International Journal of Sport Culture and Science
March 2023 : 11(1)
ISSN : 2148-1148
Doi : 10.14486/IntJSCS.2023.673

Foam Rolling in Team Sports

Buse DELEN[1], Şebnem ŞARVAN CENGİZ[2], Hayal ÖRCÜTAŞ[1]

[1] Manisa Celal Bayar University, Graduate School of Health, Manisa, Turkiye
https://orcid.org/0000-0002-8045-3143
[2] Manisa Celal Bayar University, Faculty of Sport Sciences, Manisa, Turkiye
https://orcid.org/0000-0002-2916-4784
[1] Manisa Celal Bayar University, Graduate School of Health, Manisa, Turkiye
https://orcid.org/0000-0002-4665-9623

Email: bsdelen@gmail.com , csebnem@gmail.com, hayalorcutass@gmail.com

Type: Review Article (Received: 22.08.2022 – Accepted: 30.12.2022)

Abstract

In the main part of the training, different protocols are used for the warm-up sessions for the basic biomotor characteristics that are desired to be exercised (Lee et al., 2018). The person transfers his/her body weight onto the foam roller (FR) to loosen the different parts of the soft tissue and prevent restrictions. FR is known to help improve muscle length-tension relationships and provide a better warm-up (Healey et al., 2013).

Within the scope of our research, ‘’PubMed, GoogleScholar, Web of Science, Scopus, YökTez, and Elsevier’’ databases were used. By including the studies done in the last five years in our research, 5 different keywords were used for national and international databases in the literature review. Studies were examined using the keywords ‘’self-myofascial release, range of motion, team sports, dynamic stretching, massage’’. In our research, as a result of the literature review, four team sports were categorized as ‘’volleyball, football, handball, and basketball’’.The aim of this review is the studies conducted between 2017-2022. The aim of this study is to examine the effect of FR applications on performance parameters in team sports.As a result, it was determined that the application of FR in addition to the warm-up session affected various performance parameters, increased the range of motion in the upper and lower extremity muscles, and positively affected the sportive performance at this point.

Keywords: self-myofascial release, range of motion, team sports, dynamic stretching, massage

Öz

Antrenmanların ana bölümünde çalıştırılmak istenilen temel biyomotor özelliklere yönelik ısınma seansları için farklı protokoller kullanılmaktadır (Lee ve ark., 2018). Kişi, vücut ağırlığını ilgili yumuşak dokunun farklı bölgelerini gevşetmek ve kısıtlılıkları engellemek amacıyla köpük silindirin üzerine aktarır. Köpük silindiri yuvarlama işleminin kas uzunluğu–gerginlik ilişkilerini düzeltmeye yardımcı olup daha iyi bir ısınma sağladığı bilinmektedir. (Healey ve ark., 2013).

Araştırmamız kapsamında 'PubMed, GoogleScholar, Web of Science, Scopus, YökTez, ve Elsevier' veri tabanları kullanılmıştır. Araştırmamıza son beş yıl içerisinde yapılan çalışmalar dahil edilerek literatür taramasında ulusal ve uluslararası veri tabanları için 5 farklı anahtar kelime kullanılmış, tarama yapılırken ulusal veri tabanları için 'Fasya, ısınma periyodu, esneklik, köpük rulo uygulaması ve takım sporları', yabancı veri tabanları için ise 'self-myofascial release, range of motion, team sports, dinamic stretching, massage' anahtar kelimeleri kullanılarak çalışmalar incelemeye alınmıştır. Araştırmamızda litaretür taraması sonucunda 'voleybol, futbol, hentbol ve basketbol' olarak dört takım sporu kategorize edilmiştir.Çalışmamızın amacı 2017-2022 yılları arasında yapılmış olan çalışmalarda; foam roller uygulamalarının takım sporlarında, performans parametreleri üzerine olan etkisinin incelenmesidir.Sonuç olarak, ısınma seansına ek olarak FR uygulamasının çeşitli performans parametrelerini etkilediği, üst ve alt ekstremite kaslarındaki hareket açıklığını arttırdığı ve bu noktada sportif performansı olumlu yönde etkilediği belirlenmiştir.

Anahtar Kelimeler: foamroller (fr), myofasiyal gevşetme teknikleri, esneklik, eklem hareket açıklığı, takım sporları

Introduction

Stretching exercises are thought to improve physical performance, prevent injuries and increase flexibility (Bradley, Olsen, & Portas 2007). Exercises for the protection and development of flexibility and related joint range of motion are very important for both musculoskeletal health and the general physical fitness of the individual (Bradley et al., 2007). One of the physical techniques acting on the tissue, ¨Myofascial (myo-connective tissue) release¨ (Manheim, 2008), has been used in many disability situations until today, and has become widespread in the physical therapy and manipulative treatment circles by Barnes (1997) (Barnes, 1997).

Today, it is also defined as the "myofascial release" technique. In technical terms, myofascial release is expressed as a gradual stretch (stretch) applied by a therapist to soft tissues, which is used to remove the restrictions in soft tissues with varying application angle, strength, and duration for the feedback phase in the muscles of the applied person (Manheim, 2008).

Myo-fascial relaxation (MG) through Foam Roller (FR) is a form of massage practiced (physical, occupational, athletic) and encouraged by therapists together with functional movement and sports professionals. FR is used as a warm-up, recovery, and maintenance technique targeting soft tissue to improve joint range of motion (EHG) and optimize muscle function (Macdonald et al. 2013).

Our research aims to examine the effect of myofascial release techniques applied with Foam Roller on team sports in studies conducted within the scope of the literature.

Material and Method

Within the scope of our research, ‘’PubMed, GoogleScholar, Web of Science, Scopus, YökTez, and Elsevier’’ databases were used. By including the studies done in the last five years in our research, 5 different keywords were used for national and international databases in the literature review. Studies were examined using the keywords ‘’self-myofascial release, range of motion, team sports, dynamic stretching, massage’’. In our research, as a result of the literature review, four team sports were categorized as ‘’volleyball, football, handball, and basketball’’.

Findings

Table 1. Literature Review of Foam Roller Applications on Footballers Between 2017-2022

Article	Results
The Effect of Myofascial Relaxation Technique on the Speed and Accuracy of the Ball in Young Football Players (Yazıcı, 2018)	According to the research results, it has been determined that the SMR application, which is applied in addition to the warm-up protocol, creates a significant difference in terms of ball speed, which is one of the determining game performance criteria in young male football players.

