Muzi J. (2025) EFFICACY OF DYNAMIC STRETCHING ON PERFORMANCE ENHANCEMENT IN TRACK AND FIELD ATHLETES. Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte vol. 25 (100) pp. 101-116.
DOI: https://doi.org/10.15366/rimcafd2025.100.007

ORIGINAL

EFFICACY OF DYNAMIC STRETCHING ON PERFORMANCE ENHANCEMENT IN TRACK AND FIELD ATHLETES

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Recibido 07 de junio de 2024 **Received** June 07, 2024
Aceptado 07 de diciembre de **2024 Accepted** December 07, 2024

ABSTRACT

Research shows dynamic stretching as a key topic in sports science because it helps track and field athletes become more flexible and stronger at their sports. Full-body controlled motions distend and warm up muscles which raise blood flow and expand range while making neuromuscular connections stronger. Our research looks at how dynamic stretching affects track and field athletes by studying its ability to boost performance measures including speed, agility and power. Dynamic stretching helps muscles work better and keeps joints safe to prevent harm while making movement easier. Dynamic stretching enhances athletic performance for track and field athletes in all their specific events except strength. This study proves dynamic stretching needs to be part of all track and field athlete warm-up plans to achieve higher performance alongside lower injury risk. When runners or jumpers do dynamic stretches ahead of their workout they tend to get better stride dynamics plus faster movement. Stretching while moving helps build effective muscle and joint flexibility which shields athletes from usual track and field accidents. Dynamic stretching creates better muscle coordination that helps athletes achieve deeper movements faster with increased joint strength. Track and field athletes across distances use dynamic stretching before competitions because it builds strength and speed combined with improved flexibility.

KEYWORDS: Dynamic Stretching (DS), Performance Enhancement (PE), Track (TT), Field Athletes (FA)

1. INTRODUCTION

The word dynamic stretching refers to a special type of stretching of various body joints by keeping muscles mostly active. It is an important type of

preparation of the body for intense physical activity. Usually one of the important characteristics of dynamic stretching is that these is movement so rather than keeping the body static, there is movement of joints through a specific range of motion. The other important characteristic is that there is engagement of active muscles because it is necessary for increasing blood flow, maintaining body temperature, and improving neural activity in skeletal muscles as well(Turki et al., 2011). It has been seen that some important functional movements in dynamic stretching mimic those movements of sport or other physical activity. We are going to understand the efficacy of Dynamic Stretching in track and field athletes one by one. If we describe track athletes, we may come to know that these are athletes who perform in specific tracks and more focus on running, jumping, passing hurdles, and other such activities. But field athletes are those who do not perform in any specific track and more focus on throwing or other such physical activities(Blazevich et al., 2018). Firstly we will discuss the impact of dynamic stretching on track athletes. Recent studies have shown that dynamic stretching can be helpful for improvement in flexibility, muscle strength, and muscle power as well. The first important benefit of dynamic stretching is that it can be effective for Enhancement of flexibility. As we know track athlete has to perform within the track in a limited type so the flexibility of the body is mandatory for the best movement during performance. In most cases, it has been seen that because of intense exercise, there is an aspect of muscle stiffness in athletes which can lower the chance of effective performance. But by dynamic stretching, there is improvement in muscle performance which is useful for lowering the risk of muscle stiffness(Fletcher, 2010). This aspect will help in the enhancement of the performance of athletes. Recent studies have shown that sometimes athletes are not well familiar with biodynamics which may increase the risk of injury during exercise or performance of athletes. But dynamic stretching helps them to understand these important points for consideration related to biodynamics. In this way, we can say that Dynamic Stretching makes them able to prevent any possible injury during the performance of the athlete(Herman & Smith, 2008). There are some important examples of dynamic stretching exercises for track athletes. These important exercises are leg swings, hip rotation, high knees, arm circles, and butt kicks as well. Recent studies have shown that there is an impact of dynamic stretching on the cardiovascular system in track athletes as well which is also improving the performance of track athletes. The first important benefit is that when an athlete is engaged in dynamic stretching, there is an increased heart rate(Judge et al., 2013). When heart rate increases, there is extensive function of cardiac muscles so there is less risk of stroke or other cardiovascular diseases. We can say that this increased heart rate will prepare the body for better physical activity in track athletes. As we know blood flow is responsible for oxygen and nutrient transportation to muscles. When there is better blood flow because of dynamic stretching exercises, there will be better strength and power of muscles for effective performance. Because of dynamic stretching

