Acute Effects of Stretching Types during Warm up on Selected Skill Related Performances at Ethiopian Defense Sport Club Middle Distance Athlete

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Abstract

The purpose of this study was determined the acute effect of stretching types during warm up on selected skill related performances and its association with the occurrence of injury during training and competition at Ethiopian defense athletics sport club. The total athletes selected for this study were (N=30) fourteen male and fourteen female with age range of 18-24. The athletes were oriented about the test and its objective, There was no control group in this study. An experimental group used for intervention after grouped for three. The athletes were assigned randomly for three groups having different week of stretching introduction during warm up but same training. Every group will have the intervention of no stretching, static and dynamic stretching weeks for three times interchangeably. The intervention lasts for nine weeks. After the intervention from one stretching type to the others the tests were taken at the fifth day of every week. One-way repeated measures ANOVA were conducted to compare scores on all tests across groups while repeated measure of ANOVA was employed to check the performance difference of the athletes while having different stretching week. Based up on the test there is a significant difference in athletes, agility, Broad Jump and 400m performance during dynamic stretching than static and No stretching. Better Activeness were reported during Dynamic Stretching-3 (DS-3) mean=4.46±.33, static stretching-3 (SS-3) mean=4.23±.42, and No Stretching-3 (NS-3) mean=3.54±.88. 7. In addition to this Better Pace Performance test result shows that DS-3 mean=4.55±.32, SS-3 mean=4.34±.56, and NS-3 mean=4.34±.27. Furthermore the Consistency of Performance test result shows that DS-3 mean= 4.63±.42, SS-3mean=4.63 ±.42, and NS-3 mean=4.42 ± .28. , There was a significant effect for Activeness/Direct Enrollment scores During Dynamic stretching time training. Activeness average score which is close to very good and followed by static stretching which is close to good. There is also a significant decline for Activeness/Direct Enrollment on athletes during no stretching time which is less than good. On the other hand there was no significant effect for Better Pace/Consistency and Consistency of Performance but average score mean of dynamic stretching has shown better result than static stretching and no stretching. From the data collected it is concluded that the dynamic stretching has a better effect on agility broad jump and, 400m performance followed by static and No stretching. A significant better accomplishment of Activeness during dynamic stretching was recorded followed by static and No stretching .Thus it is concluded that overall dynamic stretching can support for better performance than static and no-stretching performance.

Key Word: *Activeness/ Direct Enrollment, better performance, Performance Consistency*

1. Background of the Study

"Warming-up" is a term which covers activities such as light exercise, stretching, and even psychological preparation, before undertaking major sporting activity (Best & Garrett, 1993). Warm-ups, including stretching, have been recommended as a means of reducing musculoskeletal injury because they improve the range of motion of the joints and improve muscle elasticity, thereby removing some of the physical stresses associated with running (Thacker S.B., Gilchrist J., Stoup D.F., Kimey C.D.:2004). Stretching or cooling-down after exercise may be more physiologically effective. This is because there is an increased amount of heat generated in the soft tissues after exercise and this is necessary for the increased elasticity that would enhance stretching (McQuade, 1986). Common clinical practices suggest that pre- and post-exercise stretching or flexibility can enhance performance and prevent injuries by increasing flexibility and joint range of motion (Arnheim& Prentice, 1993; Brukner& Khan, 2003).

There are three stretching techniques that are frequently used: static, dynamic, and proprioceptive neuromuscular facilitation (PNF) (Shrier, 1999). Static stretching is the most common, and believed to be the safest, and is performed by placing the muscle in its most lengthened position and holding it there for at least 30 to 60 seconds (Shrier, 1999). Dynamic stretching consists of controlled body movements that take the limb to the limits of its range of motion (Shrier & Gossal, 2000). Ballistic stretching which incorporates rapid movements and bouncing is discouraged for most sports as during these types of movements the muscles have a greater stiffness and resistance to stretch, which does not help in lengthening the tissues (McCullough, 1990).

While warm up is considered to be essential for optimum performance, there is little scientific evidence supporting its effectiveness in many situations. The value of a warm-up is not in question but the role of static stretching within the warm-up is contentious. A number of studies have suggested that static stretching is detrimental to performance (Shrier, 2004), though these have not always employed stretching protocols that reflect those actually used by performers. Stretching activities before exercise are believed to prepare the musculo-skeletal system for physical activity and sport events by improving joint range of motion, thus promoting improved performance and reducing the relative risk of injury. As athletes prepare for performance, the chosen method of warm-up should best prepare the athletes for performance in the following activity.

Dynamic stretching in repeated cases have been suggested as the main technique of stretching in the pre-event warm-up before high speed, and power activities (Fletcher & Jones, 2004; Little & Williams, 2004; Young & Behm, 2003). Consequently, athletes, coaches and sport practitioners regularly include stretching exercises in both training programs and in pre-event warm-up activities. Many athletes continue to include static stretching as part of their routine, often following a warm-up.

