Global Scientific JOURNALS
GSJ: Volume 10, Issue 12, December 2022, Online: ISSN 2320-9186
www.globalscientificjournal.com

MOVING AND IN-PLACE EXERCISES IN LOWERING SPRINT RUNNING TIME

By:

Alex L. Señara, DM, William B. Galceran, Roger B. Marcaida Jr.

Abstract

The 100-meter dash has long been the benchmark in athletics for identifying the "fastest person in the world" at a particular moment in time. The purpose of this study is to improve athletes' 100-meter sprint running speed. A quasi-experimental design was used. There were 60 athletes from the different municipalities and regions in Mindanao who participated to determine the performance and improvement in running speed after exposure to the intervention. After being subjected to the intervention employing lunges and uphill sprinting, the Moving Exercise Group improved from "slow" to "moderately fast". However, the performance of the In-place Exercise Group using A-skip and Straight Leg Bound remained "slow" from the pre-test to the post-test. Both interventions are effective because they reduce ground contact time, but the Moving Exercise group is more effective because the exercises allow for a wide range of movement, acceleration, and force, while the In-place Exercise Group used a skip–straight leg bound, which is just static or steady exercises. It is recommended that athletes perform this exercise properly and safely to prevent injuries.

Keywords: *Lunges, Uphill Sprinting, A-skip, Straight Leg Bound*

Introduction

Sprinting is the act of moving quickly over a short distance while maintaining the highest possible speed for the body. Speed is a must in many sports and physical activities to succeed. This study focused on dynamic drills with two groups, Moving Exercise and In-place exercise Group, using a quasi-experiment to determine which one is a highly effective type of drill that leads an athlete to be competitive in a sprint. In athletics, the 100-meter dash has long been the standard for determining who is the "world's fastest human" for a specific period (Haugen et al., 2019). However, unlike the 200-meter and 400-meter sprints, the 100-meter sprint requires a simple linear running technique. Sprinters in the 100-meter dash do not run on a curved or bending section of the track (Churchill et al., 2019).

Only when training increases stride length without producing a decrease in stride frequency or vice versa could an athlete's running speed be improved. This means that the equation's stride length and its frequency components must be created. Baughman et al. (2017) went on to say that, in addition to stride frequency and length, anaerobic endurance, or the capacity to maintain a peak effort, should be considered when improving an athlete's speed. A runner, Physical Education teacher, and coach must realize that sprinting is the product of stride frequency and stride length to reach maximum speed (Behrens et al., 2021). The researcher observed that only a few players took time to stretch and did it appropriately in the school context, where the researcher was an athlete specializing in track and field. Furthermore, when it comes to training, aspiring athletes overlook and undervalue stretching activities and drills that impair sprinting and stride formation performance.

Knowing that maximum sprinting speed is determined by stride length and frequency, the researcher argued that intervention activities should target one or both of these factors. According to Baughman et al. (2017), flexibility improves stride length by allowing unfettered movement over the range of action. The length of a stride is reduced when flexibility is restricted. On the other hand, strength and flexibility should go together so that improvement can be attained at each pace thereby allowing the athlete to travel farther. Maximizing the potential of an athlete requires proper training through physical activities. To get world-class in many sports and physical activities, one must be quick in dynamic drills. These drills included a moving exercise group: lunges and uphill sprints, and in a place where exercise group: a-skips and straight leg bounds are under study with a quasi-experimental method. Runners were also taught that the more they stretch, the better they perform (Tucker, 2017). As a result, the association between enhanced flexibility and quick running was still being explored. When done at the right moment during running sessions, a moderate quantity and particular forms of stretching help one to run faster since part of the equation is addressed. As a result, the exercise lunges were used as one of the intervention drills in this study. Uphill sprinting, an example of over-speed training, is one approach utilized to improve athletes' stride frequency (Behrens et al., 2021). According to Mack (2019), uphill sprinting can improve coordination while also requiring the legs to balance under quick steps. It is believed that this exercise helped athletes improve their stride frequency in the 100-meter sprint. Furthermore, the basic technical model drill development for speed included drills that isolate and combine joints to rehearse a succession of sensations that establishes the exact sprint of motor pathways. According to Ozolin et al. (2017), teaching strategies for sports might change and be determined solely by the quality of the methods of movement theory, the ease with which the movement is performed with minimal effort, and the precise utilization of energy.

As a result, the A-skip drill combines the running action with knee lifts, which runners and other athletes commonly used to enhance running form and lower body speed, power, and flexibility. Drills that strengthen the muscles assisted and elevate the knees to prevent plodding are known as A-skip drills. It results in a naturally longer stride, allowing one to run faster and more efficiently. Straight leg bound, on the other hand, is an activity in which the athlete bounds forward with their legs straight and feet flexed (i.e., toes pulled up). To perform this drill effectively, the upper body should be kept upright and the back straight. The arms are bent at the elbow and swung dynamically from the shoulders. The basic technical model drill workout is highly particular and matched the motor unit's needs in sprinting. Furthermore, drills are created to copy aspects of good running form, such as upright posture, head position, arm movement, hip extension, and knee drive (Martin, 2017). Correct execution is also dependent on coordination and dynamic balance. As a result, another group of intervention exercises in this study is A-skips and Straight leg bounds. Furthermore, mastering a valuable method will not happen overnight. Before moving on to the technique formula, every sprinter must be physically trained and conditioned to avoid injuries and strains during the execution of procedures. As a result, physical fitness and knowledge of good running mechanics were required. The researcher felt that selecting a suitable intervention exercise is critical to improving students sprinting performance at their maximum velocity. This feeling has contributed to the researcher's mind which gives new information in the research arena. The athlete's highest achievement thus far is in the Philippine National Games (PNG), which may boost their chances of representing in the PATAFA Weekly Relay. To maintain this achievement, a series of training must be conducted to determine potential athletes to represent in competitions. The researcher, being a physical educator and athletic coach, has noticed that many athletes improve their performance by engaging in physical training and conditioning. Hence, the moving exercise compared to the in-place exercise is considered the best strategy for evaluating sprinting speed ability and is thought to be a good idea. The findings of this study will aid coaches in creating more effective drills and intervention programs for the sprint runner's athletes in different municipalities and regions of Mindanao.