exercises, there is a betterment in cardiac output as well(Chaouachi et al., 2010). The cardiac output describes the amount of blood pumped by the heart per minute. There is another important aspect of dynamic stretching exercises is that they help to increase the chances of vasodilation. As we know vasodilation will help in the widening of blood vessels for better transportation and exchange of nutrients. In some cases, it also has been seen that dynamic stretching exercises will help reduce recovery time. Thus, these exercises are useful for swift recovery by reducing the risk of muscle soreness. Now we are going to discuss the efficacy of dynamic stretching exercises on field athletes(Richman et al., 2019). The first important benefit of dynamic stretching exercises for field athletes is that they increase the explosiveness of these Athletes. As we know the main movements in field sports are kicking, throwing and others so athletes need better power and more explosiveness to perform these physical activities efficiently. Usually, speed and agility matter much in field sports so these are important points for consideration in field sports. Recent studies have shown that when there is better neuromuscular coordination, there will be better speed and agility in field athletes(Behm & Chaouachi, 2011). We came to know that this aspect of neuromuscular coordination can be enhanced by dynamic stretching exercises so we can say that there is enhanced speed and agility in field athletes as well. As we know pulls and tears are common in field sports and these pulls and tears may cause injury in field athletes(Winchester et al., 2008). However dynamic stretching exercises will help prevent such aspects to lower the risk of injury to field athletes. Dynamic Stretching exercises have also a positive impact on the respiratory system in field athletes. There is an increase in the breathing rate of athletes by dynamic stretching exercises so it prepares the lungs for increased demand for oxygen during physical activity. It has been seen that there is an improvement in lung function because of dynamic stretching exercises due to the enhancement of the vital capacity of the lungs. As we know during physical activity in field athletes, there is a need for more oxygen in the body so this increased demand for oxygen can be fulfilled by more uptake of oxygen through dynamic stretching exercises(Fletcher & Anness, 2007). There is an important aspect of respiratory fatigue in field athletes which has been a common challenge for the effective performance of athletes. However, by dynamic stretching exercises, there is a much-reduced risk of respiratory fatigue as well. There are some practical applications of dynamic stretching exercises for track and field athletes. The first practical application is that these exercises can be used for warm-up routines in track and field athletes as well. It will prepare the cardiovascular and respiratory systems for physical activity. These exercises can also be useful for pre-exercise routines so to increase oxygen uptake in the body. Recent medical studies have shown that there is a positive impact of dynamic stretching exercises on the mental health of track and field athletes as well. As we know both the physical and mental health of athletes must be good for effective performance in track and field

sports(Herrera & Osorio-Fuentealba, 2024; Wang, 2024).

1.1 Research Objective

The main objective of this research is to understand the efficacy of dynamic stretching on performance enhancement in track and field athletes. These studies have effectively explained various important positive impacts of dynamic stretching exercises for track and field athletes in terms of physical and mental health as well.

2. Literature Review

Researchers claim that athletes or young individuals that actively participate in gym related activities tend to develop shoulder pain. The main cause of this pain is due to intense upper limb workout . Weakness of shoulder muscle can result in muscle injury and affect the mobility of shoulder. To reduce the chances of shoulder injury athletes are trained using rotator cuff or shoulder rotation techniques. These techniques minimizes the risk of injury during training(Ankar & Harjpal, 2024). Studies claim that athletes are indulged in plyometric training to strengthen their physical health . This training is based on lower body stretching that provides athlete with flexibility and mobility while playing sports on field(Balaji et al., 2024). Studies reveal that to assess the neuromuscular movement of athletes many sports-based organizations are using force plate technology. This technology allows identification of movement of athletes during sport playing. This technology is preferably used for basketball players for their movement assessment(Cabarkapa et al., 2024). Studies reveal that visually impaired sports player are provided with adapted training to allow them to control the upper body sensorimotor. This exercise-based training is used to help athletes perform their daily life activities. The main aim of this training session is to make vison impaired athletes independent to perform their own task without any help(Carretti et al., 2024). Different stretching exercises are involved in improving the flexibility of athletes . Flexor exercises are adopted during training sessions to improve the hip joint mobility of athletes. Athletes with limited hip joint flexibility face problem in performing their sport related task(Catiil & Gomez, 2024). Studies suggest that dynamic stretching is helpful in providing athlete with flexibility and muscle strength. This stretching activity allows for better movement of body joints. Athletes indulging in DSE as pre workout exercise shows improve flexibility and mobility during sports playing(Caylan Gurses et al., 2024). Studies predicts that athletes that undergoes power training develops strength using kettlebell. Kettlebells have different weights and are used to achieve dynamic flexibility. Also, the strengthen exercises that athletes perform helps in building their body muscles(Jaiswal et al., 2024). Studies reveal that athletes participating in sprinting require great balance to perform their task efficiently. Improved physical skills are required for athletes participating in sprinting