A systematic review conducted by Yeung and Yeung (2001), shows that studies which have been done determining the effect of stretching either before or after exercise on soft tissue flexibility and joint range of motion demonstrated contradictory findings. Conversely, numerous studies documented the effect of stretching on the increase of soft tissue flexibility and joint range of motion (Magnusson, Simonsen, Aagaard, Sorensen, &Kjer, 1996; Harvey, Herbert, &Crosbie, 2002). In comparison to the above, it has found neither a significant positive nor negative effect of different types of stretching, warm-up or cool-down can be deduced. Hence, there is inconclusive evidence as to its effect on the soft tissue flexibility and joint range of motion and the occurrence of injuries. Peter J L Thompson1996, 2005 in Ethiopia, stated that most athletes and coaches are still widely using static stretching as part of their pre-Physical Activity and competition routine. To date there is not enough research done to determine the acute effect of stretching types during warm up on selected skill related performances and its association with the occurrence of injury during training and competition at Ethiopian defense athletics

1. Objectives of the study

This study determined the acute effect of stretching types during warm up on selected skill related performances & its association with the occurrence of injury during training & competition at Ethiopian defense athletics club.

2. Design of the Study

The researcher employed a quasi- experimental research design so as to identify the effects of dynamic and static stretching warm up exercise on agility and power, speed endurance, and endurance performance of middle distance athlete in various stretching type repeatedly. The independent variables were the stretching protocol used (dynamic stretching warm-up protocol, static stretching warm-up protocol and No stretching warming up protocol) whereas the dependent variables were agility, power speed endurance Consistency of performance and pace

3.Participants and Sampling Technique

The subjects in this study consisted of both male and female middle distance Athletes. The study involved 30 athletes. The subjects screened out for previous history injuries competitive runner with an age range of 18 to 24 years who taken part in competitive running at least once a month. All athletes train daily for at least an hour who is a member middle distance athlete at defense force sport club. Thus Census was used as study population size. Study participants were randomly assigned in to three groups to alternatively intervene for static stretching, no stretching and dynamic stretching with same warming up length as well as followed training.

4. Training Protocol

The study was conducted at Mekelakeya athletics club of middle distance athletes performing the same warm up routine procedures. The first session was a familiarization session and Study participants were randomly assigned in to three groups and each group had 10 members who alternatively intervene for static stretching, No stretching and dynamic stretching with same warming up length. Which means a group that stays as a no stretching for a week would follow a dynamic stretching and static stretching week consecutively. Similarly a group which stayed the week with dynamic stretching would follow static stretching and No stretching week. Accordingly each athlete's performance on the dependent variables were taken at the fifth day of the training and recorded under the stretching group s/he had stayed. Similarly each athlete's response during the training for Activeness/direct enrollment to the task, Better pace time and Consistence of performance was measured by the checklist that contained indicators of each variable. The checklist were filled by three experienced coaches and the average score at the fifth day was also recorded similarly. In 9 weeks all athletes of the three groups had equal number of Static stretching, dynamic stretching and No stretching days prior to their training that were similar. Thus there was no group specific to one type of stretching category. Every group got every stretching category of training alternatively and their responses were recorded daily for the Activeness/direct enrollment to the task, Better pace time and Consistence of performance but weekly for the fitness indicator tests. All groups followed the same protocol on testing days. The time between finishing the warm up and beginning the performance testing was approximately 2 minutes. Subjects at each session had been critically observed and evaluated by three experienced coaches for nearly one months. The evaluation was with likert scale from 5. 5= very good , 4= good , 3= fair , 2= poor , 1= Very bad . The average Measurements score of training performance of indicator activeness/ direct enrollment, consistency of performance, better pace/consistency recorded on the subject's data sheet. Once all subjects' results were written down, researchers then repeated the same lateral one step choice reaction time testing protocol for each subject. (see Table 1)

Table 3.2: Order of stretching method was assigned to group participant

Week	Group One	Group Two	Group Three
First Week	Dynamic Stretching	Static Stretching	No Stretching
Second Week	No Stretching	Dynamic Stretching	Static Stretching
Third Week	Static Stretching	No Stretching	Dynamic Stretching
Fourth Week	Dynamic Stretching	Static Stretching	No Stretching
Fifth Week	No Stretching	Dynamic Stretching	Static Stretching
Sixth Week	Static Stretching	No Stretching	Dynamic Stretching
Seventh Week	Dynamic Stretching	Static Stretching	No Stretching
Eighth Week	No Stretching	Dynamic Stretching	Static Stretching
Ninths Week	Static Stretching	No Stretching	Dynamic Stretching

6. Procedures of Data Collection

6.1. Standing Broad Jump Test

The athlete places their feet over the edge of the sandpit. The athlete crouches, leans forward, swings their arms backwards, the jumps horizontally as far as possible, jumping with both feet into the sandpit. The coach should measure from the edge of the sandpit to the nearest point of contact. The start of the jump must be from a static position