Comparison of Acute Effects of Dynamic Stretching and Myofascial Release on Lower Extremity Temperature, Flexibility, Balance, and Agility in Recreational Male Football Players (Seçer & Özer, 2021)	According to the research results, lower extremity warmth, flexibility, and agility of dynamic stretching alone; dynamic stretching and SMR methods were found to increase lower extremity temperature, flexibility, balance, and agility. In line with these results, it was thought that it should be taken into account during the warm-up protocols.
Acute Effect of Self-Myofascial Relaxation Exercises Using Foam Roller on Flexibility and Lower Extremity Strength (Yitik & Ateş, 2018)	According to the research results, it has been determined that 30-second SMR exercises applied to the lower extremities have no effect on vertical jump and flexibility performance, longer rolling times and different performance parameters should also be tested.
Acute Effects of Different Warm-Up Protocols on Squat Force Values: Comparison of Myofascial Relaxation Method and Force-Based Warm-Up Methods (Edis et al., 2021)	According to the results of the research, it has been determined that the use of such warm-up sessions before the measurements to be made with the heel lift applications used to eliminate the distortions in the collapse phase of the movement in the 1TM squat strength measurements of the amateur footballers will help to obtain more effective test results.
Investigation of the Effects of Foam Roller and Kinesiotape Applications on Performance Parameters, Pain, and Fatigue (Karabağ, 2022)	According to the research results, it has been determined that FR application is more effective than KT application in improving flexibility, agility and fatigue parameters, and it is important for athletic trainers and coaches to prefer FR application in addition to dynamic warm-up in order to prevent time loss in training and to get more efficiency from training.
An Investigation of the Effects of Self-Applied Myofascial Relaxation Movements on Acute Flexibility, Strength and Balance in Volleyball and Football Players (Alim, 2021)	According to the research results, it has been determined that FR equipment increases the flexibility of the latissimus dorsi muscle and the range of motion of the shoulder joint for football players and volleyball players in applications for use in training or competitions. In volleyball players, it was determined that the upper extremity strength increased after the roles, and it contributed positively to these characteristics.
Foam Rolling During a Simulated Half-Time Attenuates Subsequent Soccer- Specific Performance Decrements (Kaya et al., 2021)	According to the research results, it has been determined that FR application significantly reduces the sprint time in football players and has a positive effect on performance.
The Effects of Foam Roll on Perceptual and Performance Recovery During a Futsal Tournament (Rahimi et al., 2020)	According to the research results, it has been determined that FR improves physical performance in futsal tournaments and increases the level of lactad.
The Effects of Foam Rolling on Maximum Sprint	According to the research results, there was no

Performance and Range of Motion (Miller, 2017)	significant difference in sprint times after FR exercises. However, it has been determined that FR applications can be important in athletes who need acute range of motion without a later decrease in performance and can show an effective result in terms of performance criteria.
The Acute Effects of Foam Rolling on Ankle and Knee Range of Motion, Hamstring Flexibility, Agility, and Vertical Jump Height (Henning et al., 2019)	According to research results, it has been determined that FR exercises increase ankle and knee joint flexibility.
Effects of Foam Rolling on Ankle Joint ROM and Hamstring Flexibility (Brengesjö et al., 2017)	According to the research results, no difference was found between the control group and the training group. It has been determined that the studies on the tissue around the muscle should be increased.
Acute Effects of Dynamic and Fifa+11 Warm-Up Methods on Flexibility, Vertical Jumping and Agility Performances of Football Players (Güler, 2019)	According to the research results, it has been determined that the dynamic and FIFA 11+ warm-up protocols have a positive effect on vertical jump and body surface temperature.
The Effects of Dynamic and Static Stretching Exercises Applied in the Warm-Up Session on Performance (Polat et al., 2019)	According to the research results, Dynamic stretching movements applied in warm-up sessions for 6 weeks revealed that compared to static stretching movements, it had a more positive effect on speed and direction changing runs, while the results of SS type had more positive effects on joint range of motion.
The Effects of 8-Week Static Stretching Training on Jumping Performance in Football Players (Yaşlı & Müniroğlu, 2019)	According to the research results, it has been determined that chronic stretching trainings have a positive effect on jump strength in amateur football players.
Acute Effects of Different Warm-Up Protocols on Athlete Performance (Topçu, 2017)	According to the research results, statistically significant regression in anaerobic power and speed tests and significant improvement in flexibility were detected in football players who were applied stretching exercise protocol. When the results of the research findings are examined, it is thought that warm-ups with plyometric and suspension exercises will be more beneficial in sports that require jumping and speed, and warm-ups that include stretching exercises in sports that require flexibility.
Investigation of the Effects of Special Exercises Included in the Programs of a Football Team on Flexibility Values at the End of the Training Process (Cabacı & Taşkıran, 2021)	According to the research results, it has been determined that flexibility exercises applied in football players between the ages of 18-25 have improved the flexibility value.
Investigation of the Effect of Self-Myofascial Release Techniques Applied to Plantar Fascia on	According to the research results, it was observed in this study that there was a statistically significant

Hamstring Flexibility in Young Football Players (Torun et al., 2021)	increase in flexibility value after SMR application ($p<0.05$) and self-myofascial release applications applied before warm-up exercises increased acute flexibility performance.
Acute Effects of Applied Local Vibration During Foam Roller Exercises on Lower Extremity Explosive Strength and Flexibility Performance (Sağıroğlu,2017)	According to the research results, it was determined that vibrating FR exercises created a statistically significant difference in both vertical jump and flexibility performance.
The Effects of Vibration Foam Roller Applied to Hamstring on the Quadriceps Electromyography Activity and Hamstring Flexibility (Lim et ve ark., 2019)	According to the results of the research, it has been determined that vibrating FR exercises have a positive effect on hamstring muscle flexibility and cause EMG activation in antagonist muscles.
Effects of Foam Roller Application on Hamstring Muscle Performance (Dönmez, 2019)	According to the research results, It has been determined that the foam roller application is acutely effective in performing higher repetitions from SMR than TD for all sets, and this effect will reduce fatigue for long sets and the foam roller will contribute to the strength development in the long term by keeping the motor unit participation higher in the sets.
Acute Effects of Different Stretching Methods Applied by Footballers in Warm-Up on Vertical Jump, Speed and Agility Performance (Gürses & Akgül, 2019)	According to the research results, It has been determined that the stretching activities applied by amateur football players for 10-12 minutes during warm-up do not have an acute effect on their short-term high-intensity performance.
Acute Effect of Foam Roller Applıed At Dıfferent Frequency Levels On Flexıbılıty In Amputee Players (Günaydın, 2021)	According to the research results, It has been determined that the FR application applied at different frequency levels is an effective method to increase the normal joint movement and the frequency increase does not have an effect on flexibility.
The Acute Effects of Combined Foam Rolling and Static Stretching Program on Hip Flexion and Jumping Ability in Soccer Players (Kyranoudis ve ark., 2019)	According to the research results, It has been determined that short-term static stretching does not adversely affect joint range of motion and jumping performance, and training using static stretching and FR improves.
Effects Of Foam Rollingas A Recovery Tool In Professional Soccer Players(Rey et al., 2017)	According to the research results, It was found that FR had a greater effect on agility and recovery in perceived muscle soreness compared to the passive recovery group 24 hours after training.

