the test at the designated starting point with both feet planted firmly on the ground and propelling themselves with a thrust of both legs. The distance from the front of the jump line to the final point of body contact was measured in centimeters and recorded. The feet must remain in contact with the ground until the jump is initiated. The optimal score was achieved by performing a minimum of three repetitions for evaluation purposes.

Statistical Analysis

All data were recorded and analyzed using the IBM SPSS Statistics 22 software package for Windows (Armonk, NY, USA). Due to the limited sample size (n=15), non-parametric tests were employed for the data analysis. In this context, the Kruskal-Wallis H test was employed for comparing more than two independent groups, while the Friedman test was utilized for comparing more than two dependent measurements. A significance level of 0.05 was employed to determine statistical significance. Bonferroni tests were employed as multiple comparison tests, and the statistical significance level was determined to be 0.017.

RESULTS

This was a randomized clinical study with 45 athletes conducted between May and July 2024. Following the group allocation, all participants engaged in the exercise programs throughout the study period. Table 1 presents the variables—gender, age, age at the commencement of participation in sports, height, and body weight—by group. No statistically significant difference was observed between the gender, age, age at the commencement of participation in sports, height, and body weight variables of the 45 participants included in the study ($p>0.05$) (Table 1).

The results of the single-foot stance test for the control and KT groups indicate no statistically significant difference between the intra-time measurements ($p>0.05$). A statistically significant difference was observed between the intra-time measurements of the single-foot stance test in the IASTM group ($p<0.05$). The Bonferroni multiple comparison test was employed to ascertain the specific time points at which the observed difference occurred. The results indicated that the single-foot stance test values obtained following the application were significantly higher than those recorded before the application (Table 2).

Table 1. Socio-demographic information of the participants

Variables		IASTM (n=15)	KT (n=15)	C (n=15)	p[a]
		n (%)	n (%)	n (%)	
Sex	Female	8 (53.33)	8 (53.33)	7 (46.67)	0.91
	Male	7 (46.67)	7 (46.67)	8 (53.33)	
		X±SD	X±SD	X±SD	
Age (years)		17.53±2.77	17.6±2.92	19.6±3.14	0.10
Age of starting sport (years)		11.73±2.79	10.87±2.88	11.47±2.95	0.70
Height (cm)		170.93±11.22	170.2±1.47	174.8±7.95	0.43
Weight (kg)		59.2±15.61	58.13±12.56	65.0±12.99	0.35

$p<0.05$, [a]: Chi-square test, X: Mean, SD: Standard deviation, n: Number of people, cm: Centimeter, kg: Kilogram, IASTM: Instrument assisted soft tissue mobilization group, KT: Kinesio tape group, C: Control group

There is no statistically significant difference between the intra-time measurements of the agility t-test in the control group (p>0.05). There is a statistically significant difference between the intra-time measurements of the agility t-test in the IASTM group (p<0.05). When the difference was analyzed by the Bonferroni multiple comparison test, it was found that the agility t-test values measured after the application were significantly lower than the values measured before the application; they were also significantly lower than the values measured 1-month after the application. There is a statistically significant difference between the measurements taken during the agility t-test in the KT group (p<0.05). When the difference was analyzed by the Bonferroni multiple comparison test, it was found that the agility t-test values measured after the intervention were significantly lower than the values measured before the intervention (Table 2).

The results of the standing long jump test in the control group demonstrated no statistically significant difference between the intra-time measurements (p>0.05). No statistically significant difference was observed between the repeated measurements of the standing long jump test in the IASTM and KT groups (p>0.05) (Table 2).

No statistically significant difference was observed between the groups in the scores of the single foot stance test, agility t-test, and standing long jump test (p>0.05).

The results of the IASTM group single-leg stance test over time, as well as the associated statistical information, are presented in Figure 4.

The results of the IASTM group agility t-test over time, as well as the associated statistical information, are presented in Figure 5.

The results of the agility t-test, which provides statistical information about changes in time within the KT group, are presented in Figure 6.

DISCUSSION

The objective of this study was to examine the impact of IASTM and KT on bilateral hamstring muscles, balance, agility, and jump-lower extremity explosive power performance in track and field athletes. The findings of the study indicated that IASTM enhanced balance and agility, while KT was associated with improved agility in track and field athletes. Nevertheless, no discernible difference was noted between the two intervention methods.

One of the areas in which IASTM is applied to the lower extremity is the hamstring muscle group. Tension in the hamstrings affects the biomechanics of the lower extremities, reducing the efficiency of movements and disrupting the load balance on the lower extremity joints.