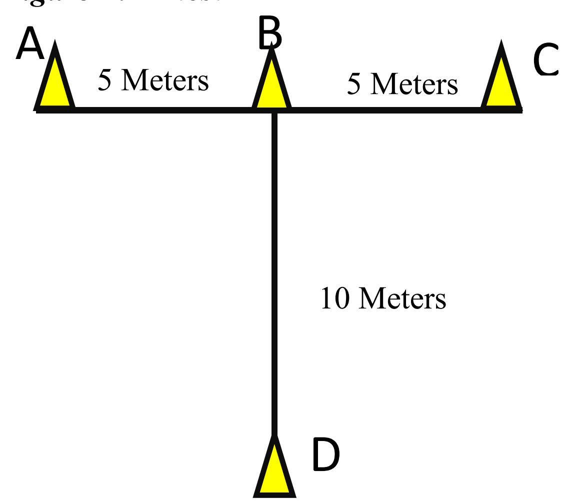
6.2. 400 Meter Test: conducted as follows

- Athlete use a standing start with leading foot behind the starting line
- On the command "Go", the athlete sprints as fast as possible around the 400m track
- Assistant records the final 400m time

6.3 T-Drill

This test requires the athlete to touch a series of cones set out in "T" shape whilst sidestepping and running as fast as possible. The T-Drill was selected as measurement tool because of the dynamic nature of athletic events. These athletic events involve elements of speed, change of direction, and varying types of movement. T-Drill is carried out as follows: The assistant places 3 cones 5 meters apart on a straight line (A, B, C) and a 4th cone (D) is placed 10 meters from the middle cone (B) so that the 4 cones form a 'T'. The athlete stands at the cone (D) at the base of the "T" facing the "T" The assistant gives the signal to 'Go', starts the stopwatch and the athlete commences the test**.** The athlete runs to and touches the middle cone (B), sidestep 5 meters to the left cone (A) and touches it, sidestep 10 meters to the far cone (C) and touches it, side step 5 meters back to the middle cone (B) and touches it and then runs 10 meters backwards to the base of the 'T' and touches that cone (D) The coach stops the stopwatch and records the time when the athlete touches the cone at the base of the "T". (BrianMac,

***Figure 1*: T- test**



6.4. Better Pace Time

Better pace was evaluated by considering each phases of training time. Coaches evaluated the appropriate pace management during reputation trainings weather the athlete maintains the pace as ordered by the coaches each time in the checklist. And the evaluation was with likert scale from 5. 5= very good, 4= good, 3= fair, 2= poor , 1= Very bad. Accordingly Each days average score of the three coaches were recorded.

6.5. Consistence of Performance

Similar to Better pace the athletes Consistency of performance throughout the training session were recorded on the checklist after each reputation. Each athlete's ability to accomplish the training breaks and stamina consistency of performance were recorded on the checklist.

6.6. Activeness or Direct Enrolment of Athletes

The most important activeness indicators for athletes or players include psychophysiological compatibility, socio psychological compatibility, and readiness score. Psychophysiological compatibility refers to the compatibility of nerve processes and subjective assessments of game partners, which can significantly impact performance (Alona Romaniuk, 2018). Socio psychological compatibility, measured through socio metric status and motivation for sports activities, also plays a role in the success of athletes (Alexander Gavrilovich , 2021). . Additionally, the readiness score, which is determined by a comprehensive set of metrics collected through athletic monitoring systems, provides coaches with real-time information about an athlete's readiness for competition, adaptation to training, and risk for injury (Dmitry et.al.2009). These indicators listed on the checklist for coaches to athletes assess the physiological and psychological conditions and make informed decisions.

6.7. Test of Instruments

The Content validity of the instruments were examined by a team of experts from the sport academy and Kotobe Education University and improved accordingly. Test retest method was used to check the reliability of the instruments and resulted for high score of .89 for the sport academy coaches.

7. Methods of Data Analysis

The data was quantitative in nature .Descriptive and inferential statistical were carried out to indicate the status of the dependent and independent variables as well as controlling variables before and after the intervention. Repeated measures of ANOVA was performed to determine if there is any significant change on selected variables during static, dynamic or no stretching prior to the measured variables during training and competition. Repeated measures of ANOVA was administered also to check if there is any significant difference across the nature and presence of stretching (during static, dynamic or static stretching prior to the measured variables) prior to the measured performance during training and competition presented as mean and standard deviation. Chi-square was applied to check if there is any association between the incidence of injury and presence or type of stretching during warming up. All comparisons were made at ($p< 0.05$) level of significance.

7.1. Acute Effect Differences on Athletes skill related performances

Acute differences on Agility Performance after Different stretching type's presence and absence

(Cohen (1988, pp. 284-7) (.0l=small, .06=moderate, .14=large effect), this result suggests a very large effect size.)