competition(Jouira, Alexe, et al., 2024). Studies elaborate that athletes with intellectually disability are trained using special training methods. neuromuscular training along with plyometric training is provided to intellectually disabled athletes. These exercises allows runner to achieve great dynamic flexibility while participating in running sports(Jouira, Borji, et al., 2024). Studies explain that athletes with intellectually disability are not trained using the traditional methods. Such athletes are trained using modern training methods. CBPS training is the modern training program use to train intellectually disabled athletes to make them physically more fit and active. Combining different training approaches help in training athletes to tackle any challenges he faced during playing sport on the sport field(Jouira, Rebai, et al., 2024). Studies explain that male jumpers are provided with PAPE induced half squat exercises-based training to make their lower body strong. Squat exercises helps in strengthening the lower body of athletes jumpers thereby allowing them to make successive jumps with full strength(Kannas et al., 2024). Also, different soccer players are provided with strengthen exercise training to warm up athlete body before actual workout. Moreover ,soccer athletes require active muscle involvement while playing so that their performance in sport is fully efficient. To make all muscle of athlete body fully energetic and active soccer athletes are trained using strengthening and dynamic exercises(Kurak et al., 2024). Studies claim that athlete trainers are shifting from static training towards dynamic training. This shift is to provide full body flexibility to athletes using dynamic stretching. Different dynamic sessions are adopted according to the training mode to improve athlete performance. Male wrestlers participating in wrestling competition are provided with dynamic exercise training to make them fully prepare to perfume well in competition(Kurt et al., 2024). Studies suggest that it is very important to provide athletes with safe training. Well supervised training sessions results in better outcomes as compared to unsupervised sessions. Athletes are mostly trained according to their body mass and index to ensure that no physical injury result due to intensive training. Also training sessions are performed in steps followed by warm ups and then athletes are given dynamic strength training. The step wise training protocols minimizes the risk of any injury. One main factor that is considered before proving athlete physical training is the age of the athlete. Old age athlete are provide with slow dynamic training whereas young athletes are given intense training sessions(Long et al., 2024). Studies predicts that athletes playing in field as well as on track are at higher risk of developing hamstring injuries. The prevalence rate of these injuries is higher in male athletes than in female athletes. The athletes facing injury problems are provided with rehabilitation therapies to improve the athlete physical health(Makwana et al., 2024). Scholars' studies claim that running sport athletes are provided training session in off and on seasons. The main aim of providing training in all season is to maintain the physical health of athletes and to make them active to perform well in running competitions(Ngo & Kazmi, 2024). Studies elaborates that functional

movement screen is a training program provided along with other training to athletes. The importance of providing functional training is to ensure that athlete on field and on track performing ability is enhanced. Improved functionality of athlete influences athlete performance in task(Pan, 2024). Studies of scholars show that training athletes using conditional training programs improves athlete body movement in different planes or angles.

This flexibility in movement allows athlete to perform with full engagement in his sport related task(Parks, 2024). Scholars declare that simmers indulge sin dynamic stretching type of exercises to perform better in their sport. In a study-based experiment swimmers undergo warm up sessions then started with dynamic stretching exercise before starting swimming. The result of the study predicted that dynamic stretching before swimming allowed athletes to perform well(Tushir et al., 2024). Another type of training that is popular in athletes-based training program is resistance training. RT allows athlete to adopt to different physiological adaptations to reduce the injury risk during playing. Also, the muscle strength of athlete maximizes as a result of RT. RT develops endurance in athletes that influence athlete to adopt to positive changes(Van Hooren et al., 2024).