Table 2. Findings related to single foot stance test, agility t-test, and standing long jump test measurements

Variables		IASTM (n=15)	KT (n=15)	C (n=15)	p^b
		X±SD (min-max)	X±SD (min-max)	X±SD (min-max)	
Unipedal stance test (sec)	BI	149.80±96.70 (25-335)	180.47±111.42 (5-430)	210.73±74.82 (60-347)	0.14
	AI	194.07±96.77 (57-400)	211.07±131.60 (18-444)	198.53±79.82 (70-310)	0.96
	1-month later	171.20±75.49 (70-343)	177.93±100.98 (20-338)	192.60±91.37 (65-332)	0.84
	p^c	**0.03 difference =1<2**	**0.42**	**0.42**	
	AI-BI	21.40±72.16 [(-89)-201]	-2.53±93.39 [(-215)-190]	-18.13±67.07 [(-168)-131]	0.24
Agility t-test (sec)	BI	11.75±1.58 (10-15)	11.78±1.54 (9-14)	11.49±0.85 (10-14)	0.94
	AI	11.09±1.42 (9-14)	11.28±1.46 (9-15)	11.54±0.89 (10-14)	0.54
	1-month later	11.62±1.67 (9-15)	11.81±1.73 (9-15)	11.42±0.60 (11-12)	0.87
	p^c	**0.00 difference =2<1.3**	**0.02 difference =2<1**	**0.77**	
	AI-BI	-0.13±0.48 [(-1)-1]	0.03±0.63 [(-1)-1]	-0.07±0.66 [(-2)-1]	0.56
Standing long jump test (cm)	BI	246.47±42.22 (174-302)	234.27±43.70 (160-316)	242.07±21.22 (216-277)	0.44
	AI	246.33±44.16 (163-313)	230.27±45.54 (157-311)	240.47±23.22 (212-281)	0.33
	1-month later	240.67±43.63 (176-305)	229.07±44.33 (163-322)	237.80±24.28 (195-275)	0.6
	p^c	**0.77**	**0.48**	**0.38**	
	AI-BI	-5.80±15.59 [(-52)-11]	-5.20±11.31 [(-33)-7]	-4.27±9.34 [(-23)-11]	0.98

$p<0.05$, ^{b}: Kruskal-Wallis H test. ^{c}: Friedman test, X: Mean, SD: Standard deviation, n: Number of people, cm: Centimeter, sec: Second, min: Minimum, max: Maximum, BI: Before intervention, AI: After intervention, IASTM: Instrument assisted soft tissue mobilization group, KT: Kinesio tape group, C: Control group, pb: Intra-group comparison, pc: Intra-group comparison

Additionally, it causes an increased load on the knee joint. The application of IASTM has been demonstrated to be an efficacious approach in the management of hamstring tension (16). This physiological mechanism may explain the observed increase in balance scores following IASTM application in our sample.

In a study, it was reported that the application of IASTM to the gastrocnemius, soleus, and Achilles tendon for four sessions per week for eight weeks (17). Furthermore, it has been documented that IASTM can be employed in the context of sports preparation with the objective of enhancing muscle response and explosive force production, improving neuromuscular efficiency, and optimizing athletic performance (18). The results of our study align with existing literature on balance in the IASTM group. We hypothesized that IASTM improves balance indirectly through enhancement of proprioceptive sensations. Agility is regarded as a crucial component of physical fitness in sports that necessitate a diverse range of movements.

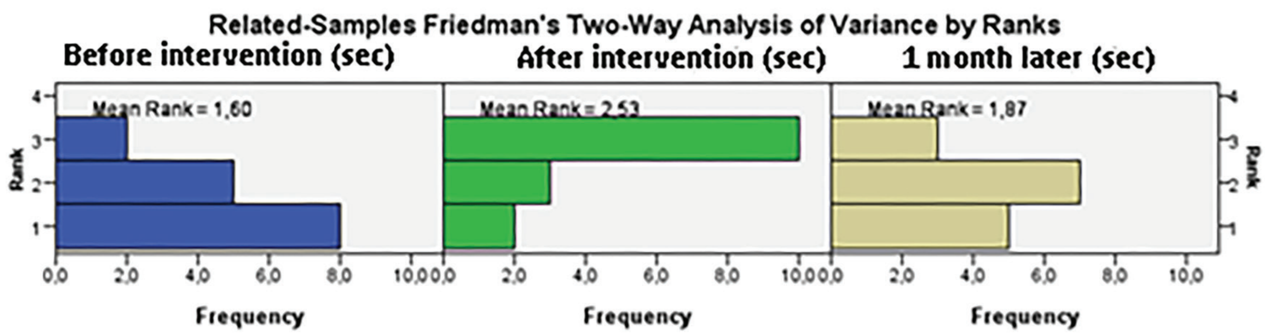

Figure 4. IASTM group single-foot stance test changes over time
IASTM: Instrument assisted soft tissue mobilization group