Methods

This quasi-experimental study assumes that moving and in-place exercises can improve 100-meter sprint running a sprint. This study was anchored on Movement Theory (Hodges et al., 2012). The movements performed during a sport are an object of movement theory. Without considering the concrete formulation of problems, movement theory is concerned with those (movement) processes that are directed more or less obviously toward the most successful solution of movement tasks given in sports. This study promotes that the lunges develop muscle growth and tone the body, particularly the core, buttocks, and legs. The main benefit of shaping up the body is that it improves the posture and range of motion, pull during uphill sprinting, and physical endurance and strength. The slope of a hill works the glutes, hamstrings, quadriceps, calves, core, and upper body and allows one to gain muscular mass in the same way that weight training did. These lunges and uphill sprinting were classified as moving exercise groups. According to Nguyen (2017), the human body can do seven basic movements, and all other exercises are variants of these seven: pull, push, squat, lunge, hinge, rotation, and gait. One can stimulate all major muscle groups in one's body by executing all these motions.

This study included the importance of A-Skips as a simple practice that aids in developing lower-leg strength while also boosting a-skips and creating a good foot strike. Many elite athletes use A-skips as part of their warm-up routine before a race or speed session to activate the critical muscles that allow them to run faster, while the straight leg bounds teach an athlete how to use the glutes and hamstrings to apply force to the ground through hip extension. It also encourages physical contact between the feet and the ground. These A-skips and Straight Leg Bounds are classified as in-place exercise groups.

Further, it is also found to support the Periodization: Theory and Methodology of Training (Bompa, 2019), describing how speed, agility, and speed endurance are crucial abilities that affect performance in various sports and the like. These abilities were related and largely depended on the athlete's muscular strength. Speed, agility, and endurance are more important abilities that affect performance in various sports. These skills were intertwined and mostly reliant on the athlete's muscular power. The approach, as a rational mode of movement execution, provided for greater conservation and efficient utilization of available biological energy and proper body inclination to obtain maximal speed as rapidly as feasible (Bompa, 2019). To illustrate the above discussions the figure below shows the interplay of the variables used in this study

The Schematic Diagram

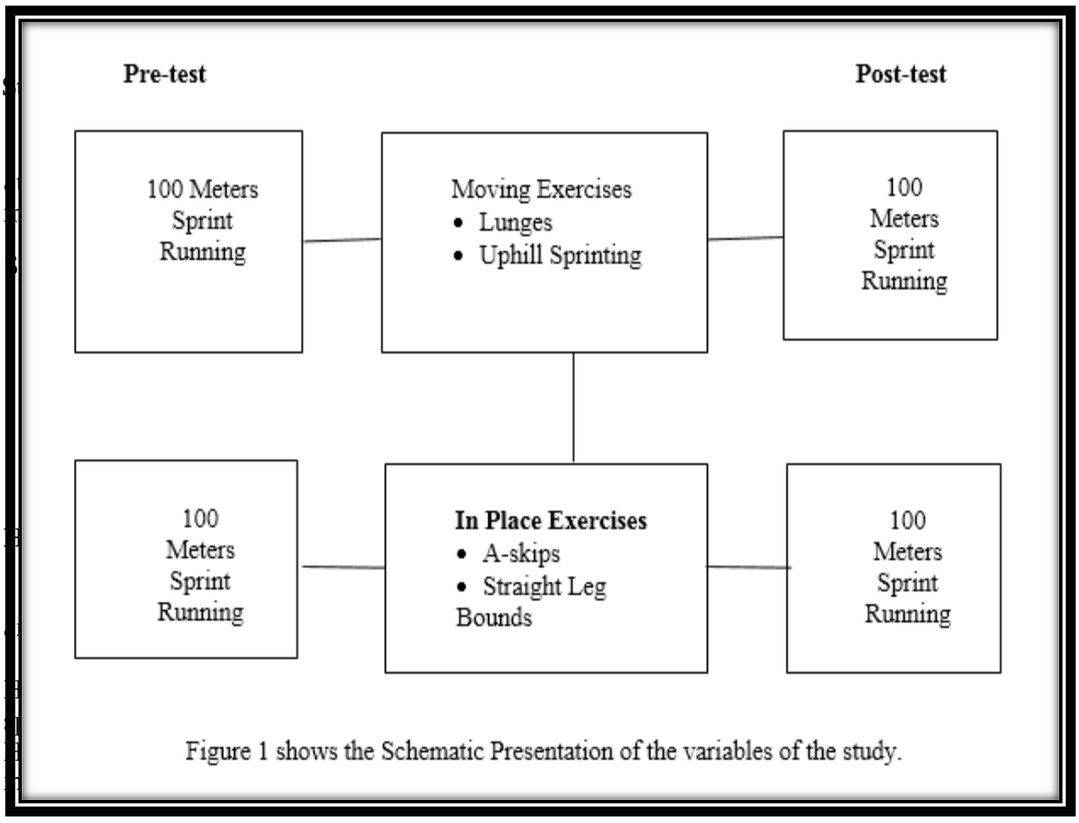

Figure 1 shows the Schematic Presentation of the variables of the study.

