



The effect of climbing and descending stairs varies in improving balestra fencing floret/foil weapon type

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Abstract: Fencing is a sport that requires a maximum physical component so that in this study the aim was to test and find out the effect of variations in stair climbing exercises in improving floret/foil balestra fencing weapons. This study used a test-experiment with the research design "Single-Group Pretest-Posttest Design". The research sample consisted of 20 people, coming from students (elective course (MKP) Fencing) of a state university in eastern Indonesia (male and female) who were then divided into training groups through random sampling technique. The balestra fence measurement tool for floret/foil type weapons uses the Kuhadja fencing skills test. Pretest and posttest results were analyzed using the influence test (t-test). The research location is at the Football Stadium (a stadium grandstand with 25 steps). Results; 1) there was a significant difference between the pretest and posttest groups with the various stair climbing exercises towards increasing the ability to balestra floret fencing weapons. 2) There is a significant difference between the posttest (after treatment) of varied stair climbing training and the control group in increasing the ability to balestra floret fencing weapons. We estimate that this increase is the result of increased leg muscle strength, speed, and explosive power obtained through varied stair climbing exercises.

Keyword: climbing and descending stairs, balestra fencing, floret/foil

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INTRODUCTION

Fencing in Indonesia, an in many countries, may not be as popular as football, basketball and badminton. However, in terms of achievements on the international stage, the sport of fencing is no less brilliant and even surpasses other sports which are considered more popular in society. The brilliance of fencing achievements in particular was also found by, taking an example, the All Indonesian Fencing Association (IKASI) of South Sulawesi Province and could not be separated from the contributions made by students (Nurul Musfira Amahoru and Haerullah). These achievements made one of public universities in east Indonesia make fencing as one of the elective courses (MKP). In addition, the euphoria of fencing in South Sulawesi Province was even more lively when the fencing sport was officially contested for the first time at PORPROV XVII Sulsel 2022, after only being an exhibition sport at the same event before. To further popularize and develop the sport of fencing, one of the efforts that can be taken is through research activities. Our preliminary study (literature review) on sports journals indexed by Sinta, shows that research articles directly related to sports fencing by researchers in Indonesia are still very few.

Only nine (9) articles that could be found directly related to fencing; Research uses body puncture accuracy exercises without and with intervals to improve puncture accuracy (Hardinata& Hidayah, 2015). Imagery and self-talk exercises improve puncture precision (Fitria, 2018). Five variations of the exercise (Forward Back Attack, Back Forward Attack, Back to Back Attack, Attack with Conne, and Parry Attack) to improve puncture precision (Rasyono& Decheline, 2019). Imagery and concentration



exercises to improve reaction ability (Hariyanto et al., 2021). Imagery and concentration exercises to improve puncture accuracy (Prakosaa et al., 2021). Research and development (R&D) research to develop fencing attack training models (Dennis Ariadinata S et al., 2020). Analyzing the effect of physical ability on the accuracy of beadier attacks and body structure on the accuracy of floret weapon attacks (Kamaruddin, 2019). Analyzing the factors that influence the success of fencing athletes (Rimasa, 2021). Evaluating programs, administrators, athletes, facilities and infrastructure, and government support for fencing sports using the Context-Input-Process-Product (CIPP) model (Yusfi et al., 2019). Analyzing the standardization of sports fencing facilities and infrastructure (Zahara et al., 2022). As well as a specification study (biomechanical analysis) of the frequency of errors in the fencing attack technique (Kurniawan, 2015). The remaining four (4) articles are indirectly related; Analyzing typological variations of outstanding athletes at PON XVII in East Java Province (one of them is a fencing athlete) (Sumartiningsih, 2011). Analyzing the 3 sports (South Sumatra Province) that won the 2016 West Java PON gold medal (one of which is fencing) (Endrawan et al., 2022). Using CIPP in high-achieving sports in Kendal Regency (one of the fencing sports) (Arif et al., 2022). R&D research to develop Harvard Step Test products based on digital technology involving various athletes in sports, one of which is fencing (Nuryadin& Siswantoyo, 2021).