Table.** 4.1**: Agility Score Differences of the Athletes after their First Different Stretching Practice

Descriptive Statistics			
	Mean	**Std. Deviation**	**N**
T-test Dynamic -1	12.0993	.98852	28
T-test Static - 1	12.4436	.96107	28
T-test No stretching -1	12.7468	1.00131	28

A one-way repeated measures ANOVA was conducted to compare scores on the t-test agility scores of an athlete after different stretching type intervention: after a week with first time Dynamic, Static and No Stretching intervention of every group. There was a significant effect for Agility scores, Wilks' Lambda = .384, F (2, 26) = 20.82, P <.0005, multivariate partial eta squared = .62 which is large effect size. As we can see on the mean value of agility scores athletes with their Dynamic stretching week have the best agility scores (M=12.099, std=.99) followed by static stretching (M=12.44, std=.96). There is also a significant decline for agility performance on athletes during no stretching time at the first round.

The second round test on agility performance significant difference is also in line with the first round. A one-way repeated measures ANOVA was conducted to compare scores on the t-test agility scores of an athlete after different stretching type intervention: after a round week for the second time with Dynamic, Static and No Stretching second week. This time every group did a different stretching intervention type of their first week. There was a significant effect for Agility scores, Wilks' Lambda = .42, F (2, 26) = 17.6, P < .00, multivariate partial eta squared = .58 which is large effect size. As we can see on the mean value of agility scores athletes with their Dynamic stretching week have the best agility scores (M=12.17,Std.=.997) followed by static stretching (M=12.38,std=.97) and No Stretching (M=12.7,std=.91). Even though the standard deviation indicates the significant variation among athletes response there is still a significant difference in athletes agility in favor of dynamic stretching followed by static and No stretching.

The third round agility test score is also strengthen the idea of saying athletes have a better performance in agility resulted from acute effect of dynamic stretching. A one-way repeated measures ANOVA indicated that the test on agility t-test scores of an athlete after a round Static, dynamic and No Stretching unlike of their previous weeks. There was a significant effect for Agility scores, Wilks' Lambda = .5, F (2, 26) = 12.99, P < .00, multivariate partial eta squared = .5 which is large effect size. As we can see on the mean value of agility scores athletes with their Dynamic stretching week have the best agility scores (M=12.42, Std.=.9) followed by static stretching (M=12.72, std=.92) and No Stretching (M=12.78, std=.96). Still the standard deviations indicate significant variations among athletes response, there is still a significant difference in athletes agility performance in support of saying dynamic stretching has an acute effect on athletes agility performance followed by saying static has a significant acute effect on better agility performance compared to No stretching. Accordingly it has also proved that dynamic stretching has an acute effect on athletes' agility than static while static is better than no stretching.

Table 4.5: Agility score differences after the third round of different stretching practice

Descriptive Statistics			
	Mean	**Std. Deviation**	**N**
T-test Dynamic Average	12.22	.91656	28
T-test Static –Average	12.52	.90880	28
T-test No stretching –Average	12.75	.90128	28

In three groups stretching category result also There was a significant effect for Agility scores, Wilks' Lambda = .19, F (2, 26) = 55.4, P < .00, multivariate partial eta squared = .81which is large effect size. As we can see on the mean value of agility scores athletes with their Dynamic stretching week have the best agility scores (M=12.22, Std. =.92) followed by static stretching (M=12.52, std=.91) and No Stretching (M=12.75, std=.92). In this regard Warm up Stretching training have been very common among the athletic population, making up a large part of training programs as well as pre-event warm-up routines for athletes. Houglum PA(2001) has been theorized by athletes, coaches, and athletic trainers that increasing flexibility is an important aspect of physical fitness, leading to an increase in performance as well as reducing incidence of injury (Weerapong P,Hume PA & Kolt GS. 2004) However, another research has found that the acute effects of stretching may have negative results on both performance and risk of injury. Stroup DF, Kimsey DC. 2004. In this study the selected measures on the t-test for agility middle distance saying dynamic stretching has an acute effect on athletes agility performance followed by saying static have a significant acute effect on better agility performance compared to No stretching . In previous research it has been recommended to use dynamic stretching as the primary method of stretching pre-event warm-up before high speed, and power activities (Little & Williams, 2004).

The findings of this study agree with that recommendation for agility activities as well. This study supported the use of dynamic stretching in eliciting the greatest performance in agility movements by decreased T-Drill time. The findings of the current study are consistent with those of Fletcher and Jones (2004), and Young and Behm (2003) who determined that dynamic stretching elicits the best performance in and no stretching effect on agility, and acceleration (Fletcher & Jones, 2004; Nelson et al., 2005). As acceleration is a component of agility, these findings support those of Fletcher and Jones (2004) and Nelson et al. (2005). Agility also involves components of braking, and change of direction. Static stretching prior to agility activities was found to have a negative effect on agility performance.

7.2 Acute differences on leg Power/Broad Jump/ Performance after Different stretching type's presence and absence

(Cohen (1988, pp. 284-7) (.0l=small,

.06=moderate, .14=large effect), this result suggests a very large effect size.)