Influence of Dynamic Stretching and Foam Rolling on Vertical Jump (Kopec et al., 2017)	According to the research results, It was determined that FR exercises applied to hamstring and quadriceps muscles together with DS were effective on vertical jump parameter. But no significant was detected.
Acute And Chronic Effects of Foam Rolling vs Eccentric Exercise On ROM and Force Output Of The Plantar Flexors (Aune et al., 2019)	According to the research results, It has been determined that eccentric exercises applied together with FR improve and improve ROM. While eccentric exercises showed an increase in both acute and chronic ROM for dorsiflexion, foam roller exercises were found to cause only acute improvement. As a result, it was determined that eccentric exercises were more effective than foam roller exercises.
Acute Outcomes of Myofascial Decompression (Cupping Therapy) Compared to Self-Myofascial Release on Hamstring Pathology After A Single Treatment (Warren et al., 2020)	According to the research results, SMR has been found to be beneficial in increasing hamstring length.

In the last five years, in the studies made by the football players of the experimental group and using foam roller; It was determined that myofascial release exercises applied in addition to the warm-up protocol made a significant difference in terms of performance criteria on the infrastructure and amateur league football players, but the 30-second self-myofascial release technique (SMR) applied to the lower extremities did not have a decisive effect on vertical jump and flexibility performance. In line with these results, it was thought that longer rolling times and performance parameters should be tested. However, only the lower extremity temperature, flexibility, and agility of dynamic stretching; It has been determined that myofascial release methods in addition to dynamic stretching affect balance performance in addition to all parameters. When other literature studies are examined, myofascial relaxation methods applied in addition to the warm-up protocol in the football branch make a significant difference in terms of ball speed, which is one of the determining game performance criteria in male football players, and myofascial relaxation methods applied together with dynamic stretching increase lower extremity temperature, flexibility, balance and agility, and fatigue. It has been determined that it is more effective than the KinesioBand application in improving the parameters. In other studies in the literature, it has been emphasized that FR exercise application before strength measurements can have a positive effect on the results and that foam roller application increases flexibility, especially on the hamstring muscle in football players.

Table 2. Literature Review of Foam Roller Applications on Volleyball Players Between 2017-2022

Article	Results
The Effect of Neuromuscular Exercises and Graston Myofascial Relaxation Technique on Vertical Jumping (Agile, 2021)	According to the research results It has been determined that plyometric and neuromuscular exercises supported by the graston technique have a positive effect on vertical jump, flexibility, and balance parameters.
The Effect of Static Stretching, Dynamic Stretching and Stretching with Foam Roller on Performance in Amateur Volleyball Players (Çakmak, 2021)	According to the research results, DS and FR, and SMR were found to be effective for vertical jump and lower extremity leg strength.
Acute Effects of Static Stretching Applications on Vertical Jumping Agility and Speed Performance of Volleyball Players (Demir, 2018)	It has been determined that static stretching exercises affect speed and agility performance negatively, and active and squat vertical jump performance positively.
Acute Effect of Self-Administered Myofascial Relaxation Exercise Time on Vertical Jump Performance and Flexibility in Well Trained Female Volleyball Players (Ali, 2019)	According to the research results, it was determined that both 30 and 60 second duration FR exercises had similar effects and did not have a negative effect on flexibility and vertical jump performance when compared to the control group. For this reason, FR exercises can be used by athletes as an alternative warm-up tool before training or competitions.
Acute Effects of Foam Roller Exercises in addition to Dynamic Stretching Exercises in the Warm-Up Protocol on Countermovement Jump and Squat Jump Performance in Regional League Female Volleyball Players (Beyleroğlu et al., 2021)	According to the research results, it has been determined that FR application in female volleyball players has a positive effect by increasing the results of SJ and CMJ. When the findings of the research are examined, it is thought that it may be beneficial to include FR practice in addition to the stretching exercises performed during the warm-up periods before the training and competition.
The Effect of Acutely Applied Different Stretching Exercises on Vertical Jump Performance in Female Volleyball Players (Durukan & Göktepe, 2020)	According to the research results, A significant difference was found in the jumping performances of female volleyball players after static, dynamic, and PNF stretching exercises. ($p>0.05$)
The Effectiveness of Ergon Instrument-Assisted	According to the results of the research, it was determined

Soft Tissue Mobilization, Foam Rolling, and Athletic Elastic Taping İn İmproving Volleyball Players' Shoulder Range Of Motion and Throwing Performance: A Pilot Study on Elite Athletes (Maniatakis et al., 2020)	that both IASTM and FR applications improved passive shoulder joint range of motion and positively affected shooting performance compared to kinesio taping (KB) technique.
Deep Tissue Massage And Flexibility İn The Structural Components Of The Superficial Back Line Of Professional Volleyball Players: A Pilot Study (Steuer, M. et al., 2019)	According to the research results, it has been determined that deep tissue massage increases the flexibility of the superficial back line and causes a positive increase in the range of motion in the hips and knees.
The Acute Effect Vıbratıng Foam Rollers Have On The Lower Extremıtıes' Abılıty To Produce Power (Klingenberg, 2017)	When the results of the research were examined, it was determined that the vibrating FR application applied with DS did not make a significant difference on the vertical jump height of female volleyball players.
The Combined Effect of Static Stretching and FoamRolling With or Without Vibration on the Range of Motion, Muscle Performance, and Tissue Hardnessof the Knee Extensor (Nakamura et al., 2022)	According to the research results, it has been determined that applied FR exercises reduce tissue stiffness and significantly increase knee flexion range. When the findings were examined, it was determined that it did not have an effect on the changes detected to be supported by vibrating FR in addition to SS in increasing the range of motion.