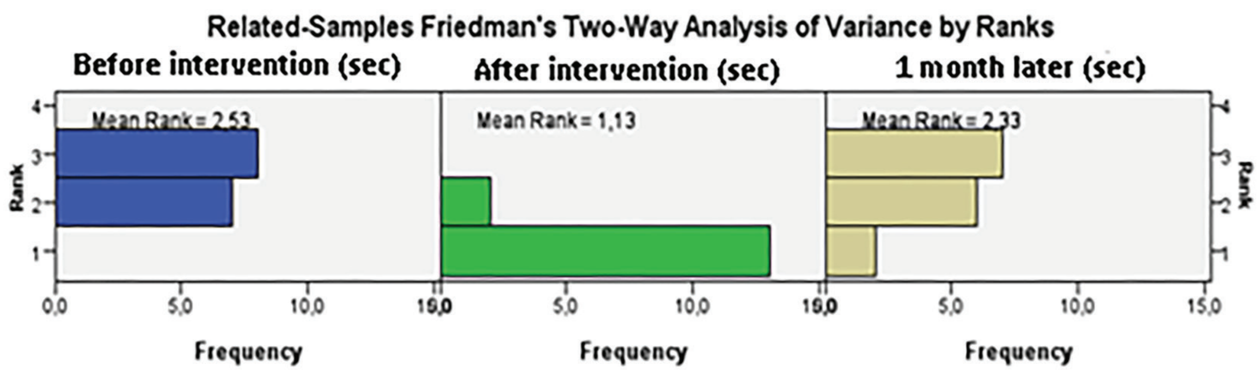

Figure 5. IASTM group agility t-test changes over time
IASTM: Instrument assisted soft tissue mobilization group

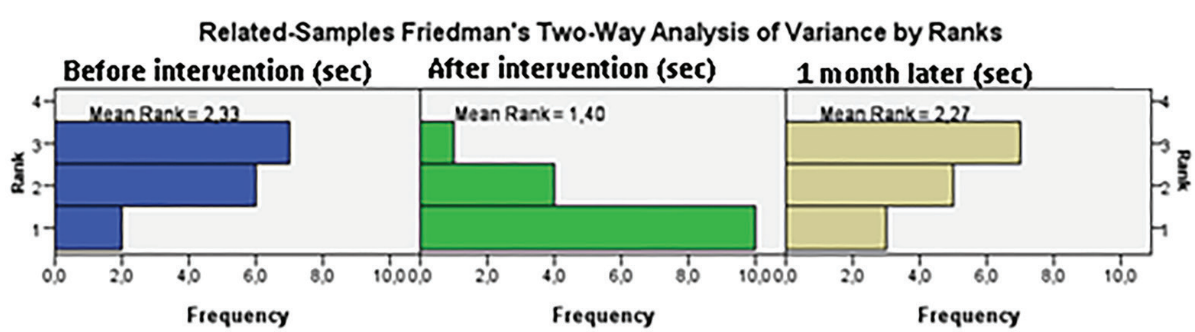

Figure 6. KT group agility t-test changes over time
KT: Kinesio tape group

A reduction in agility is a contributing factor to injuries sustained during competitive events. The enhancement of flexibility can improve agility and maintain technical fitness (19). In a study, it was demonstrated that the application of IASTM to bilateral hamstring muscles five minutes resulted in a favorable acute impact on agility (20). The results of our study align with existing literature on agility in the IASTM group. The observation that IASTM has the same effects as warm-up exercises may be indicative of enhanced agility. The results substantiated Laudner's assertion that IASTM rehabilitation impacts physical activity performance by stimulating the muscular and nervous systems (9) and soft tissues. Given that diminished flexibility and muscle strength can impede agility, it is imperative to maintain flexibility and muscle strength throughout the seasons to prevent a decline in agility (21). In a single study, the impact of IASTM, applied for a period of three minutes, on muscle performance was evaluated through the measurement of vertical jump height, peak power, and peak velocity. The findings indicated that there was no statistically significant difference between the IASTM group and the control group (22). The results of our study on jump performance in the IASTM group are in accordance with the findings of previous research in this field. It was highlighted that IASTM may necessitate a longer treatment duration, augmented pressure during application, or multiple treatments to achieve a significant improvement in measures such as vertical jump performance (22). We believe that further research is needed to determine the effect of IASTM on muscle performance.