A one-way repeated measures ANOVA was conducted to compare scores on the Power/Broad Jump/scores of an athlete after different stretching type intervention: after a week with first time Dynamic Stretching, after a week with First time Static Stretching and after a week with first time No Stretching training. The means and standard deviations are presented in Table 6. There was a significant effect for Leg power scores, Wilks' Lambda = .54, F (2, 26) = 10.3 , P < .0005, multivariate partial eta squared = .46 which is large effect size. As we can see on the mean value of Broad jump scores athletes with their Dynamic stretching week have the best scores (M=2.02, std=.39) followed by static stretching (M=1.95,std=.38). There is also a significant less leg power performance on athletes during no stretching time.A one-way repeated measures ANOVA was conducted to compare scores on the Broad Jump performance scores of an athlete after different stretching type intervention: after a round week for the second time with Dynamic, Static and No Stretching training. The second round test on Broad Jump performance difference is also in line with the first round. There was a significant effect for Agility scores, Wilks' Lambda =.42, F (2, 25) = 17.31, P < .00, multivariate partial eta squared = .58 which is large effect size. Athletes with their Dynamic stretching week had the best power scores (M=1.999, std=.34) followed by static stretching (M=1.88, Std. =.37) and No Stretching (M=1.79, std=.36). Even though the standard deviation indicates significant variation there is still a significant better Broad Jump performance for dynamic stretching.

The third round Broad Jump performance test score also indicates better mean score for dynamic stretching acute effect category. However A one-way repeated measure ANOVA indicated that there was only significant difference between Dynamic and No Stretching. Moreover There was no significant effect for **Broad Jump** scores, Wilks' Lambda =.89, F (2, 25) = 1.5, P <.23.

To conclude this athletes average leg power scores with the three round dynamic, static and no stretching have also been tested. The ANOVA result proved athletes leg power (Broad Jump) is best after dynamic stretching and better after static stretching and least if there is no stretching at all. Accordingly the result indicated significant effect for leg power scores, Wilks' Lambda = .41, F (2, 25) = 18.2, P < .00, multivariate partial eta squared = .56 which is large effect size. As we can see on the mean value of leg power scores athletes with their Dynamic stretching week have the best scores (M=2.01, Std. =.34) followed by static stretching (M=1.95, std=.35) and No Stretching (M=1.88, std=.33). In this regard Roberts et al (2011) reported that static stretching before exercise has no significant effect on the lower and upper body muscular endurance. In some studies, that investigated the effect of static stretching on performance has shown that stretching has no significant effect on the performance (Roberto et al., 2011; Tsolakiset al., 2010; Yamaguchi et al., 2006). In partial confirmation of our findings can note to Tsolakiset al (2010) that showed implementation of static stretching before exercise does not have a significant effect on the muscular power of the professional fencers.

7.3. Acute Differences on Speed Endurance/400M/ Performance after Different stretching presence and absence

(Cohen (1988, pp. 284-7) (.0l=small, .06=moderate, .14=large effect), this result suggests a very large effect size.)

A one-way repeated measures ANOVA was conducted to compare scores on the Speed Endurance/400M/ scores of an athlete after different stretching type intervention. There was a significant effect for Leg power scores, Wilks' Lambda = .47, F (2, 25) = 10.95, P < .0005, multivariate partial eta squared = .46 which is large effect size. The mean value of Speed Endurance/400M/ scores athletes with their Dynamic stretching week have the best scores (M=53.94, std= 4.54) followed by static stretching (M=54.38, std=4.48). There is also a less leg power performance during no stretching. The second round test on Speed Endurance/400M/ performance difference is also in line with the first round. There was a significant effect for Agility scores, Wilks' Lambda =.53, F (2, 25) = 10.93 P < .00, multivariate partial eta squared = .48 which is large effect size. As we can see on the mean value of Speed Endurance/400M/ scores athletes with their Dynamic stretching week have the best agility scores (M=54.01, std=4.52) followed by static stretching (M=54.62, Std. =4.31) and No Stretching (M=54.99, std=4.13. Furthermore the third round Speed Endurance/400M/ performance test score has also strengthen the idea of saying athletes have a better performance in Speed endurance resulted from acute effect of dynamic stretching. A one-way repeated measure ANOVA indicated that Speed Endurance/400M/ performance scores of athletes after the thrid round week dynamic Stretching has a significantly better score .