When the studies carried out between 2017-2022 are examined; Due to the fact that volleyball is one of the determining performance criteria of FR exercises performed on volleyball players and that the branch of volleyball is a sport based on explosive power; It has been determined that it is effective on the vertical jump performance and lower extremity leg strength, which is significantly necessary, but affects the speed and agility performance in a negative way. In another study, it was determined that the vibrating FR application applied with dynamic stretching (DS) did not make a significant difference in the vertical jump height in female volleyball players, the FR exercises applied reduced the tissue stiffness and significantly increased the knee flexion range. At this point, it can be thought that the types of foam roller do not make a difference in terms of performance, the important point is the application variables, and at this point, trainers and athletes should create a purposeful type of exercise. When the variables such as pressure, set, and duration in the Foam Roller exercise application are examined and the results of the studies are examined; It was determined that both 30 and 60-second duration FR exercises had similar effects and did not have a negative effect on flexibility and vertical jump performance when compared to the control group. The results of the studies in the literature show similarities with each other. For this reason, foam roller exercises are recommended to be used by athletes and trainers as an alternative warm-up tool before training or competitions. When the studies in the literature including the foam roller application for the upper extremity are examined, it is seen that both IASTM and foam roller applications improve the passive shoulder joint range of motion and positively affect the shooting performance, increase the flexibility of the superficial back line, and increase the range of motion in the hips and knees positively compared to the KB technique. included in the results.

Table 3. Literature Review of Foam Roller Applications on Basketball Players Between 2017-2022

Article	Results
Comparison of Some Motoric Characteristics of Male Basketball and Handball Players (Koç et al., 2011)	According to the research results, it has been determined that some motoric features of basketball players and handball players, who are similar in terms of their characteristics, are similar. It was thought that the similarity of motoric features in the study was due to the fact that the athletes were in the same age group and participated in a similar training program
The Effects of Foam Roller Application on Joint Range of Motion, Flexibility and Lower Extremity Explosive Power in Female Basketball Players (Çolak et al., 2018)	It has been determined that the FR application in female basketball players has a positive effect by increasing the ROM and flexibility results. It is thought that it may be beneficial to include FR practice in addition to the stretching exercises performed during the warm-up periods before training and competition.
Acute Effects of Different Stretching Exercise Protocols on Some Anaerobic Motoric Tests (Aydin et al., 2019)	According to the research results, it has been determined that different stretching exercise protocols have different effects in terms of related motor performance parameters. Beforehand, DS applications were suggested to trainers and athletes in order to get more efficiency from 10m, 20m and 30m linear running performance.
The Impact of Self-Myofascial Trigger Point Release on Fatigue Management and Performance in Female College Basketball Players (Hanna et al., 2022)	According to the research results, it has been determined that the applied FR applications are effective to eliminate the performance barriers related to fatigue and reduce the risk of disability.
Assessment of The Effects of Foam rolling on The Pain Threshold in Professional Basketball Players (Cabak & Mielczarek, 2022)	According to the research results, it was determined that SMR exercises applied immediately after basketball training created significant differences in the trapezius muscle and the levator scapula on the left side, and there was a 60% reduction in muscle stiffness with an 85% improvement in post-training regeneration.
The Effects of Self-Myofascial Release Compared to Dynamic Warm-Up on Muscle Performance (Sinclair & Niles, 2019)	According to the research results, it has been determined that DS exercises are more effective than FR exercises in muscle activity and vertical jump performance.
The Effect Of Vibrating Foam Roller Exercise On Bilateral Ankle Proprioception In Basketball Players	According to the research results, it has been determined that the FR exercises applied can improve

(Liu et al., 2020)	the non-dominant left ankle proprioceptive performance and contribute to the sportive performance at this point.
Comparison of The Effects of Static Stretching on Range of Motion and Jump Height Between Quadriceps, Hamstrings and Triceps Surae in Collegiate Basketball Players (Takeuchi & Tsukuda, 2019)	According to the research results, while there was no change in vertical jump height after static stretching exercises (SS) applied on the quadriceps and hamstring muscles, it was determined that it decreased after the SS of the triceps surae.
The Acute Effect of Different Specific Warm-Up Intensity on One Repeat Maximum Squat Performance on Basketball Players (Eken, 2021)	According to the research results, it was determined that there was an increase in 1RM squat performance after the high-intensity specific warm-up period applied.
Exploring the Impact of Different Durations of Foam Rolling as a Recovery Technique following Intense Exercise in College-aged Males (Saker,2022)	According to the research results, it has been determined that FR exercises applied with 60 and 120 seconds immediately after exercise are not significantly effective in the recovery of muscle pain.
Impact of 10 Minute Interval Roller Massage on Performance and Active Range of Motion (Hodgson et al., 2019)	According to the research results, it was determined that static stretching exercises applied with FR improved knee flexion and hip flexion range of motion, but relatively did not affect neuromuscular performance.
Acute Effects of Tecar Therapy on Skin Temperature, Ankle Mobility and Hyperalgesia in Myofascial Pain Syndrome in Professional Basketball Players: A Pilot Study (Yeste-Fabregat et al., 2021)	According to the research results, it has been determined that FR exercises applied can cause changes in the absolute temperature of diathermy and medial gastrocnemius muscle.
Combined Effects of Self-Myofascial Release and Dynamic Stretching on Range of Motion, Jump, Sprint, and Agility Performance (Richman et al., 2018)	According to the research results, it has been determined that FR and SMR exercises applied after the warm-up session and before dynamic stretching improve sprint and agility performance in basketball players. More research is needed to determine the extent to which variables (pressure, time, sets, etc.) involved in SMR implementation affect performance outcomes and to develop the most beneficial combinations and timing of SMR, DS, and SS.
Influence of Foam Rolling on Recovery from Exercise-Induced Muscle Damage (D'amico & Gillis, 2017)	According to the research results, it has been found that FR reduces pain perception, increases hip abduction range of motion (ROM), and hamstring muscle length compared to non-FR-control (CON) after sprint-induced exercise-induced muscle damage (EIMD).
Effects Of Chains Squat Training with Different Chain Load Ratio on The Explosive Strength of	According to the research results, it is recommended to use 20% chains squat training (CST) or 30% CST

Young Basketball Players' Lower Limbs (Jiang & Xu, 2022)	in the special preparation phase and pre-competition phase to encourage the conversion of general strength to special strength as well as the development of lower extremity explosive strength.
Comparison of the Effect of Passive and Active Recovery, and Self-Myofascial Release Exercises on Lactate Removal and Total Quality of Recovery (Özsu et al., 2018)	According to the research results, a significantly higher improvement in total healing capacity (TQR) was detected with SMR compared to active recovery (AR) and passive recovery (PR).