Significance of the Study

This study would benefit the following:

Track and Field Athletes. This study help athletes comprehend the concept of good sprint running speed and the value of doing so. Athletes would use this information to create their training program incorporating therein the treatments employed in this study.

Coaches and Trainers. As a result, the findings of this research will aid coaches and trainers in developing methods, particularly in competitive games and competitions.

Future Researchers. This research is significant in terms of giving knowledge, and information and finding gaps in the impact of stride length and frequency exercises on sports skill performance. This will shed light on the issue of athletes' running speed performance.

Scope and Delimitation of the Study

This study is limited to the dynamic drills, namely the moving exercise group: lunges and uphill sprint; and the in-place exercise group: a-skip, straight leg bounds. There were 60 participants from the different municipalities and regions in Mindanao using two groups under quasi-experimental.

The pre-test, post-test, and drills were performed in available open spaces at least 100-meter distance. The participants spent 8 weeks in this study from March 7, 2022, to May 7, 2022.

Definition of Terms

The terminology used in the study was defined conceptually and operationally to eliminate term ambiguity:

In-place Exercises. This term refers to one of the intervention exercises performed or executed "in place." This study comprises two exercises; A-Skips, and Straight Leg Bounds. The exercise is performed for 10 repetitions and 13 sets.

A-Skips. Lift oneself off the ground by forcing one's knee high. Keep the majority of one's movements in the sagittal plane. Keep one's toes towards one's shin by dorsiflexing one's foot. In this study, the participants performed in a series of 10 repetitions over 13 sets.

Straight Leg Bounds. Simply put, straight leg bounding was an activity in which an athlete bounded forward with their legs straight and feet flexed (i.e., toes pulled up). To perform this drill effectively: The torso should be kept upright and the back straight. The arms were bent at the elbow and swung vigorously from the shoulders. In this study, the participants performed in a series of 10 repetitions over 13 sets.

One Hundred Meter (100-m) Sprint. This study focuses on 100-meter distance running. This is a short-distance running event that did not run on a curved or bending section of the track.

Moving Exercises. This term refers to one of the intervention exercises performed or executed "while moving". This study is composed of two exercises, Lunges, and Uphill Sprinting. The exercise is performed for 13 sets over a 35-meter.

Lunges. An exercise in which a person in a standing position steps forward into a position in which the front knee is deeply bent while keeping the torso erect and then returns to the starting position.

Uphill Sprinting. This refers to running at maximum effort uphill, driving the hips forward, and exploding out of each step to propel up and forward. It is similar to plyometric training one gets through burpees, box jumps, and high knees.

Sampling Procedure

The study's participants were athletes from different municipalities and regions in Mindanao in the 100-meter sprint running speed; a total of 60 athletes were part of the study. Furthermore, the participants were split into two groups, namely: Moving Exercise Group included 30 athletes who performed lunges and uphill sprinting scheduled every Monday, Wednesday, and Friday from 4:00 to 5:00 pm, while the In-place Exercise Group included 30 athletes who performed a-skips and straight leg bounds every Tuesday, Thursday, and Saturday at 4:00 to 5:00 pm. The study's duration is 8 weeks, from March 7, 2022, to May 7, 2022. Each group was given different training dynamic drills to improve their 100-meter sprinting running. Because non-controlled variables had influenced the results, using non-uniform comparison groups limited the generality of the findings. The two groups in this study were all experimental. Internal validity was jeopardized when research began with non-equivalent groups which could be a flaw in the quasi-experimental design. The researcher-led and supervised the exercises or interventions to ensure that they were performed correctly and attuned to the intended objective. The researcher considers the quasi-experimental sample size of 30 athletes per experimental group or 60 participants.

In the different municipalities and regions of Mindanao, numerous athletes were involved. However, the researcher used a blended experiment which means that any information that could influence the participants was suppressed until the experiment was over. This explains further that all athletes were given a chance to be a part of the study. The researcher has a direct relationship with the athletes, but this relationship was not utilized to compel them to perform. Participants were interested and eager during the initial discussion with the researcher since they understood the study's objectives. At all times, the participants' willingness was observed. It signified that the researcher covered all costs without tampering with the variables or data. The researcher kept track of the risk-benefit ratio.

Research Instruments

The researcher utilized the Health Appraisal Record to establish the participants' physical condition, which contains the name (optional), weight, height, BMI, and health history. The 100-meter sprint running test was utilized to record the running time and measure the athletes' running speed. In this study, the activity logs of the participants were utilized to track the training program every session. To collect and record the data, the researcher employed the following materials: cones, a stopwatch, a whistle, and a level and clean area of at least 150 meters to measure the athletes running speed.

Scoring Procedure

Five (5) class intervals were utilized to identify the performances and the level of the participants' sprint running speed to determine the rating scale for the 100-meter sprint test. The qualifying time was determined by the PATAFA (Philippine Amateur Track and Field Association) time record (Pinoy Athletics, 2019). Only one trial was allotted, with the lowest time being recorded. The scoring system revealed that the faster the sprint was completed, the higher the performance in running speed.