In light of the various factors that may influence the athletic performance of professional athletes, it can be posited that even minor alterations may confer a competitive advantage to athletes. A review of the literature reveals a divergence of opinions regarding the impact of KT application on performance. It is hypothesized that these effects may vary depending on the specific muscles to which the tape is applied and differences in application techniques (23). The results of a study conducted on athletes specializing in jumping events revealed that the application of KT to the gastrocnemius muscle, using facilitation and inhibition techniques, did not result in any discernible acute effects on vertical jump height and lower extremity explosive power (24). In a separate investigation, no notable discrepancy was observed in jump height between the KT and control groups. However, an increase in ground reaction force was noted in the KT group, along a vertical trajectory (25). In a study conducted on healthy athletes, Nunes et al. (26) found that KT did not affect balance performance. The results of our study are in accordance with the existing literature concerning the relationship between balance and jump performance in the KT group. In light of the assertion that, thus far, there is no evidence to suggest that KT exerts any influence on motor control, this may help elucidate the absence of an effect of KT on balance and jump performance in the present study. It has been documented that KT can elevate body temperature, thereby enhancing neuromuscular function and, subsequently, agility (27). In a single study, an enhancement in agility was documented in track and field athletes following the administration of KT (20). The results of our study on agility performance in the KT group are in accordance with the findings of previous research in this field.

In their study on the effect of KT and IASTM, Grase et al. (28) found no significant difference between the groups in terms of pain, pain pressure threshold, range of motion, and function. Gandhi et al. (29) identified a statistically significant discrepancy in maximum grip strength when comparing the IASTM and KT groups with the control group. However, no significant divergence was observed between the IASTM and KT groups. The findings of Kurt et al. (20) indicated that both IASTM and CT applications yielded favorable acute outcomes with respect to balance and agility. Furthermore, no discernible superiority was observed between the two techniques (20). The findings of our study indicate that IASTM enhances balance and agility performance, while KT has a positive impact on agility performance in track and field athletes. Our results suggest that the two interventions have comparable effects, although further research is necessary to substantiate these observations. Improvements in fascial layer slippage, increased skin temperature, and decreased collagen resistance may be observed following IASTM treatments (8). The favorable effects of IASTM on balance and agility can also be attributed to neurophysiological mechanisms, as it has been demonstrated to stimulate intra-fascial mechanoreceptors, resulting in altered proprioceptive input to the central nervous system, and a global reduction in muscle tone of the affected muscle groups (30). The beneficial impact of KT on agility can be attributed to the enhancement of functional performance through the optimization of neuromuscular and joint capabilities (8).

Study Limitations

Should our findings be corroborated by future studies, they would represent a significant contribution to the fields of athlete preparation and sports injury prevention. This is because balance, agility, and jumping are prerequisites for optimal performance and injury prevention in athletics. The observed non-significant effects may also be explained by the relatively small sample size of the study. Additionally, the outdoor setting in which the assessments were conducted may have resulted in inconsistencies in the environmental factors (air temperature, wind, humidity, sunlight and brightness, noise, etc.) to which the participants were exposed, potentially affecting the reliability of the results. Moreover, the dynamic application of these techniques during functional movements may result in neurophysiological adaptations that enhance functional performance. Therefore, we recommend that future studies evaluate dynamic and functional applications in different sports disciplines using larger samples of athletes.

CONCLUSION

IASTM can effectively enhance balance and agility, while KT can improve the agility of track and field athletes. Nevertheless, no notable discrepancies were discerned between the two methodologies. In light of the findings presented here, it is recommended that IASTM and KT be employed as supplementary interventions in conjunction with existing training programs for athletes.

ETHICS

Ethics Committee Approval: Before commencement, ethical approval was obtained from the Üsküdar University Non-Interventional Research Ethics Committee (approval no: 2023-22, date: 31.10.2023) following the Helsinki Declaration.

Informed Consent: All participants provided written informed consent.

FOOTNOTES

Authorship Contributions

Surgical and Medical Practices: D.K., Ö.Ş., Consept: D.K., Ö.Ş., Design: D.K., B.D.H., Ö.Ş., Data Collection or Processing: D.K., B.D.H., B.B., Analysis or Interpretation: D.K., B.D.H., B.B., Literature Search: D.K., B.D.H., Ö.Ş., B.B., Writing: D.K., B.D.H., B.B.

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