2.1 Smart PLS Algorithm Model

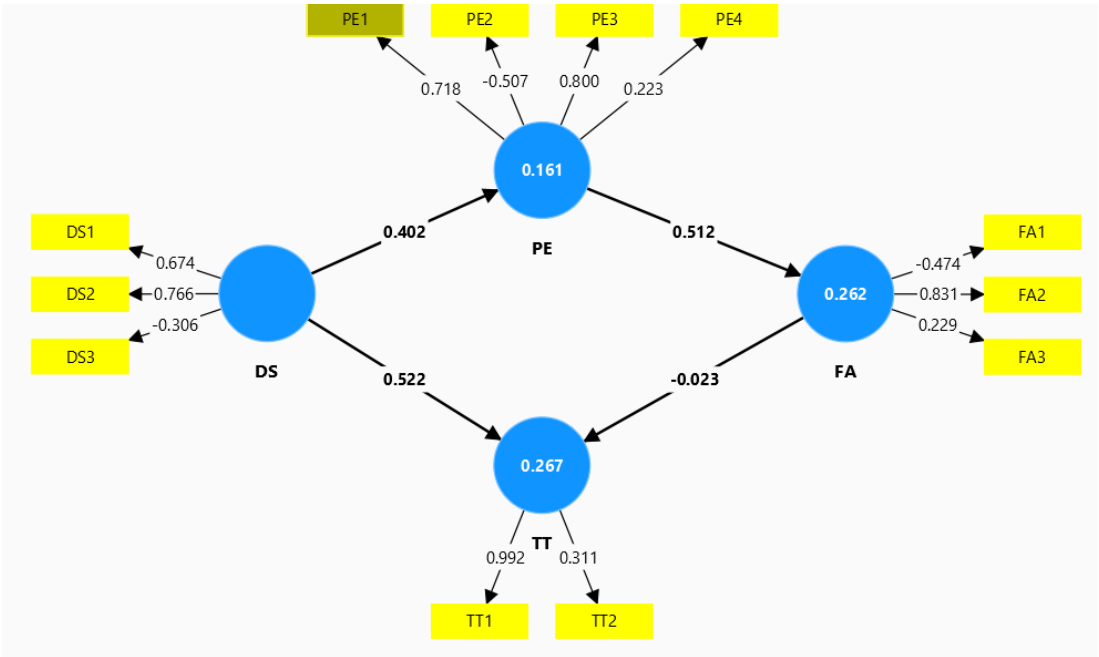

Figure 1: Result of Smart PLS Algorithm Model

The above model of figure 1 describes that smart PLS Algorithm Model in between DS, PE, TT and FA result describe that the DS shows 67%, 76%, 30% positive rates. The TT shows that 99%, 31% positive values of each variable. the result also describes that negative relation but its significant link with FA its value is -0.023 its shows that 2% significant link with them. the PE

describe that 51% positive and significant relation between them. the result also describes that 40% positive and significant relation with PE.

2.2 Descriptive Statistic

Table 1: Result of Descriptive Statistic

NAME	NO.	MEAN	MEDIAN	SCALE MIN	SCALE MAX	STANDARD DEVIATION	EXCESS KURTOSIS	SKEWNESS	CRAMÉR-VON MISES P VALUE
DS1	1	1.560	1.000	1.000	3.000	0.637	-0.442	0.723	0.000
DS2	2	1.620	2.000	1.000	3.000	0.629	-0.590	0.522	0.000
DS3	3	1.700	2.000	1.000	4.000	0.781	0.015	0.857	0.000
PE1	4	1.480	1.000	1.000	3.000	0.608	-0.133	0.905	0.000
PE2	5	1.580	2.000	1.000	3.000	0.635	-0.507	0.654	0.000
PE3	6	1.680	2.000	1.000	3.000	0.676	-0.744	0.507	0.000
PE4	7	1.700	2.000	1.000	4.000	0.755	0.271	0.863	0.000
TT1	8	1.560	2.000	1.000	3.000	0.605	-0.522	0.599	0.000
TT2	9	1.400	1.000	1.000	3.000	0.663	0.808	1.442	0.000
FA1	10	1.500	1.000	1.000	3.000	0.574	-0.523	0.653	0.000
FA2	11	1.600	2.000	1.000	3.000	0.632	-0.556	0.587	0.000
FA3	12	1.460	1.000	1.000	3.000	0.573	-0.283	0.819	0.000

The above result of table 1 demonstrate that descriptive statistical analysis result represents the mean values, the median rates, the minimum values, the maximum values also that explain the standard deviation rate and probability value of each variables included dependent and independent variables. the DS 1,2,3 these factors consider as independent variable result demonstrate that its mean values are 1.560, 1.620 and 1.700 these values shows that positive average value of mean.