Based on these two phenomena, research activities in fencing in Indonesia should start with simple, easy, and inexpensive studies, so that they can be directly implemented in development centers and/or IKASI organizations in areas that are still in the process of developing themselves. but does not leave scientific principles in the form of novelty values in it. Peer-reviewed research that identified various studies related to the sport of fencing, concluded that (elite) fencers have sequential coordination of upper and lower extremity movements with coherent patterns of muscle activation compared to novice fencers, for this reason fencing training should focus a lot on improving Explosion power (Chen et al., 2017). Fencing at the elite level is required to have a leg mechanism (step) that is lighter and more elastic, this ability will help them to move at higher speeds, travel longer distances when forward, backward, and lunging, as well as save energy so that able to compete during the competition (Turner & Harmenberg, 2018). Related to these findings, namely that fencing training should focus on increasing the explosive power of the limbs and lighter and more elastic leg work, so if "practice going up and down stairs" is still relevant enough to be proposed as a treatment in improving the performance of fencing athletes. Elements of physical ability that can be built through training up and down stairs include speed, strength, and endurance of one's limb muscles (Ismail et al., 2017).

The movement of lunges when carrying out an attack is the most common method used in the sport of fencing (Bottoms, Greenhalgh, & Sinclair, 2013). The fencer must train lower body strength by emphasizing horizontal displacement (A. Turner et al., 2016). The speed of movement of the lower extremities to form "lunges" is an important ability that a fencer must have, therefore training must be able to increase strength, and the strength of the back knee extensors is important for fencers to improve "lunges" (Guan et al., 2018). Research related to the effect of heating whole body vibration (WBV) to improve the performance of fencers, the implication of this research is that heating WBV can induce neuromuscular activation and increase scores of lunges, agility, and strength reaction reactions, characterized by increased lunge reaction abilities, sprint 10 meters, and countermovement jump (Chang et al., 2019). Based on these findings, the exercise of going up and down stairs can be modified by applying a variation of lunges exercises (climb the stairs with one leg positioned forward "left or right", then the knee is bent while the other leg is positioned straight back). The next variation is the practice of running at high speed (sprint) when climbing stairs, as well as variations of the countermovement jump exercise (climbing the stairs in a vertical jumping position "the jumper is required to stand straight, then stretch the knees 90 degrees together with the body position downwards, hips and knee extends to prepare for a vertical jump").

Habits of holding weapons and asymmetry of arm performance when holding weapons in fencing athletes can be changed by intense long-term training (Akpınar et al., 2015). Studies that try to test the width of the base of support (BOS), early postural adjustments (EPA) and the upper extremity while holding the weapon during "lunges", find that when the fencer makes the "lunges" movement, the upper extremity during holding weapons will be disturbed (Akbaş et al., 2021). These findings can become the basis for the next variation of climbing and descending stairs, namely the practice of climbing stairs while performing the balestra movement of the floret (foil) type of fencing. Because the mechanics of moving up and down the stairs is only moving forward and down the stairs by running (moderate

intensity), this exercise is intended to improve balestra fencing with the floret (foil) type of weapon. The basic techniques of fencing include the stance (en garde), stab, attack, parry, balaestra and redoublement (Rasyono& Decheline, 2019). Balestra is a movement with a short and sharp jump forward which is used in preparation for an attack, then followed by a lunge movement, while the floret (foil) is a type of weapon for stabbing (in certain areas) and the material of the blade is very thin, the tip is blunt, quite flexible and will bend when attacking the opponent, so as not to injure the target (www.fencing.net., 2007).

Based on the description above, this study aims to test and determine the effect of various stair climbing exercises (walking stairs with lunges, climbing stairs with sprints), climbing stairs with a countermovement jump, and climbing stairs. Stairs while performing balestra movements of the floret/foil type of fencing towards the increase in the floret/foil type of fencing balestra. Based on the initial intention of the researcher which is to present an easy and cheap scientific research paper, Thus the fencing related research will be more developed, then We chose the easiest acceccible test instrument which is Balestra's ability by using the Kuhadja skill fencing test. The intention does not eliminate the scientific value since it is normal to use to this day, just as in the research by (Fitria et al., 2018), (Rimasa & Sartono, 2020), dan (Prakosaa et al., 2021). Even though it is relatively simple, the additional variations of the exercise are expected to be a novelty from previous research. In connection with the historical picture at the beginning, that the brilliant achievements of a public university in east Indonesia students in fencing sports and specifically a public university in east Indonesia made fencing as MKP, the subjects in this study were students who took part in MKP Fencing at a public university in east Indonesia.

