

THE IMPACT OF ASSISTED SPRINTING TRAINING (AS) AND RESISTED SPRINTING TRAINING (RS) IN REPETITION METHOD ON IMPROVING SPRINT ACCELERATION CAPABILITIES

(Experiment study assisted sprinting training towed by elastic cord and resisted sprinting training use sled harness in repetition method on improving sprint acceleration capabilities)

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Abstract

The purpose of this research is to determine the impact of assisted sprinting training (AS) and resisted sprinting training (RS) in repetition method on improving sprint acceleration capabilities. This research used experimental method in pre-test and post-test design. The research sample were twelve male collegiates track sprinters, athletic division Indonesia University of Education, Bandung. Six male collegiates track sprinters for AS and six male collegiates track sprinters for RS. It used simple random sampling. The instrument used is 30 m sprint test. After training three times per week for six week, data were obtained from pre-test and post-test processed statistically by t-test. The AS group and RS group showed significant changes on improving sprint acceleration capabilities. No significant different between AS and RS on improving sprint acceleration capabilities. In AS the increase is better than RS at a distance of 10 m from a distance of 30 m. While, in RS the increase is better than AS at a distance of 10-20 m and 20-30 m from a distance of 30 m. Accordingly, to improve acceleration at a distance 10 m use AS, while to improve acceleration at a distance of 10-20 m and 20-30 m from a distance of 30 m use RS.

Keyword : *Assisted sprinting, Resisted sprinting, Repetition method, Acceleration*

1. INTRODUCTION

The 100-meter sprint fundamentally divided into different phases : the reaction phase at the start, the acceleration phase, the phase of maximum speed, the deceleration phase, and the finish. From several phases of sprinting, The phases of acceleration is very important. In 100 meter dash the ability to accelerate has an immediate effect on the outcome of the race(Wibowo, 2017). Even in long distance running lost of races decided in a sprint finish (Knugler dan Janshen (2010:343).

Acceleration is the ability to increase velocity to achieve maximum speed by the number of shortest possible time. Therefore, specific training is needed to improve sprint acceleration. There are a number of tools that are used to enhance an athlete's speed, but not all of these are equally relevant to every sport and every level of development. These tools include: Technique drills, Explosive starts, Sprints of varying distances, Resisted sprinting, Assisted sprinting, Varied-pace sprinting, Stride length drills, Stride frequency drills (Cissik, 2011: 11).

Assisted sprinting was often referred to as supramaximal sprint or overspeed training. However, these three terms refer to the same notion, namely the sprint training at speeds exceeding the maximum speed. Assisted sprinting by moving or running faster than normal speed which can be run on a downward trajectory or run in a way so that the elastic cord is pulled using the normal speed exceeds runners. Assisted sprinting types by Dintiman (1998: 193) is (1) Downhill sprinting (2) High-Speed Stationary Cycling (3) Towing (4) Treadmill sprinting. Based on the purpose, assisted sprinting is expected to increase the stride frequency and stride length. The purpose of assisted / overspeed training is to increase of both your stride rate and stride length by forcing you to perform at a much higher level than you are capable of without assistance (Dintiman, 1998: 191).

Different from assisted sprinting, resisted sprinting is a normal component of many sprinters training program. This may involve; weighted vest potentially running, uphill running, resisted towing, sand and water running (Faccioni, 1994: 1). While the load for resisted sprinting can involve : towing of a sled, tire, speed chute (parachute), or other weighted device (Faccioni, 1994: 2). One of the resisted sprinting is using the sled harness . Based on the purpose, forms of training sled harness by pulling the load can increase stride length by increasing the strength of the leg muscle fibers recruited and developed with fast muscles (fast twitch muscle fibers). Therefore, in this study the authors chose to resisted sprint training using a load sled, which tied a rope harness. As for the weight of the load adjusted to the abilities of each athlete.

From previous studies, the authors found two interesting research. Faccioni (1993: 1-4) and Upton (2011: 2645-2652). In Assisted sprinting, Faccioni states assisted sprinting group only showed significant improvements over a distance of 60m while Upton states assisted sprinting increases significantly in a distance of 15 yards (13.7 m). Then in resisted sprinting, Faccioni states resisted sprinting increase compared better than group assisted sprinting at a distance of 20 m and 40m and Upton states resisted sprinting better than asisted sprinting to improve acceleration within 25 yards 15- (13.7-22.9 m) and 25-40 yards (22.9-36.6 m). From previous studies above, the authors look at the difference in velocity improvements at certain distances so that the view to implement both forms of training will also be different. Therefore, the authors see the need to examine more deeply felt than a lack of data and identify both forms

of training are reviewed based on sprint acceleration phase and the factors that affect sprint.

Based on several study, the author would like to try and add their repertoire of research to reveal the extent of the impact of the application of assisted sprinting pulled elastic cord and the impact of resisted sprinting pull sled harness in repetition method to increase sprint acceleration ability. Completely, The purpose of this research is to determine of study the difference influence of assisted sprinting exercises and resisted sprinting exercises in the repetition method to increase the ability of acceleration sprint.