The standard deviation rate is 63%, 62% and 78% deviate from mean values. The overall probability value is 0.000 its shows that 100% significant rates the overall minimum value is 1.000 the maximum value is 3.000 the median rate is 2.000 respectively. The PE1,2,3,4 consider as mediator variable result demonstrate that its mean value is 1.480, 1.580, 1.680 and 1.700 the standard deviation rate is 60%, 67%, 75% deviate from mean values. The TT1,2, also consider as mediator variable result describe that its mean value is 1.560, 1.400 the standard deviation rate is 60% and 66% deviate from mean values. The FA1,2,3 these factors consider as dependent its mean value is 1.500, 1.600 and 1.460 these values shows that positive average value of mean. The standard deviation rate is 57%, 63% and 57% deviate from mean values of each variable.

2.3 Correlation Coefficient

Table 2: Result of Correlation Coefficient

	DS1	DS2	DS3	PE1	PE2	PE3	PE4	TT1	TT2	FA1	FA2	FA3
DS1	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
DS2	0.082	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
DS3	-0.104	-0.069	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PE1	0.184	0.268	-0.244	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PE2	-0.160	0.051	0.431	-0.307	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PE3	0.323	0.090	-0.068	0.276	-0.220	1.000	0.000	0.000	0.000	0.000	0.000	0.000
PE4	0.391	-0.114	0.119	-0.253	0.029	0.243	1.000	0.000	0.000	0.000	0.000	0.000
TT1	0.224	0.559	0.017	0.248	-0.116	0.047	-0.026	1.000	0.000	0.000	0.000	0.000
TT2	0.180	-0.067	-0.077	0.169	-0.076	0.062	-0.240	0.189	1.000	0.000	0.000	0.000
FA1	-0.164	-0.083	0.245	-0.229	0.247	-0.206	0.023	0.058	-0.315	1.000	0.000	0.000
FA2	0.208	0.070	0.364	0.291	-0.020	0.355	0.209	0.063	-0.000	0.055	1.000	0.000
FA3	-0.048	0.263	0.130	0.055	0.036	0.019	0.088	0.295	-0.168	0.213	0.177	1.000

The above result of table 2 demonstrate that correlation coefficient analysis result represents that overall result shows some positive and some negative interrelation between them. Dynamic stretching uses body part movement to introduce slow progressions of distance and speed. Track and field athletes regularly use dynamic stretching to get their muscles ready for the unique actions they perform in their events.

Dynamic stretching proves effective at boosting athletic results in several different directions. Dynamic stretching allows you to move parts of your body more easily while also improving your stretch and movement range for athletic tasks including sprints, jumps, and throws. Through increased blood flow to muscles Dynamic stretching raises their temperature which then activates them making them better prepared for track and field event maneuvers. Research shows that dynamic stretching offers better muscle and nervous system activation than static stretching which enhances reaction time and movement coordination more.

3. Applications of Efficacy of Dynamic Stretching on Performance Enhancement in Track and Field Athletes.

The efficacy of dynamic stretching on performance enhancement in track and field athletes can be applied in several key areas to improve athletic performance and reduce injury risk:

3.1 Warm-Up Routine

Athletes need to perform dynamic stretching prior to their preparation work and before training or competitions. When athletes warm up their muscles, they make their blood circulate better which helps them practice running throws and jumps without hurting themselves. Stretches before physical activity produce superior results in body performance according to research. When done correctly warm-up helps athletes reach their best track and field results while reducing their risk of getting hurt. Dynamic stretching helps athletes by warming up their muscles and making their range of motion better with soft exercises that ready their brain's control of muscle movement. Dynamic stretching unlike static stretching uses controlled exercises to match the exact movements of each athletic event. For example, sprinters perform high knees leg swings and walking lunges to flex their hips strengthen their hamstrings and activate their quadriceps. Jumpers gain lower body exercises from activities such as jumping jacks and hip rotations.