METHODS

This research uses experiment-test with single group pretest-posttest design. The research locus (training) at the Football stadium (with 25 stairs) Campus a public university in east Indonesia. This research was conducted on October to November 2022. It Involved 20 sample from the students (elective course, theory/practice of fencing) of Men and women divided into climbing stairs variation training group (Group A) and Control group (Group B) through random sampling technique, after the pretest. The students were willing to be the sample of this research and was not related to the teaching process since this research was conducted after class. And the teacher helped the researcher in directing the students, Thus all the research steps are the responsibility of the researcher. There two research hypotesa which are testing the correlatuin before and after the treatment and testing the difference correlatin of Group A and Group B posttest. The research location is at the Football Stadium (stadium grandstand with 25 steps) FIK UNM Campus Banta-Bantaeng City Makassar.

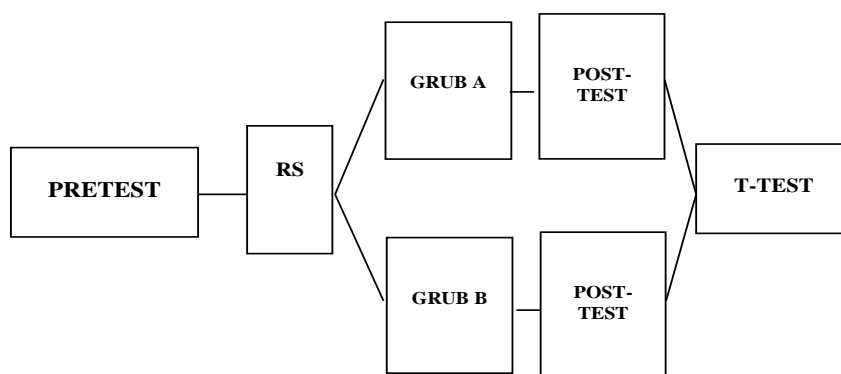


Figure1. Research Design

Description

Pretest : Test done before the treatment

RS : Random sampling techniques by drawing lots

Grup A : Group trained up and down various stairs

Grup B : Control group (comparison group)

Post-test: Test done after the treatment

T-test : Test to compare theresults of the post-test in Group A and Group B

The test to determine the increase in Balestra's ability uses the Kuhadja Skill Fencing Test, with the following needs and assessment mechanisms; (1) Tools and facilities consist of fencing weapons, fencing statues/puppets, stop watches, chalk, test forms, stationery, circular targets for attack with a radius of 30 cm (printed on a sheet of paper and pasted on fencing statue/dummy), (2) Form of target for assessment needs; 6 cm radius 5, 12 cm radius 4, 18 cm radius 3, 12 cm radius 4, 18 cm radius area is 3 points, 24 cm radius area is 2 points, 30 cm radius area is 1 point, each stab that touches the line is scored according to the circle above it, punctures outside the target are not given value. (3) Implementation; The taster stands in the on guard position facing the target, after the command "YES" the tester makes as many attacks on the target within 15 seconds, the total number of hits on the target for 15 seconds is then recorded. This test has validity coefficient level =0.8 and reliability coefficient level = 0.81 (D.Collins, 1978; Rimasa & Sartono, 2020).