Range	Description
10 sec. below	Very Fast
10.1-12.8 sec.	Fast
12.9-15.7 sec.	Moderately Fast
15.8-18.6 sec.	Slow
18.7 sec. above	Very Slow

Based on PATAFA (Philippine Amateur Track and Field Association) time record (Pinoy Athletics, 2019)

Statistical Treatment

The quantitative data in this study were analyzed using various statistical methods. Data problem 1 which described the participants' 100-meter sprint running speed before and after the interventions, was organized using descriptive statistics such as frequency, percentage, mean, and standard deviation. For problem 2, the researcher employed a t-Test for Paired Samples to compare their 100-meter sprint running speed before and after the intervention in each group. For problem 3, the researcher utilized the T-test for Independent Samples to measure the two groups' 100-meter sprint running speed increments.

Data Gathering Procedures and Ethical Considerations

The researcher observed the following steps while acquiring data: An approval certificate was secured from the Lourdes College Research Ethics Committee. A permission letter was also sent to the participants through coaches and parents. In addition, a parent's permission was requested to allow their athletes to participate in the study. The researcher conducted an orientation for the study for the selected participants after receiving consent from the coaches and parents. Participation in the study was voluntary and had no bearing on their performances as athletes. They were given plenty of time to confirm. Participants undergo a Health Appraisal before the start of the pre-test to determine their physical condition and to ensure that they were all healthy and able to perform the various exercises in the training program which also included permission to participate in the study conducted. The researcher administered the pre-test and post-test in the open space area with the help of his fellow athletic coach, who served as the starter. Meanwhile, as the timekeeper, the researcher standstill at the finishing line to record individual running time as they reached the line. This is to ensure that all participants in the study have been vaccinated and have a 1-meter physical distance between them; the face mask is not worn during the activities. The researcher must deal with ethical issues. Ethics was challenging because the requirements sometimes conflict with the desire to produce rigorous evidence. Before the conduct of the study, informed consent and information authorization was provided. Informed consent means that the participants had adequate information about the research, comprehend the information given and can consent or decline their participation voluntarily. Fully informed consent in this study involved "communicating the following to the participants; status, study goals, type of data, procedures, nature of commitment, participant selection, potential benefits and risk" if there was, confidentiality pledge, voluntary consent, and contact in participants. The participants signed the informed consent provided and agreed to the research's stipulated terms and conditions.

The researcher carefully considered ethical requirements in planning the study and asked the participants whether they received sufficient protection for their human rights. The questions formulated were based on the performance of athletes on moving and in-place exercises as quasi-experimental. Obtaining informed consent and participant authorization were essential procedures for safeguarding the information of the study. Informed consent allowed the study participants to withdraw or decline participation at any time they wanted.

Consent information was presented to the prospective participants, either orally or in writing, while they were recruited. Written notice was not exploited to replace the spoken explanations, which provided opportunities for elaboration and participant questions and the "screen" of the researchers (Polit et al. 2012).

The activities are documented in the informed contest by having each participant sign a consent form. Using a separate authorization form was advantageous to protect athletes' confidentially because the form does not need to provide detailed information about the purpose of the research. If the research purpose was not sensitive, an integrated authorization and consent form sufficed. Anonymity was secured by protecting confidentiality by not linking the participants to their data. For example, if demographic data were collected from a group of athletes, data coding and analysis should not be limited to participants identifying information. Responses were treated anonymously.

Results were reviewed in each athlete, records from which all identifying information (e.g., name, social security number, etc.) has been expunged, and anonymity was observed. A promise of confidentiality was a pledge that any information participants provided were not publicly in a manner that identified them and would not be accessible to others. The certificate allowed the researcher to refuse the disclosure of the information about the study participants to any civil, criminal, administrative, or legislative proceeding at the national or local level. Furthermore, confidentiality helped the researcher to achieve the research objectives without threatening involuntary disclosure. The researcher obtained a certificate to alert prospective participants about the valuable protection in the consent form and noted any planned expectations. The researcher respected the participants and proactively minimized emotional risk by carefully attending to the nature of the interaction they had with them during the experiment. For example, the researcher was always gracious and polite, phrased the questions tactfully, and was sensitive to cultural and linguistic diversity; the researcher explored more formal strategies to communicate respect and concern for the participants' well-being. For example, it was sometimes helpful to offer debriefing sessions after the data collection was completed to permit participants to ask a question or air

complaints. Debriefing in this study was critical when the data collection was stressful or ethical guidelines had to be "bent" (Polit et al. 2017). Strong commitment and objectively evaluating of this research's risks and benefit assessments are done. Fairness is observed in all efforts to protect participants' rights and avoid the possibility of a biased self-evolution. The ethical dimensions of the study were typically subjected to external review. These were the following criteria stipulated in research ethics:

Prospective participants were the athletes who needed to understand the nature of the research. They were informed that the data they provided was used for research purposes only. The overall goals of the research were stated in inlay rather than in technical terms. The use of this was the description of data. The athletes were told what type of data was collected. The athletes were given 8 weeks of the performance test. The duration was used for the intervention implementation.

Moreover, the athletes were reminded of the expected time commitment at each. The athletes were told how they were selected as participants and how many athletes would be part of the quasi-experimental. The athletes were informed of any foreseeable risk (physical, psychological, social, or economic) or discomforts and efforts to minimize risk. The possibility of foreseeable risk was discussed. When risks were minimal, prospective participants should be encouraged to seek advice before the quasi-experimental study. There was no compensation given because the participants were already athletes. They were part of their routine activity as part of their training. The athletes were assured that their privacy was protected if anonymity was guaranteed; this should be stated. The researcher indicated that participation was strictly voluntary and that failure to volunteer would not result in any penalty or loss of benefits. The athletes were told that they had the right to withdraw on, during, or before the study. The researcher described the circumstances under which the researcher would terminate the study. The researcher told the participants whom they could contact in case of further questions, comments, or complaints.