When the studies carried out between 2017-2022 are examined; 10m It has been determined that performing dynamic stretching exercises beforehand, to get more efficiency from the 20m and 30m linear running performance, can contribute positively and effectively reduce the risk of injury to eliminate the performance barriers related to fatigue. When the results of other studies in the literature are examined, FR applications are dominant in basketball players compared to the lower extremities and have a positive effect on the upper extremity temperature, SMR exercises applied immediately after basketball training create significant differences in the trapezius muscle and the levator scapula on the left side, and with an 85% improvement in post-training regeneration. It has been found to cause a 60% reduction in muscle stiffness. In another study, it was determined that dynamic stretching exercises were more effective than FR exercises in muscle activity and vertical jump performance. There are many studies on dynamic and static stretching in the literature. However, a clear result could not be reached due to the differences in the experimental groups and methods. When this result was evaluated according to team sports, it was determined that FR exercises applied to basketball players improved sprint and agility performance and caused increases in shooting speed compared to volleyball and football branches. It has been determined that FR exercises have an effect on increasing hamstring muscle length in basketball players (football).

Table 4. Literature Review of Foam Roller Applications on Handball Players Between 2017-2022

Article	Results
Investigation of the Effect of Training Periodization of Elite Male Handball Players on Some Motoric and Physiological Parameters (Dağseven, 2019)	According to the research results, It is thought that starting with the classical training method and choosing the combined training method towards the end of the preparatory season will be more beneficial for the development of the athletes
The Effects of Self-Induced Multi-Bar Massage Rolling on Physical Performance in Collegiate Level Athletes (Popovic, 2019)	According to the research results, 5, 10 and 15 minutes self-performed myofascial relaxation exercises had a positive effect on balance performance, but no difference was found on athletic performance on anaerobic and aerobic capacities. (Popovic, 2019)
The Effect of Foam Rolling And Dynamic Stretch On Some Physical Abilities Of Female Handball Players (Zaky et al., 2021)	According to the research results, A significant difference was found between dynamic stretching exercises and shoulder extension.
Effects of Dry Needling in Teres Major Muscle in Elite Handball Athletes. A Randomised Controlled	According to the research results, It has been determined that in handball players with shoulder

Trial (Ceballos-Laita et al., 2021)	pain, shooting speed and internal rotation have a positive effect on joint range of motion and to improve pain intensity.
Effects of Foam Rolling on Range of Motion, Peak Torque, Muscle Activation and The Hamstrings to Quadriceps Strenght Ratios (Madoni, 2017)	According to the research results, compared to the control group, foam roller exercises were found to cause greater changes in hamstring range of motion without creating a deficit in peak torque or muscle activation.
Effects of Traditional Stretching Versus Self-Myofascial Release Warm-up on Physical Performance in Well-Trained Female Athletes (Kurt et al., 2022)	According to the research results, It has been determined that self-myofascial relaxation techniques applied together with dynamic stretching to handball players increase in flexibility and strength parameters better than static stretching alone. It is recommended that trainers and players use myofascial relaxation techniques in conjunction with dynamic stretching practices to sharply improve muscle strength, strength and flexibility.
The Effect of Rehabilitative Exercises Accompanying Reflexology Massage İn The Treatment of Shoulder İnjury For Young Handball Players (Shymaa & Ali, 2022)	According to the research results, in order to reduce the feeling of pain in handball players, it has been determined that static muscle strength exercises and various flexibility exercises should be used for the affected limb in the program where reflexology point massage is used before each rehabilitation unit.

During the literature review, the studies conducted between 2017 and 2022 were included in our research. Due to the limited number of studies covering the keywords ''handball and self-myofascial release techniques'' in the last five years, the literature review was completed using similar keywords (massage, handball and myofascial release techniques, handball, and flexibility). It has been stated in the studies that FR exercises applied to increase the shooting speed and internal rotation joint range of motion in handball players, it is more effective in strength parameters than static stretching when done together with dynamic stretching and causes an increase in balance parameters. Few studies on the field have been found in the literature. This indicates the need for further research.

Discussion and Conclusion

If the connective tissue called myofascial surrounding the muscles is damaged or if it is not active or triggered, it affects the strength, strength, and endurance negatively by restricting the range of motion of the joints (Sullivan et al, 2013). The friction caused by the rolling motion during foam roller operation increases the temperature in the fascial areas. Foam roller rolling causes the temperature in the cell to increase and the cell fluids become more fluid with the increase in temperature. The fluidization of the cell fluid minimizes the limitation of movement, supports the range of motion and contributes to maintaining the sudden running speed (Wolf & Caucasian, 2018).

In physical activity, the muscle must have a certain elasticity. This poses a risk if it lacks elasticity and has hardened. In case of stiffness of certain muscles, injuries that vary according to sports branches occur. For example, tendonitis and patellofemoral problems in the stiffness of the hamstring group, Achilles tendinitis (inflammation of the tendons that attach the muscles to the bones) in the triceps surae; In the case of iliotibial band stiffness, iliotibial band

creep syndrome may develop. Here, the stiffness of these muscles both increases the risk of injury and decreases the performance, as elasticity, which is one of the elements that determine the joint range of motion, is lost (Özdemir, 2004).

Okamoto et al., (2014) stated in their study that foam roller application reduces arterial stiffness (stiffness) and improves vascular endothelial functions. The development of vascular endothelial functions causes the release of nitric oxide (NO), a vasoactive (vessel-constricting-expanding) substance, which results in an increase in the performance of the myofascial system by transmitting more blood and O2 to the muscle from the enlarged vessel wall (Okamoto et al., 2014).

Every day in the world of sports, athletes continue their activities under various risks. While some of these risks affect the performance of the athletes negatively, some of them cause sports injuries (Kirişci, 2011). Ermis et al. (2019) found hand and ankle injuries at 35.4% and knee injuries at 19.7% in team sports (Ermiş et al., 2019). In another study, it was reported that the most injured body area was the wrists (Tik-Pui Fong et al., 2007).

Kose et al. (2020) in their study, injuries in 4 sports branches (volleyball, handball, basketball, football) occurred in the ankle 34.5% (n=76), knee 20.9% (n=46), and wrist 14.5%, respectively. (n=32) (Kose et al., 2020).

Today, warm-up protocols are performed by many professionals in preparation for any physical activity to increase muscle performance and prevent sports injuries; It has become an important part of physical activities performed (Rahnama, 2012). Range of motion has been defined as the priority in terms of disability prevention (Trakis et al., 2008).

Although the range of motion can be seen as the factor that most affects the risk of injury, many athletes may have difficulty in gaining this feature at later ages because they cannot gain this feature during adolescence. It can be said that the range of motion of the joint increases with SMR (Yoshimura et al., 2019).

Cakir et al. (2019) found that static stretching and graston relaxation techniques increased the flexibility of the latissium dorsi muscle. Although the static stretching application increases flexibility by creating a decrease in tone on the muscle, it has been determined that the application of the graston technique will be a more advantageous approach for the athlete in terms of muscular flexibility and muscular performance, since it also carries the risk of muscle degeneration and local fatigue (Çakır & Karadenizli, 2019).