There was A significant effect for Speed Endurance/400M/ scores, Wilks' Lambda = .65, F (2, 25) = 6.67, P < .23, multivariate partial eta squared = .35 which is large effect size. As we can see on the mean value of Speed Endurance scores athletes with their Dynamic stretching week have the best speed scores (M=52.45, Std.=10.93) followed by static stretching (M=52.6, std=10.98) and No Stretching (M=52.66, std=10.97). Even though stile the standard deviations indicate significant variations among athletes response, there is still a significant difference in athletes speed performance in support of saying dynamic stretching has an acute effect on athletes Speed Endurance. To conclude this also The finale average score which means athletes average Speed Endurance/400M/ scores with the three round for the dynamic, static and no stretching have also tested . The ANOVA result proved saying the acute effect on athletes Speed Endurance/400M/ is best after dynamic stretching and better after static stretching and least if there is no stretching at all. There was a significant effect for Speed Endurance/400M/ scores, Wilks' Lambda = .42, F (2, 25) = 17.2, P < .00, multivariate partial eta squared = .58 which is large effect size. As we can see on the mean value of speed scores athletes with their Dynamic stretching week have the best agility scores (M=53.47, Std. =5.98) followed by static stretching (M=53.87, std=5.86) and No Stretching (M=54.18, std=5.7).

Thus there is still a significant difference in athletes Speed Endurance/400M/ performance in support of saying dynamic stretching has an acute effect on Speed Endurance/400M/ performance followed by static and No stretching.

8. Acute Effect Differences on Athletes Training Performance Variables

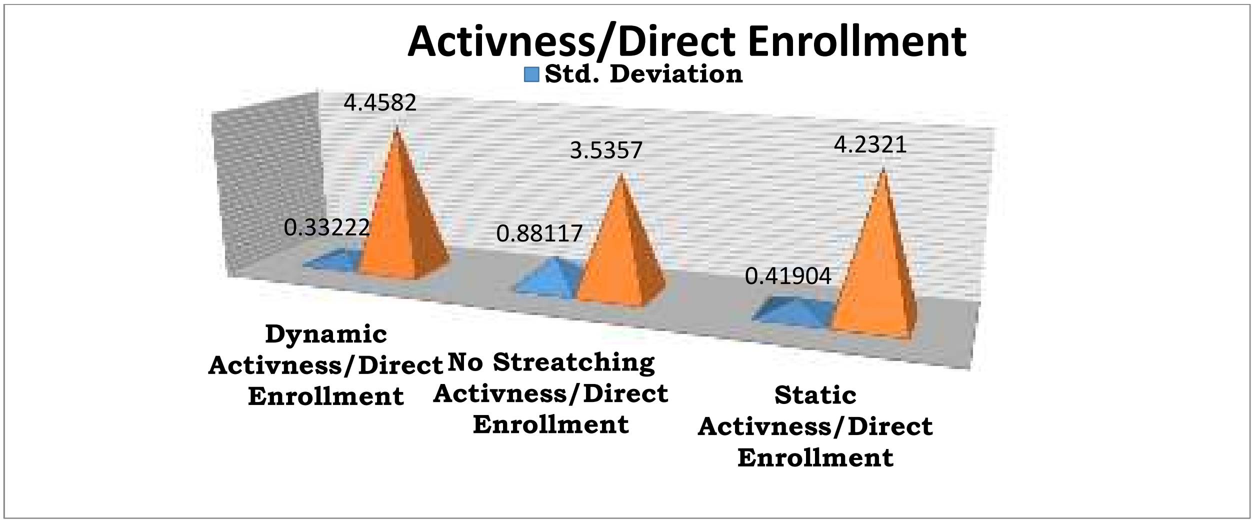
8.1. Activeness / Direct Enrollment Repeated Measures

Athletes at each session have been critically observed and evaluated by three experienced coaches for nearly two months. The evaluation was out of a likert scale from 5. 5= very good , 4= good , 3= fair , 2= poor , 1= Very bad . The average score of the three coaches were recorded each day for each athlete.

A one-way repeated measures ANOVA was conducted to compare scores on the **Activeness/Direct Enrollment** scores of an athlete after different stretching type intervention: after 9 week during with Dynamic Stretching, Static Stretching and No Stretching training.

Thus Athletes aggregated score in 9 weeks with 3 weeks for facing each stretching type introduction have been compared. The means and standard deviations are presented in Graph 2.