The acquired data from all participants, whether hard or soft copies, will be erased 5 years after the study will be over, and the researcher obtained a letter stating that the athletes had given their permission for the researcher to use their data information in the study. In addition, all participants' names were coded as a preventive step.

Implementation of Interventions

The 100-meter sprint running test (Pre-test) was conducted on selected athletes to determine their running time pace. Following the pre-test, the researcher divided the participants into two groups and assigned each group to a different exercise to do as part of the dynamic drills. The moving Exercise Group of 30 qualified athletes did lunges and uphill sprinting, while the In-place Exercise Group of 30 qualified athletes did A-skips and straight leg bounds.

The participants were told to avoid any further severe physical exercise throughout the trial to keep the internal risks at hand and ensure that no other factors influenced their results. During the exercise for dynamic drills, participants were instructed to wear proper attire (ideally jogging trousers, rubber shoes, and a t-shirt).

Each training session began with a one-minute resting pulse rate (RPR) check and recording, followed by a five-minute warm-up exercise and assigned tasks. Lunges were performed with a progression of 13 sets over a 35-meter open space, and uphill sprinting was performed with a succession of 13 sets over a 35-meter open space for the Moving Exercise Group.

While in the In-place Exercise Group, on the other hand, A-skips with a series of 10 repetitions over 13 sets, and straight leg bounds performed in a series of 10 repetitions over 13 sets.

After each exercise program, the participants used their index and middle fingers to find their radial pulse for 10 seconds to obtain the Exercise Pulse Rate (EPR) multiplied by 6 to translate to minutes. Participants will be timed for their radial pulse for 60 seconds after resting for 3 minutes to determine their Recovery Pulse Rate (RPR). This was done to figure out how intense the dynamic drills should be. Every after-exercises dynamic drill included a 2-minute cool-down breathing exercise for the participants.

Dynamic drills were performed for eight (8) weeks, following the recommendations and methods for conducting particular activities. During their training, all groups of trainees had weekly sessions in their respective open spaces.

Sprinting was broken down into five phases: start, acceleration, drive phase, recovery phase, and deceleration.

Starting. The starting position, with its dropped stance, legs staggered behind the body, and hands anticipatorily waiting to lift off the track just as the sprinter explodes into full speed, is one of the first things that comes to mind when people think of sprinting.

The sprinter begins by standing in a four-point posture (i.e., when all four sprinter limbs are making contact with the ground). The legs will be in an offset posture with the feet against the starting blocks, and the center of gravity should be inclined towards the leading leg. To provide proper stability and power transfer as they propel themselves forward, keep the arms shoulder-width apart and their head and spine in straight alignment.

It is critical to maintaining the exact spinal alignment from their head to the low back as their move into the second half of the 4-point stance (that moment when all the sprinters lift their hips into the air immediately before taking off). According to the National Strength and

Conditioning Association (2018), the front leg should be near 90 degrees, and the back should be about 120-125 degrees.

Many athletes will choose to position their dominant leg in front, which can be figured out with the help of a coach, trainer, or physical therapist.

They are entering the dynamic take-off when they set their position. Participants need to push off the blocks with both feet as they begin their sprint; specifically, using the blocks at the start will allow them to channel the most horizontal forces into their propulsion. The back leg will swing forward first, followed by one's contralateral arm, and they are gone.

Acceleration. The point of acceleration, also known as the "transition phase" of the sprint, occurs when the switches from sprinting with horizontal to mostly vertical forces. This phase occurs in real-time, and maintaining perfect form is critical to maximizing force generation as the transition from a crouching, stationary stance to a good sprint.

The key to a successful acceleration phase is fully extending their legs for maximum force output into the ground. Which, while conceptually easy, requires a bit of a balancing act. Longer ground contact durations are required for higher power output, yet sprinting requires as little ground contact time as possible.

During the acceleration phase, lean forward as much as possible (usually around 40-50 degrees) to achieve as many forces as possible. As a result, their shin angle will increase, keeping the back end of one's foot off the ground. The body will deliver the same amount of force while having minimum ground contact time through the balls of its feet.

Maintaining this forward lean is primarily helpful during the acceleration phase. Participants need to move out of the starting position and keep their forward lean until they reach a completely upright position throughout the rest of the sprint.

Drive Phase. Transition into the stride phase of one's sprint once they have passed the first acceleration phase and run in a more upright position. Their head begins to rise, their spine lengthens and straightens, and their gaze is fixed on the finish line of the sprint.

This is when the hit is of maximum speed, usually between 40 and 80 meters per second. One is now relying on a combination of momentum and muscle force to get to the finish line of the sprint. Furthermore, that is the primary goal of the drive phase: to reduce any potential braking forces or deceleration spots that can slow down. It is all about using those vertical forces to propel oneself ahead with each stride one takes.

Recovery Phase. When the leg is cycling through the air, it is in recovery. The recovery leg should be parallel to the ground when it comes up. The foot should be cocked upward (or dorsiflexed) and ready to strike the ground.

. This last phase's name is a little deceptive; they were not aiming to slow down from the sprint intentionally. More specifically, this is the time in a sprint when athletes run out of power and must work harder to avoid weariness or other variables that could cause a slowdown.

Their deceleration phase is similar to the drive phase but with the extra challenge of maintaining anaerobic endurance. The researcher made sure to obtain high knee action and enough arm drive in the closing stretch of the sprint to sustain that maximal force production (keep those elbows bent at 90 degrees).