In a study by MacDonald et al. (2013), it was stated that SMR applied after exercise-induced muscle damage increased muscular activation more than the control group, improved the active and passive ROM value, and decreased the perception of muscular pain (MacDonald et al., 2013).

Mahdis et al. (2022), it was found that SMR increased the range of motion and improved dynamic balance in the knee joint without having a significant effect on postural sway (Mahdis et al. 2022).

In a study conducted by Popovic (2019) on handball, basketball, and volleyball players, 5, 10 and 15 minutes self-performed myofascial relaxation exercises had a positive effect on balance performance, but no difference was found on anaerobic and aerobic capacities when examined in terms of athletic performance (Popovic, 2019).

As a result, it has been determined that the application of FR in addition to the warm-up session affects various performance parameters, increases the range of motion in the upper and lower extremity muscles, and at this point, it has a positive effect on the sportive performance. In light of the information, we observed from the literature review, FR applications are more commonly used in individual sports branches compared to team sports. We think that this is due to the inequality of the number of coaches and athletes in team sports, but that the athletes who are a part of a team should prefer FR applications to increase their performance.

REFERENCES

Ali, S. (2019). Acute Effect of Self-Administered Myofascial Relaxation Exercise Time on Vertical Jump Performance and Flexibility in Well-Trained Female Volleyball Players.

Alim, K. (2021). Investigation of the Effects of Self-Applied Myofascial Relaxation Movements on Acute, Flexibility, Strength, and Balance in Volleyball and Football Players.

Aune, A. A. G., Bishop, C., Turner, A. N., Papadopoulos, K., Budd, S., Richardson, M., & Maloney, S. J. (2019). Acute And Chronic Effects of Foam Rolling vs. Eccentric Exercise on ROM and Force Output of The Plantar Flexors. Journal of Sports Sciences, 37(2), 138–145. https://doi.org/10.1080/02640414.2018.1486000.

Aydin, Y., Kafkas, A., Cinarli, F. S., Eken, O., Kurt, C., & Kafkas, M. E. (2019). Acute Effects of Different Stretching Exercise Protocols on Some Anaerobic Motoric Tests. Turkish Journal of Sports Medicine, 54(2), 99–107. https://doi.org/10.5152/tjsm.2019.121

Barnes, M. F. (1997). The Basic Science of Myofascial Release: Morphologic Change in Connective Tissue. Journal of Bodywork and Movement Therapies, 1(4), 231-238.

Beyleroğlu, M., Demirtaş, B., & Çakır, O. (2021). Acute Effects of Foam Roller Exercises in Addition to Dynamic Stretching Exercises in Warm-Up Protocol on Countermovement Jump and Squat Jump Performance in Regional League Female Volleyball Players. Journal of Exercise and Sport Sciences Research (JOINESR) 1(1), 23-30, 2021.

Bradley, P. S., Olsen, P. D., & Portas, M. D. (2007). The Effect of Static, Ballistic, and Proprioceptive Neuromuscular Facilitation Stretching on Vertical Jump Performance. In Journal of Strength and Conditioning Research (Vol. 21, Issue 1).

Brengesjö, O., Lohaller, J., & Grau, S. (2017). Effects Of Foam Rolling on Ankle Joint ROM And Hamstring Flexibility. Gupea, 2017-11-15.

Cabaci, A., & Taskiran, Y. M. (2021). Investigation of the Effect of Special Exercises Placed in Programs of a Football Team on Flexibility Values at the End of The Training Process. In Journal of Health and Sport Sciences (JHSS) (Vol. 4, Issue 1).

Cabak, A., & Mielczarek, W. (2022). Assessment of The Effects of Foam rolling on the Pain Threshold in Professional Basketball Players. Polish Journal of Sports Medicine, 38(1), 25–35. https://doi.org/10.5604/01.3001.0015.8185.

Çakır, E., & Karadenizli, Z. İ. (2019). Comparison of the Efficiency of Graston Technique and Static Stretching on Latissimus Dorsi Muscle Flexibility. International Journal of Sport, Exercise & Training Sciences, 221–226. https://doi.org/10.18826/useeabd.622997.

Cakmak, D. (2021). The Effects of Static Stretching, Dynamic Stretching, And Stretching with Foam Roller on Performance in Amateur Volleyball Players.

Ceballos-Laita, L., Medrano-De-La-Fuente, R., Estébanez-De-Miguel, E., Moreno-Cerviño, J., Mingo-Gómez, M. T., Hernando-Garijo, I., & Jiménez-Del-Barrio, S. (2021). Effects Of Dry Needling İn Teres Major Muscle İn Elite Handball Athletes. A Randomised Controlled Trial. Journal of Clinical Medicine, 10(18). https://doi.org/10.3390/jcm10184260.

Çevik, K. (2021). The Effect of Neuromuscular Exercises and Graston Myofascial Relaxation Technique on Vertical Jumping.

Çolak, H., Aktaş, M., & Hair, A. (2018). The Effects of Foam Roller Application on Joint Range of Motion, Flexibility, And Lower Extremity Explosive Power İn Female Basketball Players. Journal Of Sports and Performance Research. https://doi.org/10.17155/omuspd.

Dagseven, T. (2019). Investigation of the Effect of Training Periodization of Elite Male Handball Players on Some Motoric and Physiological Parameters. Ambient Science, 2021: Vol. 08(Sp1); 19-23.

D'amico, A. P., & Gillis, J. (2017). Influence Of Foam Rolling on Recovery from Exercise-Induced Muscle Damage. Journal of Strength and Conditioning Research: September 2019- Volume 33- Issue 9- p 2443-2452 doi: 10.1519/JSC.0000000000002240.

Demir, K. D. (2018). The Acute Effects of Static Stretching Applications on Speed Agility And Vertical Jump Performance of Volleyball Players.

Donmez, E. (2019). Effects Of Foam Roller Application on Hamstring Muscle Performance.

Durukan, E., & Göktepe, M. (2020). The Effect of Acutely Applied Different Stretching Exercises on Vertical Jump Performance İn Female Volleyball Players (Vol. 22, Issue 4).

Edis, C., Uçan, İ., & Vural, F. (2021). Acute Effects of Different Warm-Up Protocols on Squat Force Values: Comparison of Myofascial Relaxation Method and Force-Based Warm-Up Methods. Atatürk University Journal of Physical Education and Sport Sciences, 23(1).

Eken, O. (2021). The Acute Effect of Different Specific Warm-Up Intensity on One Repeat Maximum Squat Performance on Basketball Players. Pedagogy Of Physical Culture and Sports, 25(5), 313–318. https://doi.org/10.15561/26649837.2021.0506.