Dynamic stretching workouts prepare your body to handle the demanding movements of physical activity ahead. Dynamic stretches raise body temperature and improve blood flow to muscles that lets them stretch better to boost muscle performance during movement. Activation throughout your muscles prepares you for powerful movement and enables you to run faster with better coordination while generating stronger output. Stretching with movement prepares athletes for speed-related activities because it maintains joint freedom for sprinting jumping and throwing tasks. By adding dynamic stretching to your pre-workout activities, you reduce your risk of muscle and ligament damage while preparing your body for the gameplay demands successfully. Tracks and field athletes should start their warm-ups with dynamic stretching exercises because these movements prepare their bodies for best performance and lower their chance of getting hurt.

3.2 Injury Prevention

Using dynamic stretching helps you avoid injuries more effectively. Dynamic stretching readies muscles and joints to handle high-energy movements which protects athletes from most typical sport-related injuries. When done before track and field events dynamic stretching helps protect athletes from the injuries they often sustain during their fast movements.

Making dynamic stretching part of a track and field athlete warm-up helps prevent injuries more than any other benefit. Dynamic stretching makes muscles tendon and ligaments ready for the high-speed and forceful movements involved in running and jumping events including throwing. Dynamic stretching delivers better muscle flexibility and joint movement through warmer blood flow to muscles that help prevent strains and soft tissue injuries. Using leg swings walking lunges and arm circles during stretching warms up precisely the muscles used for physical activity.

Dynamic stretching lets you move more effectively as it builds strong nerve-muscle connections to reduce damage risk. Neuromuscular activation shields athletes from stress injuries because it helps them command their muscles better during movement. Dynamic stretching helps athletes track their body position better which lets them react faster to pose alterations and stay steady. Our joints become safer and stronger due to dynamic stretching. Track and field sports take a hard toll on joint health because athletes make strong sudden movements using their knees, ankles, and hips. Specific stretches for movements help joints absorb more nutrients and decrease the risk of sudden muscle strains or dislocated joints. By performing dynamic stretches athletes develop strong muscles that work well together and limit their risk of repetitive muscle strain. Dynamic stretching before training improves athletic performance and protects runners from getting hurt which lets them maintain stable training routines and achieve peak performance.

3.3 Enhancing Specific Performance Metrics

Dynamic stretching makes athletes run faster during sporting events. Performing dynamic stretches such as leg swings and high knees during your sprint warm-up lets you move better which then helps you hit faster times. When athletes stretch their muscles dynamically during jumping and throwing routines, they gain increased muscle flexibility while building stronger reactions for stronger athletic benefits. Dynamic stretching methods boost track and field athletes' results in their sports since they excel at these drills. Dynamic stretching teaches your body to perform ability-based activities like sprinting jumping and throwing through quick essential movements. Dynamic stretching helps athletes prepare their muscles for sport participation and ensures their muscles deliver optimal results in their specific sport action. Sprinters should perform dynamic stretches including high knees, butt kicks and leg swings because these actions help them run longer while releasing hip tension and making their foot strikes stronger. Our muscles ready themselves for exercise as dynamic stretching preserves their movement flexibility to maintain correct sprinting position and form. To prepare for jumping you must do movements that activate your lower body such as leg swings, walking lunges, and deep squats. Hips flexors and triceps muscles alongside calves’ experience

stretching during dynamic movements which builds forceful starts.

By activating their stretch reflex, dynamic stretches allow athletes to transform between muscle actions more rapidly which extends their jumping distance. Performing torso twist motions along with shoulder rotations and arm circles during dynamic stretching builds throwing athletes' overall upper body power. These exercises train shoulder muscles to support better movement and enhance joint flexibility which lets athletes throw forcefully and accurately. Dynamic stretching exercises improve body movements allowing athletes to develop skills specific to their sports. Through dynamic stretching track and field athletes improve their movement quality while generating more power to perform at their best during competition.