These steeper joint angles lessened external deceleration as they sprint to the finish line. The final 20 meters tested the physical and mental endurance.

Findings and Discussions

What is the level of the participants' 100-meter running speed before and after the interventions?

Table 1 shows the frequency, percentage, and mean distribution of participants' 100-meter sprint running speed before and after the dynamic drills.

The Moving Exercise Group was found to have progressed from "slow" (M=16.15 seconds) to "moderately fast" (M=14.92 seconds). In comparison, the performance of the In-place Exercise Group improved by 0.91 from "slow" (M=16.93 seconds) to "slow" (M=16.02 seconds). Furthermore, after the intervention in the Moving Exercise Group, the number of participants in the fast category increased by 20%.

Table 1. Frequency, Percentage, and Mean Distributions of Participants' 100-meter Sprint Running Speed before and after the Interventions

Range	***Description***	***Moving Exercise Group (Lunges and Uphill)***				***In-Place exercise Group (A-skip and Straight Leg Bound)***			
		Pre-test		Post-test		Pre-test		Post-test	
		f	%	f	%	f	%	f	%
10 sec. below	Very Fast	0	0.0	0	0.0	0	0.0	0	0.0
10.1-12.8 sec.	Fast	3	10.0	6	20.0	3	10.0	3	10.0

12.9-15.7 sec.	Moderately Fast	12	40.0	9	30.0	9	30.0	9	30.0
15.8-18.6 sec.	Slow	9	30.0	12	40.0	12	40.0	12	40.0
18.7 sec. above	Very Slow	6	20.0	3	10.0	6	20.0	6	20.0
Total		30	100.0	30	100.0	30	100.0	30	100.0
Overall Mean		16.15		14.92		16.93		16.02	
Description		Slow		Moderately Fast		Slow		Slow	
Standard Deviation		2.27		2.31		2.18		2.21	

The first set of participants was put through a series of dynamic workouts, including lunges and an uphill sprint, to increase stride length and frequency to achieve maximum sprinting velocity (Majundar et al., 2021). In these actions, increased stride length occurred without a drop in frequency or vice versa. As a result, their running speed increased from "slow" to "moderately fast." Stride length should not compromise the ability to produce maximal power, according to Jeffreys (2019), which means stride length should be achieved by pushing hard off the ground to propel the body forward.

Technical development for speed involved specific drills designed to isolate and combine joints to rehearse a series of sensations that established the exact sprint of motor pathways. While the In-place Exercise Group, exposed to a-skip and straight leg bound, showed an increase in performance, the post-test did not show a higher result. Because it remained on the "slow" level with a difference of 0.91, this result showed that a-skip and straight leg bound have little performance transfer. Furthermore, both groups' participants showed an increase in their 100-meter running pace after being exposed to numerous dynamic workouts.

Problem 2. How do the participants in each group compare their 100-meter sprint running speed before and after the interventions?

The participants in each group do not significantly differ in their 100-meter sprint running speed performance before and after the interventions. Table 2 shows the test results on the difference in the participant's performance in the 100-meter sprint running speed before and after the dynamic drills.

In running, the shorter the time, the better. It means that the runners improve their speed running performance. Findings reveal an improvement because the mean of the Moving Exercise Group decreased from 16.15 to 14.92 while the running time of the In-place Exercise Group decreased from 16.93 to 16.02. The t-test demonstrated a significant difference (t=9.73**, p=.000) between the pre-test and post-test scores of the individuals in the Moving Exercise Group after the lunges were implemented - their uphill sprint performance increased from "slow" to "moderately fast". While in the In-place Exercise Group, the t-test demonstrated a significant difference in their performance after being exposed to dynamic drills, namely a-skip and straight leg bound (t= 10.64**, p=.000). Thus, the null hypothesis can be rejected.

Table 2. T values showing Significant Differences in the Participants' 100-Meter Sprint Running Speed before and after the Interventions

	Moving Exercise Group (Lunges and Uphill Sprint)		***In-Place Exercise Group (A-skip and Straight Leg Bound)***	
	Pre-test	Post-test	Pre-test	Post-test
Mean	16.15	14.92	16.93	16.02
Description	Slow	Moderately Fast	Slow	Slow
SD	2.27	2.31	2.18	2.21
t	9.73**		10.64**	
p	.000		.000	

**significant at 0.01 level

The results indicated that the two workouts used in the Moving Exercise Group: lunges and uphill sprinting, increased participants' running speeds. Tucker (2017) The facts support the theory that the more athletes stretch, the better they perform and become faster runners. Bruen (2017) backed this up, claiming that dynamic stretching before a race not only warms up the athlete's muscles but also prepares them for a brief and intense rush of energy.

Lunges had a stronger strength component than flexibility, according to Jonhagen (2019), which enhanced stride length, allowing athletes to travel further with each step and improving hamstring strength and running speed. Furthermore, Behrens et al. (2021) found that uphill sprinting as an over-speed training exercise compels an athlete's legs to produce both faster and longer steps over time, resulting in neuromuscular adaptations that increase stride frequency rate. The two groups of dynamic drills effectively improved a person's 100-meter sprint running speed.

Problem 3. Do the two groups of participants differ significantly in their 100-metersprint running speed increments?

Table 3 shows the difference in increments between the two groups in their 100-meter sprint running speed performance before and after the interventions.

The means indicated a negative sign which implies an increase; in running speed, considering that the increments consist of the difference between the post-test and the pre-test. When the time has decreased, it implies that the running speed is better.