Graph 1. Training Performance Indicator of Activeness/ Direct Enrollment

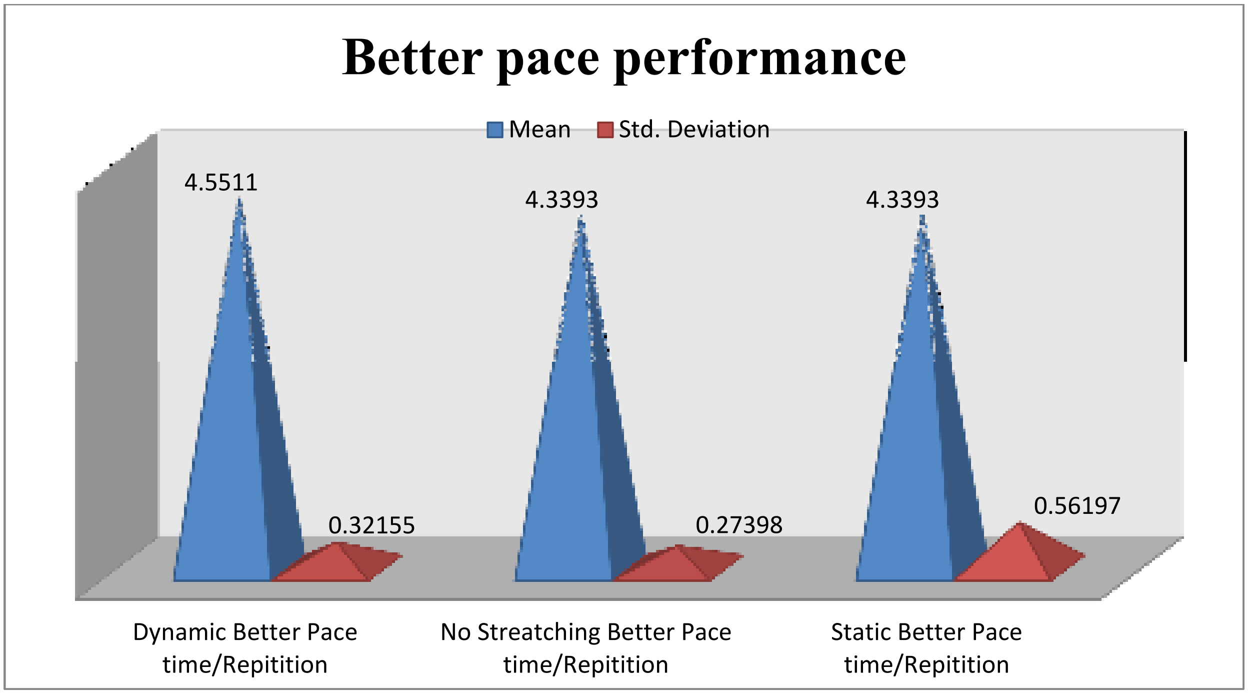


There was a significant effect for Activeness/Direct Enrollment scores Wilks' Lambda = .47, F (2, 26) = 14.87, P <.00, multivariate partial eta squared = .54 which is large effect size. As we can see on the mean value of activeness/ Direct Enrollment scores athletes during their Dynamic stretching time prior to their training were actively enrolled compared to during static stretching and no stretching time. During Dynamic stretching training activeness average score (M=4.46, std=.33) which is close to very good and followed by static stretching (M=4.23, std=.42) which is close to good. There was a significant decline for Activeness/Direct Enrollment (M=3.54, std=.88) on athletes during no stretching time which is less than good.

8.2.Better Pace/Consistency of Performance Repeated Measures

The following same training have been evaluated for A one-way repeated measures ANOVA was conducted to compare scores on the **Better Pace/Consistency** scores of an athlete after different stretching type intervention: after 9 week during with Dynamic , Static and No Stretching training. Thus Athletes aggregated score in 9 weeks with 3 weeks for facing each stretching type introduction have been compared. The means and standard deviations are presented in *Graph 3.*

Graph 3. Training Performance Indicator of Better Pace/Consistency of Performance Repeated Measures



There was no significant effect for Better Pace/Consistency scores Wilks' Lambda =. 80, F (2, 26) = 3.24, P <.055, multivariate partial eta squared = .199 which is too large effect size. As we can see on the mean value of Better Pace/Consistency scores athletes during their Dynamic stretching time prior to their training actively enrolled compared to during static and without stretching . During Dynamic stretching time training activeness average score (M=4.55, std=.32) is close to very good and followed both by static stretching b(M=4.23, std=.42)and no stretching time M=4.34, std=.27). Both are close to good. There were also no a significant decline for Activeness/Direct Enrollment.

Better pace / consistency training have been evaluated. A one-way repeated measures ANOVA was conducted to compare scores on the **Better Consistency of Performance** scores of an athlete after different stretching type intervention: after 9 week during with Dynamic Stretching, with Static Stretching and after with No Stretching training. Thus Athletes aggregated score in 9 weeks with 3 weeks for facing each stretching type introduction have been compared.

There was no a significant effect for **Consistency of Performance** Wilks' Lambda = .84, F (2, 26) = 2.52, P < .100, multivariate partial eta squared = .162 which is small effect size. As we can see on the mean value of **Consistency of Performance** scores athletes during their

Dynamic stretching time prior to their training **Consistency** average score (M=4.63, std=.42) which is close to very good and followed by no stretching (M=4.42, std=.28)) which is close to good and during static stretching (M=4.63, std=.42). There was also no a significant decline for **Consistency of** time.

Similarly there was no a significant effect for **Better pace / consistency** scores Wilks' Lambda = .84, F (2, 26) = 2.52, P < .100, multivariate partial eta squared = .162which is not large effect size. As we can see on the mean value **Better pace / consistency** scores athletes during their Dynamic stretching time prior to their training **consistency** average score (M=4.63, std=.42) which is close to very good and followed both by static stretching b (M=4.63, std=.42),) and no stretching time (M=4.42, std=.28). Both are close to good. There are also no a significant decline for Activeness/Direct Enrollment. There was no a significant effect for **Better pace / consistency** scores Wilks' Lambda = .84, F (2, 26) = 2.52, P < .100, dynamic (M=4.63, std=.42) (M=4.63, std=.42), no stretching (M=4.42, std=.28) and static (M=4.43, std=.45) Even though the test of **Consistency of Performance** mean shows difference, We can say that there is no significant difference resulted from the acute effect of stretching types introduced.