Through out the research, Group A did varies climbing stair training which were; 1) climbing stairs with lunges moves, 2) Climbing stairs with high speed (sprint), 3) climbing stairs with countermovement jump, and 4) climbing stairs while performing Balestra fencing floret weapon (foil). Group B was not given treatment and only did pretest and posttest. Varies Climbing stairs training was conducted for 16 meetings (three meetings in a week) on Mondays, Wednesdays, and Fridays by using 2-4 sets consist of 1-3 repetition/set with 2-5 minutes break for each interval. In order to discover the improving of Floret weapon Balestra fencing ability by using the Kuhadja skill Fencing test through out the pretest and posttest. Before conducting the hypotesis test, then the Kolmogrov smirnov test was used to test the normality of the data and ANOVA test for the homogeneity. Then the Correlation test (t-test) was conducted by using SPSS 22. If the Parametric test condition are not fulfilled, then it will use non-parametric test (mann-whitney u test). We anticipates this due to the small amount of sample and the characteristic of the sample which are students, thus they only did fencing activity once in a week (especially Group B), Where as the Group A did fencing activity once a week plus 3 times trained as the treatment on this research, So the possibility of the improvement will be significant.

RESULT AND DISCUSSION

The results of the descriptive analysis in this study were obtained from the initial test data pretest and posttest for the Group A and Group B of 20 samples in total.

Table 1. The results of the descriptive analysis of the Pretest and Posttest data for the two groups.

Balestra's ability to fencing the floret (foil) type of weapon	N	Means	Median	std. Deviation	Minimum	Maximum	Range
Posttest Group A		11,6	11	1.07497	11	14	3
Pretest Group B	10	5,9	7	0.87560	5	7	2
Posttest Group B		6,1	6	1.10050	5	8	3

It is obtained that the Group A and Group B pretest data has similarities (means, median, std deviation, minimum, and maximum). The significant change is on the training group posttest data compare to the pretest, while control group posttest does not have any change. Pracondition test result is the normality test on the table 2. The research results show that the data are not normally distributed.

Table 2. The Result of Normality Test

Group	P	Sig.	Conclusion	
Group A	Pretest	0.062	0.05	Normal
	Posttest	0.000	0.05	Not normal
Group B	Pretest	0.082	0.05	Normal
	Posttest	0.103	0.05	Normal

Based on the table 2 the result of normality test, all pretest data are normally distributed and Group B posttest are normally distributed as well, while the posttest data of group A are not normally distributed. It means that further data analysis by using parametric statistic can not be conducted, Thus the correlation test will use non parametric test (mann-whitney u test).

Table 3. Test result of hypothesis 1

Variable	Asymp. Sig. (2-tailed)	α
Pretest Group A and Posttest Group A	0.000	0.05

Based on the table 3 hypothesis test result by using non-parametric (mann-whitney u test) that asymp value. Sig. (2 -tailed) which is 0.000 or smaller then < probability value of 0.05. It is concluded that there is a significant difference between pretest and posttest of varies climbing stairs training group (group A) towards the improving ability of floret weapon balestra fencing.

Table 4. Test result of hypothesis 2

Variable	Asymp. Sig. (2-tailed)	α
Posttest Group A and Group B posttest	0.000	0.05

Based on the table 4 the hypothesis test result by using non-parametric test Based on the table 3 hypothesis test result by using non-parametric (mann-whitney u test) that asymp value. Sig. (2 -tailed) which is 0.000 or smaller then < probability value of 0.05. It is concluded that there is a significant difference between posttest (after treatment) of varies climbing stairs training and the control group towards the improving ability of floret weapon balestra fencing.

The data analysis result can be concluded that all hypotheses are accepted; 1) there is a significant difference between pretest and posttest of the varies climbing stairs training group towards improving ability of floret weapon balestra fencing. 2) There is a significant difference between posttest (after treatment) of varies stairs climbing training and the control group towards improving ability of floret weapon balestra fencing. Fencing is a high-intensity sport with dynamic movements driven by the lower extremity musculoskeletal system (Chang et al., 2019). Intense, repetitive and asymmetrical movements in fencing affect the body components in the lower extremities (Thompson et al., 2022). Martial arts fencing in its implementation requires unity of motion between the arms and legs, so a fencer must focus on arm exercises, forward and backward leg movement exercises, jumping backwards, as well as training on a combination of these movements in order to be able to make effective attacks carried out during matches (Kamaruddin, 2019). The attack technique for fencing is divided into three motion positions and also applies to the balaestra technique. First, the position of full forward movement using the front foot which is balanced with the stability of the pelvic position, at the same time the arms are fully extended forward (illustrating a position of threat to the opponent), secondly, doing the back leg repulsion (creating a forward movement with good power) is marked by moving the position of the body, the second movement begins by straightening the arms (holding the sword), the direction of the sword tip is preparing to stab the opponent (in a predetermined target area), and the third movement is the hand holding the sword, the legs are ejected to reach straight ahead preparing to reach full motion, the heel of the front shoe lands right on the ground to then form a full attack position (Kurniawan, 2015). The physical components that are considered very important in fencing are speed, reaction time, strength, coordination, endurance and so on (Rasyono& Decheline, 2019).