Table 3. Result of the Test of Difference in the Increments of the Two Groups of Participants' 100-Meter Sprint Running Speed

	Moving Exercise Group (Lunges & Uphill Sprint)		*In-Place Exercise Group (A-skip & Straight Leg Bound)*			
	Mean	SD	Mean	SD	t	p
100-meter sprint	-1.24	.669	-.886	.460	2.36*	.022

*significant at 0.05 level

Findings reveal that the two groups' 100-meter sprint running speeds significantly differ (t=2.36, p=.022), with the group exposed to the Moving Exercise Group having a higher increment (M= -1.24, SD= .669) than the group exposed to In-place Exercise Group (M=-.886, SD=.460). The result shows that the null hypothesis can be rejected at the 0.05 level of significance. According to the data, the two groups contributed to boosting athletes' 100-meter sprint running speeds because they reduced the track's contact time.

In summary, more participants performed at the "fast" level in the post-test of Moving Exercise Group: lunges – uphill sprint after the dynamic drills. The In-place Exercise Group: a-skip – straight leg bound demonstrated that they were in the same range of category in the post-test and pre-test after the offered dynamic drills because the Moving Exercise Group because it has a wide range of movement, acceleration, and force, while in the In-place Exercise Group the movement is just static/steady (Morris et al. 2017). Time discrepancies such as seconds and microseconds, according to (Witt 2019), had a substantial impact on the outcome of every running event.

Overall, the results showed that the moving exercise group has higher increments, with the use of a-skip and straight leg bound, that enhance 100-meter sprint running speed among athletes from different municipalities and regions in Mindanao.

Findings

The Problem. This study attempted to investigate the efficacy of Moving Exercise Group: lunges - uphill sprint and In-place exercise Group: a-skip - straight leg bound in improving athletes' 100-meter sprint running speed performance in different municipalities and regions of Mindanao. The purpose of the research was to address the following questions: (1) what is the level of the participants' 100-meter sprint running speed before and after the interventions? (2) How did the

participants in each group compare in their 100-meter sprint running speed before and after the interventions?; and (3) Did the two groups of participants differ significantly in their 100-meter sprint running speed increments?

In this inquiry, a quasi-experimental design was used. The participants in this study were divided into two groups, each of which completed a pre-test and post-test to determine their 100-meter sprint running speed before and after exposure to various intervention programs. The interventions were administered thrice a week for eight weeks in one-hour increments. Participants were athletes from different municipalities and regions of Mindanao who were not members of any school varsity team; consequently, this study functioned as a training ground to enhance their sprinting ability and talents.

The study's intervention programs were the moving Exercise Group: lunges – uphill sprint and the In-place Exercise Group: a-skip – straight leg bound. Sixty participants were divided into two groups and assigned to one of the two intervention exercises. The International Association of Athletics Federation (IAAF) required a pre-and post-test to conduct the 100-meter dash. The study's variables were described using descriptive statistics such as mean, percentage, frequency distributions, and standard deviations. In contrast, a T-test Paired with Two Samples was used to see if there were any significant differences in the participants' 100-meter sprint running speed before and after the two intervention programs, and T-test Independent Samples to determine if there was a significant difference in the increments.

Conclusion

Based on the findings of the study, the following conclusions and implications were asserted. Both dynamic drills were effective, but the Moving Exercise Group, namely lunges and uphill sprinting, is more effective in improving the athletes' sprint running speed performance because it has a wide range of movement, acceleration, and force. At the same time, in the In-place Exercise Group: a-skip – straight leg bound is static or steady. Utilizing the entire range of motion while exercising enhance performance and yield better outcomes. The transition from zero to the top speed is known as acceleration. One of the secrets to a successful sprint is striking the ground as forcefully as possible. Four workouts increased hip flexor muscle strength and endurance, including the gluteus muscles, allowing for a longer stride. It also improved flexibility, coordination, balance, stride length, and stride frequency, all of which helped run races and other physical activities. Sprinting's muscles and actions should be treated specifically to improve speed. These drills assisted in learning and establishing effective movement patterns that the body adapted. Weekly running workouts helped to build key muscle groups for running, including the foot, calves, shins, thighs, and hips. They also helped prepare the ankle, knee, and hip joints for the range of motion required for running.

Recommendations

Based on the findings and conclusions, the researcher endorses recommendations:

1. Track and Field Athletes.
   This study raises awareness and provides suggestions for an exercise program, particularly while completing exercises to improve sprinting. If not done properly and safely, this activity can lead to injury.
2. For Coaches and Trainers
   Assist athletes in strengthening their running skills, which are required for developing strategies in inter-school competition games;
   Analyze athletes' performance in teaching new skills and offer incentives and support;
   Ensure good training and a safe setting to avoid injuries, mainly when doing various drills.
3. For future researchers
   As part of their experimental investigation, they will conduct and consider additional training exercise programs aimed at improving sprinting skills; Consider this exploratory research can be used as a resource for future scholars.