Ermiş, E., İmamoğlu, O., & Seller, A. (2019). Frequency of Sportive Injuries İn Amateur Athletes and Factors Affecting Injuries. Turkish Journal of Sport and Exercise, 341–348. https://doi.org/10.15314/tsed.487446.

Guler, U. (2019). The Acute Effects of Dynamic and Fifa+11 Warm-Up Methods on Flexibility, Vertical Jump, and Agility Performances of Football Players. Marmara Unıversity (Turkey) ProQuest Dissertations,2019. 28244014.

Gunaydın, G. (2021). Acute Effect of Foam Roller Applied at Different Frequency Levels on Flexibility in Amputee Players. Journal of Sport and Performance Studies. https://doi.org/10.17155/omuspd.856163.

Gürses, V., & Akgül, M. (2019). Acute Effects Of Different Stretching Methods Applied By Footballers in Warm-Up On Vertical Jump, Speed,And Agility Performance. Ankara University School of Physical Education and Sports Journal of Physical Education And Sports Sciences, 17(1), 178–186. https://doi.org/10.33689/spormetre.520033.

Hanna, K., & Mc, C. (N.D.). The Impact of Self-Myofascial Trigger Point Release on Fatigue Management and Performance in Female College Basketball Players.

Healey, KC., Hatfield, D. L., Blanpied, P., Dorfman, L. R., & Riebe, D. (2013). The Effects of Myofascial Release with Foam Rolling on Performance.

Henning, C. J., Stovern, O., Porcari, J. P., Arney, B. E., Doberstein, S., Emineth, K., & Foster, C. (2019). The Acute Effects of Foam Rolling on Ankle and Knee Range of Motion, Hamstring Flexibility, Agility, and Vertical Jump Height. In Int J Res Ex Phys (Vol. 14, Issue 2).

Hodgson, D. D., Quigley, P. J., Whitten, J. H. D., Reid, J. C., Behm, D. G., & Hodgson, B. (2019). Impact Of 10-Minute Interval Roller Massage on Performance and Active Range of Motion.

Jiang, D., & Xu, G. (2022). Effects Of Chains Squat Training with Different Chain Load Ratio on The Explosive Strength of Young Basketball Players' Lower Limbs. Frontiers In Physiology, 13. https://doi.org/10.3389/fphys.2022.979367.

Karabag, A. M. (2022). Investigation Of the Effects of Foam Roller and Kinesiotape Applications on Performance Parameters, Pain and Fatigue.

Kaya, S., Cug, M., & Behm, D. G. (2021). Foam Rolling During a Simulated Half-Time Attenuates Subsequent Soccer- Specific Performance Decrements. Journal of Bodywork and Movement Therapies, 26, 193–200. https://doi.org/10.1016/j.jbmt.2020.12.09.

Kirisci, I. (2011). Types Of Injury in People Playing Team Sports and Investigation ff These Injury According to Various Variables (Bursa Example).

Klingenberg, J. L. (2017). The Acute Effect Vibrating Foam Rollers Have on The Lower Extremities' Ability to Produce Power. http://dc.ewu.edu/theses/467.

Koç, H., Pulur, A., And Karabulut, E. Ö. (2011). Comparison of Some Motoric Characteristics of Male Basketball and Handball Players.

Kopec, T. J., Bishop, P. A., & Esco, M. R. (2017). Influence Of Dynamic Stretching and Foam Rolling on Vertical Jump. Athletic Training & Sports Health Care, 9(1), 33–38. https://doi.org/10.3928/19425864-20161003-01.

Köse, B., & Kirişçi, İ. (2020). Comparıson Of Causes and Treatment Methods of Injury in Football, Basketball, Handball, Volleyball Branches. Ankara University School of Physical Education and Sports Sportmetre Journal of Physical Education and Sports Sciences, 18(1), 235–241. https://doi.org/10.33689/spormetre.649766

Kurt, C., Gürol, B., & Nebioğlu, İ. Ö. (2022). Effects of Traditional Stretching Versus Self-Myofascial Release Warm-Up on Physical Performance in Well-Trained Female Athletes.

Kurt, C., & Kafkas, E. M. (2018). Recovery Uses of Myofascial Relaxation Exercises Applied with Foam Roller. Journal of Physical Education and Sport Sciences, 2148–6786.

Kyranoudis, A., Arsenis, S., Ispyrlidis, I., Chatzinikolaou, A., Gourgoulis, V., Kyranoudis, E., & Metaxas, T. (2019). The Acute Effects of Combined Foam Rolling and Static Stretching Program on Hip Flexion and Jumping Ability in Soccer Players. Journal of Physical Education and Sport, 19(2), 1164–1172. https://doi.org/10.7752/jpes.2019.02169

Lee, C. L., Chu, I. H., Lyu, B. J., Chang, W. D., & Chang, N. J. (2018). Comparison of Vibration Rolling, Non-vibration Rolling and Static Stretching as A Warm-Up Exercise on Flexibility, Joint Proprioception, Muscle Strength, and Balance in Young Adults. *Journal of Sports Sciences*, *36*(22), 2575–2582. https://doi.org/10.1080/02640414.2018.1469848

Lim, J. H., Park, C. B., & Kim, B. G. (2019). The Effects of Vibration Foam Roller Applied to Hamstring on The Quadriceps Electromyography Activity and Hamstring Flexibility. Journal of Exercise Rehabilitation, 15(4), 560–565. https://doi.org/10.12965/jer.1938238.119

Macdonald, G. Z., Penney, M. D. H., Mullaley, M. E., Cuconato, A. L., Drake, C. D. J., Behm, D. G., & Button, D. C. (2013). An Acute Bout of Self-Myofascial Release Increases Range of Motion Without a Subsequent Decrease in Muscle Activation or Force. www.nsca.com

Madoni, S. N. (2017). *Effects Of Foam Rolling on Range of Motion, Peak Torque, Muscle Activation, and The Hamstrings-to-Quadriceps Strength Ratios*.

Manheim, C. J. (2008). The Myofascial Release Manual (Fourth Edition). Slack Incorporated, USA.

Maniatakis, A., Mavraganis, N., Kallistratos, E., Mandalidis, D., Mylonas, K., Angelopoulos, P., Xergia, S., Tsepis, E., & Fousekis, K. (2020). The Effectiveness of Ergon Instrument-

Assisted Soft Tissue Mobilization, Foam Rolling, and Athletic Elastic Taping In İmproving Volleyball Players' Shoulder Range of Motion and Throwing Performance: A Pilot Study on Elite Athletes.

Miller, K. L. (2017). The Effects of Foam Rolling on Maximum Sprint Performace and Range of Motion. Order No. 10280581 ed. California State University, Fullerton.