Based on this explanation, an increase in leg muscle strength, speed, and explosive power obtained through various stair climbing exercises is predicted to be the main element in increasing the floret (foil) type of balestra fencing in this study. The increase in speed is obtained from a variety of running exercises at high speed (sprint) when climbing stairs. The most important requirement of short distance running is speed and is the result of the strength and speed of muscle contraction in the mechanism of smooth, smooth and efficient movement (Indra& Lumintuarso, 2014). Sprint or short distance running (one of the athletic events) really requires a physical component of speed, strength, power, endurance, flexibility, agility, and so on (Purnomo, Irianto, & Mansur, 2020). The element of

strength is obtained from variations of lunges when climbing stairs where the training load is a person's body weight. Strength can be trained and increased through weight training (strength training) (Kusuma et al., 2020). Increased leg muscle strength was also obtained through variations of countermovement jump exercises. Increased ability to countermovement jump (CMJ) is one of the predictors of a person's leg muscle strength (Karim et al., 2019). Countermovement jumps (CMJs) are widely used as a form of exercise, performance monitoring, and measurement instrument, because the height of the jump measured via countermovement jump is highly correlated with leg strength and explosive power (Philpott et al., 2021). By increasing the physical components of speed and strength, it will also support an increase in leg explosive power performance. Strength, speed, and muscle contraction greatly affect the performance of muscle explosive power (Ambarwati, Widiastuti, & Pradityana, 2017). Especially with the variation of climbing the stairs while doing the balestra fencing movement with the floret (foil) type of weapon. Training and or measurements in talent scouting and training activities must be in accordance with the actual competition situation (McCalman et al., 2022).

For this reason, it is not excessive to rely on the results of studies that also use climbing and descending stairs to increase the physical components of leg muscle strength, speed, and explosive power. Exercise going up and down stairs increases the explosive power of the leg muscles of athletes at Fencing UKM, Jambi University (Primary, 2021). Significant effect through climbing and descending stairs exercise increases explosive muscular limbs in male basketball athletes aged 17 years (Sari & Madri, 2022). Exercise up and down stairs affects the leg muscle strength of soccer players in SMK students (Belo, Bile, & Tapo, 2021). Exercise going up and down stairs has an effect on increasing blocking ability (a physical component needed for leg muscle explosive power through a combination of speed and strength) (Putri, Syafrial, & Arwin, 2022). Through the application of training up and down the stairs significantly increases the ability of the dual kick athlete (the physical component needed for leg muscle explosive power) in Taekwondo athletes Pelatda, West Sumatra Province (Wahyuri, Nurmai, & Emral, 2019). Exercise up and down stairs can significantly increase the explosive power ability of the limb muscles of VHS volleyball club players (Yuliansyah, 2015).

CONCLUSSION

Based on the research results, it can be concluded that; 1) there is a significant difference between pretest and posttest of the varies climbing stairs training group towards improving ability of floret weapon balestra fencing. 2) There is a significant difference between posttest (after treatment) of varies stairs climbing training and the control group towards improving ability of floret weapon balestra fencing. This increase is the impact of an increase in leg muscle strength, speed, and explosive power obtained through varied stair climbing exercises which are the main elements of increasing the attack ability of balestra fencing types of floret (foil) weapons, besides that research subjects can experience direct experience through variations of training. Climbing the stairs while doing the balestra fencing movement with the floret (foil) type of weapon.

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