References

1. A prospective study comparing distance-based vs. time-based exercise prescriptions of walking and running in previously sedentary overweight adults. (2017). PubMed Central (PMC). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5609661/ Are track sprint drills still worth doing? (2020, April 11). SimpliFaster. https://simplifaster.com/articles/effective-track-sprint-drills/
2. Baughman, et. al. (2017). Strength and conditioning for young athletes: Science and application. Routledge

3. Behrens, et. al. (2021). Predicting individual responses to exercise interventions. Frontiers Media SA.
4. Bompa, (2019). Conditioning young athletes. Human Kinetics.
5. Bruen, (2019). Qualitative diagnosis of human movement: Improving performance in sport and exercise. Human Kinetics.
6. Cagas, et. al. (2020). Strength and conditioning: A concise introduction. Routledge.
7. Cagas, et. al. (2020). *The mechanics of sprinting and hurdling*. CreateSpace.
8. Chandler, et.al. (2018). Conditioning for strength and human performance (3rd ed.). Routledge.
9. Churchill, et. al. (2019). The art of sprinting: Techniques for speed and performance. McFarland.
10. Cissik, (2017). Physiology of sports. Routledge.
11. Coker, (2017). Strength training for soccer. Routledge.
12. Corbin, et. al. (2018). Technology for physical educators, health educators, and coaches: Enhancing instruction, assessment, management, professional development, and advocacy. Human Kinetics Publishers.
13. Dorn, et. al. (2021). The athletic trap: How college sports corrupted the Academy. JHU Press.
14. Dynamical systems theory: A relevant framework for performance-oriented sports biomechanics research. (n.d.). Sportscience. https://sportsci.org/jour/03/psg.htm
15. Eaton, (2020). Sports performance and health. MDPI.
16. Fraioli, (2017). Planning for sports ultimate performance. Sports Education Technologies.
17. Gangstead, et. al. (2018). Science of stretching. The Crowood Press.
18. Haff, et. al. (2018). Laboratory manual for exercise physiology, 2E. Human Kinetics.
19. Haugen, et. al. (2019). Biomechanics of sprint running: A methodological contribution.
20. Hip-muscle activation during the lunge, single-leg squat, and step-up-and-Over exercises. (n.d.). ResearchGate.https://www.researchgate.net/publication/24234739_Hip-Muscle_Activation_During_the_Lunge_Single-Leg_Squat_and_Step-Up-and-Over_Exercises
21. IDEA Health & Fitness. (2021). Program design for older adults. IDEA Health & Fitness Association.
22. Jeffrey, (2019). Science of sport: Sprinting. Crowood.
23. Jonhagen, et. al. (2019). Athletic movement skills: Training for sports performance. Human Kinetics.
24. List of Filipino records in athletics. (2010, April 1). Wikipedia, the free encyclopedia. Retrieved December 9, 2021, from https://en.wikipedia.org/wiki/List_of_Filipino_records_in_athletics
25. Mack, (2019). The biomechanics of competitive gait: Sprinting, hurdling, distance running, and race walking. Frontiers Media SA.
26. Majumbar, et. al. (2021). Martingales and Markov chains: Solved exercises and elements of theory. CRC Press.
27. Martin, (2017). Fundamentals of sprinting: A guide for high school sprinters. Xlibris Corporation.
28. Martinopoulou, et. al. (2021). Maximum interval training. Human Kinetics.
29. Moir, G. (2018). Strength and conditioning. Jones & Bartlett Publishers.
30. Morris, et. al (2017). Strength and conditioning for sports performance. Routledge.
31. Movement theory: Fundamental aspects. (n.d.). SpringerLink. https://link.springer.com/chapter/10.1007/978-3-642-77630-4_9
32. NSCA -National Strength & Conditioning Association, & Jeffreys, I. (2018). Developing speed. Human Kinetics.
33. Ozolin, et. al. (2017). The effects of selected progressive resistance exercises on the sprinting times of marginal sprinters.
34. Parker, D. A. (n.d.). The effects of scripted instruction on proper foot plant during a -skip in a practice high school track and field setting. Digital Scholarship@UNLV. https://digitalscholarship.unlv.edu/rtds/2774/
35. Pantoja, et. al., (2016). Sprint Acceleration Mechanics in Masters Athletes. Med Sci Sports Exerc. 2016 Dec;48(12):2469-2476. doi: 10.1249/MSS.0000000000001039. PMID: 27414690. Pantoja PD, Saez DE Villarreal E, Brisswalter J, Peyré-Tartaruga LA, Morin JB. Sprint Acceleration Mechanics in Masters Athletes. Med Sci Sports Exerc. 2016 Dec;48(12):2469-2476. doi: 10.1249/MSS.0000000000001039. PMID: 27414690.
36. Polit, et. al. (2017). The kinematics of sprint running.
37. Quasi-experimental design | Definition, types & examples. (2021, March 8). Scribbr. https://www.scribbr.com/methodology/quasi-experimental-design
38. Salo, et. al. (2021). Serious strength training. Human Kinetics.
39. Slawinski J, et. al. (2017). How 100-m event analyses improve our understanding of world-class men's and women's sprint performance. Scand J Med Sci Sports. 2017 Jan;27(1):45-54. doi: 10.1111/sms.12627. Epub 2015 Dec 8. PMID: 26644061.
40. Stastny, et. al. (2018). Training for speed, agility, and quickness, 3E. Human Kinetics.

41. Struzik, et. al. (2017). Sport speed and agility. Coaches Choice Books.
42. Trowel, et. al. (2021). Physiological aspects of sports training and performance. Human Kinetics.
43. Tucker, (2017). undefined. Human Kinetics.
44. Upton, (2021). Exercise physiology: For health and sports performance. Routledge.
45. Whelan, et. al. (2017). Running heavy with an 8-week training plan. Hillseeker Publishing.
46. Witt, D. (2019). Running: Biomechanics and exercise physiology in practice. Churchill Livingstone.
47. Witt, D. (2019). Dynamic stretching: The revolutionary new warm-up method to improve power, performance, and range of movement. Ulysses Press.
48. Yap, et. al (2021). Sprinting: Training, techniques, and improving performance. Crowood Press.

© GSJ