To conclude this also The finale average score which means athletes average **Consistency of Performance** scores with the dynamic, static and no stretching have also tested . The ANOVA result proved the acute effect on athletes **Consistency of Performance** is best after dynamic stretching and better after static stretching and slightly different no stretching compare to static. There was no significant effect for Better Pace/Consistency scores Wilks' Lambda =. 80, F (2, 26) = 3.24, P <.055, multivariate partial eta squared = .199 which is a large effect size. As we can see on the mean value of Better Pace/Consistency scores athletes during their Dynamic stretching time prior to their training were actively enrolled compared to during static stretching and no stretching time. During Dynamic stretching time training activeness average score (M=4.55, std=.32) which is close to very good and followed both by static stretching b(M=4.23, std=.42) and no stretching time M=4.34, std=.27). Both are close to good. There are also no a significant decline for Activeness/Direct Enrollment.

Researchers believed that dynamic stretching exercises because of the same pattern of motion, increasing in muscle temperature there upon increasing in nerve impulses, substrate delivery and etc. Are effective than static stretching. Therefore, previous researches on acute effects of dynamic and static stretching on peak performance then concluded that dynamic stretching are effective than static stretching and improves sport overall performance (Mcmillianet al. 2006; murphy, 2008; Yamaguchi et al. 2006). While some studies have reported inconsistent results with these researches and concluded that dynamic stretching had no effect on sport performance (Beedleet al., 2008; Torres et al., 2008). Today, according to evidence about effects of dynamic stretching on physical activity, fitness and strength training coaches in the warm-up period before main training session, static stretching, and replace by dynamic stretching (Mareket al. 2005a). Comparison between different methods for selecting the most efficient way of doing stretching exercise, provide useful information regarding the variety of specific exercises, for trainers and sport professionals to improve the level of exercise for participants in the different physical activities. One of the common ways to do this is to use static stretching that involves slowly moving a joint motion to the final point, just before the onset of the pain (Vetter, 2007)). However, some studies have shown that performing static stretching before exercise extremely decreases the performance (Franco et al., 2008; Monteiroet al., 2009; nelson et al., 2005; Roberto et al., 2011). In recent decades, researchers have studied the acute effects of stretching on maximal muscle function (muscle strength, muscle endurance, muscle peak power) have done. Most researchers examined the effects of static stretching on muscle peak performance have shown that static stretching may reduce the performance (Franco et al., 2008; Monteiroet al., 2009; nelson et al., 2005; Roberto et al., 2011). In conclusion, the use of warm-up screeching protocols may produce mechanical and neural responses that may affect skill related performance. In this study, we the training related motivations activeness and Consistency of pace which is related to active enrolment were also examined from the psychological readiness perspectives. Psychophysiological compatibility refers to the compatibility of nerve processes and subjective assessments of game partners, which can significantly impact performance (Alona Romaniuk, 2018). Additionally, the readiness score, which is determined by a comprehensive set of metrics collected through athletic monitoring systems, provides coaches with real-time information about an athlete's readiness for competition, adaptation to training, and risk for injury (Dmitry et.al.2009). No such variations were observed from our research regarding the acute effects of stretching types on these psychological variables however Further researches on evaluating theses variables with better evaluation tools can help to study the impact in depth. Although the study provided evidence that may assist coach and athlete in performance settings, certain limitations should be noted. The study is only limited to an acute finding using agility, power, speed endurance and endurance performance only. Future studies should warrant the use of this performance measures in longer time settings.

5.2 Conclusions

❖ It revealed that the type of stretching protocol had a significant effect on the T-test for agility, broad jump for power & 400m speed endurance.

- ❖ Dynamic stretching has an acute effect on athletes, agility and 400m performance than static while broad jump performance decline was also resulted in the absence of Stretching.
- ❖ Consistency of Performance test shows no significant effect for Activeness.
- ❖ Activeness average score; close to very good is followed by static stretching (close to good).
- ❖ There was no significant effect for Better Pace/Consistency &Consistency of Performance. But average score of dynamic stretching has shown better result than static and no stretching.

Generally, it is concluded that overall dynamic stretching has indicated acute effect on performance variables.

5.3 Recommendations

The recent literature on this topic is in favor of dynamic stretching vs. static, however, there are still some aspects that need to be looked at further. For example, the number of studies looking at short distance sprint speed and power tests support the idea that dynamic stretching increases performance. One recommendation for future research would be interesting to compare dynamic and static stretching looking at Better Pace and Consistency of Performance

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