3.4 Recovery and Muscle Activation

Dynamic stretching steps help athletes recover better from training sessions because it makes blood flow faster and relieves tight muscles. After workouts athletes use dynamic stretching to keep their muscles flexible so they can perform better during their next events. Training effectiveness and muscle readiness depend on dynamic stretching during an athlete's workout routine. Though people tend to use dynamic stretching during warm-ups it proves essential for helping athletes recover after workouts or events. Physical activity taxes muscles which become too stiff and unresponsive which blocks the athlete's recovery and future performance. When you engage in dynamic stretching it helps you recover by moving blood through muscles more efficiently to take out harmful lactic acid that builds up during exercise. Better blood delivery to muscles delivers oxygen and nourishment to make recovery happen faster with less muscle pain. Dynamic stretches improve muscle performance and reactivate muscles that stop working when resting or taking part in intense exercises. Through stretching your muscles will be better prepared for long physical movements.

Following sprint workouts and throwing exercises particular muscle groups prepare for training and competition by performing dynamic stretches including leg swings hip openers and torso twists. During warmups the right muscle stretches help you move correctly and preserve your muscle performance for competition training. During recovery periods dynamic stretching methods improve muscle flexibility better than passive stretches because you move through full ranges of motion. Athletes in track and field sports need complete mobility training because it allows them to perform their events with better results. The positive effects of dynamic stretching exercises during recovery protect joints and muscles ensuring athletes remain fit and lower their risk of getting hurt. When athletes perform dynamic stretching their muscles regain their full range of movement quicker through better blood

circulation and active movement retention. Through recovery exercises athletes experience quicker restoration to peak performance and faster recovery times.

3.5 Training Programs

Athletic experts need to add dynamic stretching routines to personal training plans for track and field athletes. Trainers make perfect dynamic stretching routines for athletes to reach event-specific fitness goals and improve their competitive results.

3.6 Sports Rehabilitation

By using rehabilitation techniques this stretching style enables athletes to rebuild joint mobility while strengthening their muscles and growing their range of movement. By properly stretching key muscle groups athletes gain better joint flexibility and improved muscle coordination which helps them heal quickly and get back to competition.

3.7 Developing Youth Athletes

By performing dynamic stretching exercises athletes develop both their flexibility and improved movement synchronization. Athletic training with dynamic stretching begins at the right age to make sure athletes maintain their physical strength in track and field events. A dependable youth athlete development process requires dynamic stretching which teaches athletes basic physical skills such as fitness level and muscle response funds coordination. Track and field students gain better muscle control through dynamic stretching which helps them move their bodies more easily. Through early dynamic stretching children master right movement strategies that let them use their full body effectively during sprints jumps and throws. Youth athletes should use walking lunges with arm circles and leg swings because these exercises effectively target muscles while improving flexibility without risking injury. By stretching the right muscles during dynamic movements athletes decrease their danger of injury while increasing training intensity.

When coaches introduce dynamic stretching to young athletes, they build essential warm-up routines that will benefit their sports development. Track and field athletes benefit when they learn to generate both quick power and speed because of dynamic stretching techniques. Linear running movements with high knees butt kicks and hip turns will improve athletes' running style and sprint techniques to succeed. The use of dynamic stretches helps young athletes begin their training journey while understanding how it protects them from sports injuries. Young athletes develop poor training habits because they perform intense workouts before learning about appropriate warm-ups and muscle preparation. University campuses accept dynamic

stretching as the leading method to help athletes understand that warm-up preparation keeps them safe and improves performance. Foundational dynamic stretching programs help young athletes become stronger at muscle control and joint flexibility as they naturally boost performance and protect against future strains. Dynamic stretching helps track and field athletes perform better while building stronger bodies and reducing their career risk.

4. Conclusion

Track and field athletes receive better warm-up results from dynamic stretching. Dynamic stretching prepares athletes for competition by improving both their movement skills and muscular activation better enabling them to perform at top speed. Research proves that dynamic stretches help athletes perform safely at high speeds and gain better muscle function plus joint control to avoid sports injuries. Adding dynamic stretching to their pre-training and competition practice helps track and field athletes reach better outcomes and stay safe from injury.

Coaches and players need to use dynamic stretching as their training foundation because it improves performance today with enhanced fitness gains tomorrow. Training programs for athletic youth still depend on dynamic stretching as they let young athletes reach higher sports results safely. Regular dynamic stretching helps young track and field athletes improve muscle control so they can get stronger and better at their chosen sports. Athletes experience better sports abilities now and develop optimal potential for future sports success through dynamic stretching.

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