2. METHOD

This research used experimental method in pre-test and post-test design. The research sample were twelve male collegiates track sprinters, Sport Unit of Indonesia University of Education (average values: age=20, height=1.69cm, weight=60.5kg, training experience=2.8 years). Six male collegiates track sprinters for assisted sprint training pulled elastic cord (X_1) and six male collegiates track sprinters for resisted sprint training using sled harness (X_2) with repetition methode. It used simple random sampling. Subject then engage in 6 week of training 3 day per week. Instrument used is 30 m sprint test. The time taken at a distance of 30m, 20m, 10, split 20-30m and 10-20m. The best time of the two trials was taken into the final score. In addition, researchers also calculated the number of steps the sample during the test run of 30 m. After training three times per week for six week, data were obtained from pre-test and post-test processed statistically by t-test. This research used experimental method in pre-test and post-test design. Generally, this research has been conducted at the Student Sport Unit of Indonesia University of Education with 6 (Six) male in the Assisted Sprinting Exercies Group (AS) and 6 (six) in the Resisted Sprinting Exercises Group (RS) selected randomly.

3. RESULT AND DISCUSSION

The results of the study show that differences development. The results of treatment are described in Table 1 below:

Tabel 1. Pre test, Post test and Significant test between AS and RS

Variable	AS		RS		AS vs RS
	Pre	Post	Pre	Post	
30 m	4,185	4,048**	4,228	4,101**	*
20 m	3,14	3,035**	3,15	3,06**	*
10 m	1,90	1,83**	1,91	1,86**	*
10-20m	1,24	1,21**	1,238	1,201**	*

20-30m	1,038	1,001**	1,078	1,04**	*
Stride frequency	4,225	4,24*	4,195	4,2*	*
Stride length	1,69	1,745**	1,69	1,74**	*
rata-rata					

*** = No Significant; ** = Significantly; * = AS > RS No Significant; * = RS > AS No significant**

The data describe that AS had a significant impact on the improvement of sprint acceleration ability. This is because AS are achieve higher velocities beyond current capability of the athlete and to train the neuromuscular system to maintain these high rates without assistance (Behren dan Simonson,2011:1) Gervais (2005:2).

Similarly thing with RS significant impact on the improvement of sprint acceleration ability. Improved acceleration capability of the RS is also caused by the development or formation of fast muscle fibers in this training because it is believed that throught resisted sprint training, more muscle fibers will be recruited via a greater neural activation and result in an improved stride length (Behren and Simonson.2011:2). The basis behind these methods is to increase the movement resistance requiring the athlete to increase force out put (especially in the hip, knee and ankle extensors) to continue to run at speed (Faccioni, 1994:2).

Increased acceleration time of 10 meters in the two groups differed with AS greater impact than the RS but not significant with an increase in the AS of 0.07 seconds, while the RS of 0.05 seconds. The difference of 0.02 seconds when viewed reality in the field will be very meaningful in the sprint. At a distance of 10 meters AS greater than RS caused Thus AS training may be an effective way of developing '*first-step quickness*' (Upton (2011:2651) and the increased neural activation in the AS had a positive effect on stride frequency (Mero *et al.* 992:392) because good early acceleration exhibited higher stride frequency, probably as a result of lower ground contact time (Murphy et al. 2003:148)."

Improved RS greater than the AS at a distance of 10m-20m and at a distance of 20m-30m due to the acceleration distance is exerting maximum explosive force. The acceleration or transition phase commences after the first two strides of the 100m sprint. This phase starts around 10m and ends at the 50m mark. Ground contact times fall in a range of 70-110ms. Such low ground contact times are too short for the athlete to apply maximal or near maximal explosive strength (Newman,2009:4). Resisted sprinting it has been said that such techniques will increase muscular force output (Lockie *et al.* (2003:760), Faccioni (1994:2). In line with research conducted by Alcaraz (2007:323) on *Performance Adaptations To Short-Term Sled Towing And*

Sprint Training yang suggested “Resisted sprint training with 8% body mass sled towing for 4 week improve performance (16-31 m)...”

From the discussion above, found the AS has a greater impact than the RS to increase the acceleration at a distance of 10 m. While the RS is better than AS at a distance of 10-20 m and 20-30m. In other words, the RS has increased acceleration better than AS over a distance of 10 meters from the total acceleration sprint distance of 30 meters.

4. CONCLUSION

AS and RS group showed significant changes on improving sprint acceleration capabilities. No significant different between AS and RS on improving sprint acceleration capabilities. In AS the increase is better than RS at a distance of 10 m from a distance of 30 m. While, in RS the increase is better than AS at a distance of 10-20 m and 20-30 m from a distance of 30 m. Accordingly, to improve acceleration at a distance 10 m use AS, while to improve acceleration at a distance of 10-20 m and 20-30 m from a distance of 30 m use RS. Otherwise. Thus, The research concludes that there are significant changes in the improving of sprint acceleration capabilities. But no significant different between AS and RS in the improving of sprint acceleration capabilities. Note: The increasing of the AS better than the RS at 10 m from 30 m totaly. While, in the increasing of the RS better than AS at 10-20 m and 20-30 m from 30 m totaly.

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