Nakamura, M., Konrad, A., Kasahara, K., Yoshida, R., Murakami, Y., Sato, S., Aizawa, K., Koizumi, R., Wilke, J., & Nakamura, A. (2022). The Combined Effect of Static Stretching and Foam rolling with or Without Vibration on the Range of Motion, Muscle Performance, and Tissue Hardness of the Knee Extensor. Journal of Strength and Conditioning Research: May 9, 2022- Volume- Issue- 10.1519/JSC.0000000000004263 doi: 10.1519/JSC.0000000000004263.

Okamoto, T., Masuhara, M., & Ikuta, K. (2014). Acute Effects of Self-Myofascial Release Using a Foam Roller on Arterial Function. Journal of Strength and Conditioning Research: January 2014 - Volume 28 - Issue 1 - p 69-73 doi: 10.1519/JSC.0b013e31829480f5.

Özsu, İ., Gurol, B., & Kurt, C. (2018). Comparison Of the Effect of Passive and Active Recovery, and Self-Myofascial Release Exercises on Lactate Removal and Total Quality of Recovery. Journal of Education and Training Studies, 6(9a), 33. https://doi.org/10.11114/jets.v6i9a.3511.

Polat, S., Edis, C., & Catikkas, F. (2019). The Effects of Dynamic and Static Stretching Exercises Applied in The Warm-Up Session on Performance.

Popovic, M. (2019). The Effects of Self-Induced Multi-Bar Massage Rolling on Physical Performance in Collegiate Level Athletes. Department of Education and Sports Science.

Rahimi, A., Amani-Shalamzari, S., & Clemente, F. M. (2020). The Effects of Foam Roll on Perceptual and Performance Recovery During a Futsal Tournament. Physiology and Behavior, 223. https://doi.org/10.1016/j.physbeh.2020.112981.

Rahnama, N. (2012). Preventing Sport Injuries: Improving Performance. In International Journal of Preventive Medicine (Vol. 3, Issue 3).

Rey, E., Padro´Npadro´Padro´N-Cabo, A., Costa, P. B., & Barcala-Furelos, R. (2017). Effect of Foam Rolling as A Recovery Tool İn Professional Soccer Players. Journal of Strength and Conditioning Research: August 2019- Volume 33- Issue 8- p 2194-2201
doi: 10.1519/JSC.0000000000002277

Richman, E. D., Tyo, B. M., & Nicks, C. R. (2018). Combined Effects of Self-Myofascial Release and Dynamic Stretching on Range of Motion, Jump, Sprint, and Agility Performance. Journal of Strength and Conditioning Research: July 2019- Volume 33- Issue 7- p 1795-1803 doi: 10.1519/JSC.0000000000002676.

Seçer, E., & Özer, D. (2021). Comparison Of Acute Effects of Dynamic Stretching and Myofascial Relaxation on Lower Extremity Temperature, Flexibility, Balance, and Agility in Recreational Male Footballers. Journal of Exercise Therapy and Rehabilitation. https://doi.org/10.15437/jetr.729553.

Shymaa, A. P. D., & Ali, R. (2022). The Effect of Rehabilitative Exercises Accompanying Reflexology Massage in The Treatment of Shoulder İnjury For Young Handball Players. Texas Journal of Multidisciplinary Studies, issn:2770-0003.

Sinclair, P., & Niles, B. (2019). The Effects of Self-Myofascial Release Compared to Dynamic Warm-Up on Muscle Performance.

Sullivan, M. K., Silvey, B. J. D., Button, C. D., & Behm, G. D. (2013). Roller Massager Application to The Hamstrings Increases Sit-And-Reach Range of Motion Withing Five to TEN Seconds Without Performance Impairments. *The International Journal of Sports Physical Therapy*, *3*, 228.

Takeuchi, K., & Tsukuda, F. (2019). Comparison Of the Effects of Static Stretching on Range of Motion and Jump Height Between Quadriceps, Hamstrings and Triceps Surae in Collegiate Basketball Players. *BMJ Open Sport and Exercise Medicine*, *5*(1). https://doi.org/10.1136/bmjsem-2019-000631.

Tik-Pui Fong, D., Hong, Y., Chan, l.-k., Shu-Hang Yung, P., & Chan, K.-M. (2007). A Systematic Review on Ankle Injury and Ankle Sprain İn Sports. In *Sports Med* (Vol. 37, Issue 1).

Topçu, H. (2017). Acute Effect of Different Warm-Up Protocols on Athlete Performance. Europan Journal of Physical Education and Sport Science. (Vol. 3,8) Issn: 2501-1235 doi: 10.5281/zenodo.833657.

Torun, S., Torun, M. C., & Kaya, M. (2021). Investigation Of the Effect of Self-Myofascial Release Techniques Applied to Plantar Fascia on Hamstring Flexibility In Young Football Players. In Nation Journal of Kinesiology (Vol. 2, Issue 2). http://ojs.turkishkinesiology.com.

Yaşlı, B. C., & Müniroğlu, R. S. (2019). The Effects of 8-Week Static Stretching Training on Jumping Performance in Footballers. Ankara University School of Physical Education and Sports Sportmete Journal of Physical Education and Sports Sciences, 17(4), 134–142. https://doi.org/10.33689/spormetre.562545.

Yazıcı, G. (2018). The Effect of Myofascial Relaxation Technique on Ball Speed And Accuracy İn Young Football Players.

Yeste-Fabregat, M., Baraja-Vegas, L., Vicente-Mampel, J., Pérez-Bermejo, M., Bautista González, I. J., & Barrios, C. (2021). Acute Effects of Tecar Therapy on Skin Temperature, Ankle Mobility and Hyperalgesia İn Myofascial Pain Syndrome İn Professional Basketball Players: A Pilot Study. *International Journal of Environmental Research and Public Health*, *18*(16). https://doi.org/10.3390/ijerph18168756.

Yitik, R., & Ateş, B. (2018). Acute Effect of Self-Myofascial Relaxation Exercises Performed Using Foam Roller on Flexibility and Lower Extremity Strength.

Zaky, H. A., Khalil, M. M., & Barakat, M. H. (2021). The Effect of Foam Rolling and Dynamic Stretch on Some Physical Abilities of Female Handball Players.

Warren, A. J., Lacross, Z., Volberding, J. L., & O'Brien, M. S. (2020). Acute Outcomes of Myofascial Decompression (Cupping Therapy) Compared to Self-Myofascial Release on Hamstring Pathology After a Single Treatment. *International Journal of Sports Physical Therapy*, *15*(4), 579–592. https://doi.org/10.26603/ijspt20200579