

Training Using Wrist Forearm Modification Tool

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Abstract—The javelin throw requires an efficient release angle. The angle is at 30 ° to 36 °. Observations made on the ground in novice athletes are used as a single sample because athletes have difficulty directing the javelin to get the correct throw angle. Athletes that perform javelin with reduced ability to release techniques result in the athlete's inhibition to get maximum throw performance. A stiff wrist causes this. Stiffness in the wrist is one factor that causes inadequate throwing performance. The reason is that a javelin that is not at an angle of 30 ° to 36 ° will find it difficult to reach the maximum distance. Thus, the problem of the ability of the javelin release technique is of concern for research. In this situation, the researchers presented a device called the wrist to practice the simulation of the javelin release technique. So, with training using a wrist device, problems with stiffness when removing the javelin can be overcome appropriately.

Keywords: effect of exercise, wrist forearm, javelin release technique

I. INTRODUCTION

One of the main factors influencing the yield of the javelin is the angle of release of the javelin. The efficient javelin angle was previously written by reference [1] which states that "the optimal angle of the body's longitudinal tilt (vertically forming), and the angle of release is between 30° to 36°, the angle between the shoulder axis and the longitudinal axis around 90° . Reference [2] says that as many as 70% of athletes are trained and produced a throw as fast as 0.1 seconds at the time of release. Through this opinion, it can be concluded that the javelin will be at the right momentum when it is at the angle of the escape vector.

The problem in this study occurs when the researchers observe the ability of a sample to get a bad throw. It is because the javelin release experiences an inconsistent release angle, which is detrimental to the throw.

The effort to overcome the error of releasing technique is by giving simulation exercises. Reference [3] states that "simulation is a replication or visualization of the behavior of a system." The training to release a javelin using a wrist forearm device is the answer to the difficulties faced by athletes. Reference [4] says that "The intended target is specific to certain muscle groups, specific to a series of movement patterns, specialization of predominant energy systems." Wrist training is a reasonable reason to use the wrist forearm as a simulation tool to release the javelin. This is considered appropriate because the ability to release the javelin can specifically be associated with wrist training using a wrist forearm device. Reference [5] states that "An interesting finding in this study is that wrist speed is close to zero at the time of release. It could be because the tendons between the wrist and fingers simultaneously control the release of objects, which will be the angle of the object.

II. METHOD

This study employed the SSR approach (Single Research Subject). It is done because the sample in this study is casuistic and cannot be generalized. The research sample javelin thrower was taken from the Bekantan's Athletic Club.

This study used 2 (two procedures, where the first procedure is to determine the initial test. Determining the initial test in this study is a sample that would be thrown 6 (six) times, then measure the results of the toss and see the angle of releasing the javelin with Kinovea application. In the intervention procedure, the athlete performs a simulation of releasing the javelin using the forearm wrist using maximum performance. The results obtained are 20, so the first treatment is 80% of the maximum performance test. The length of time to gather information to conclude is to do six tests along with angular analysis using the Kinovea application practicing for 18 meetings 6 times to do the test.

III. RESULTS AND DISCUSSION

Data obtained from the first week to the sixth week, there were 3 (three) observations obtained. The first observation is measuring the results of the javelin throw with a meter, the second observation is the speed of the arm in releasing the javelin, and the third is the javelin release angle, which is supported by the Kinovea application. Based on our observations, we get the following results:

TABLE I. RESEARCH DATA

Throw Session	Before Treatment			After Treatment																	
	AR	SR	TA	Week 1			Week 2			Week 3			Week 4			Week 5			Week 6		
				AR	SR	TA	AR	SR	TA	AR	SR	TA	AR	SR	TA	AR	SR	TA	AR	SR	TA
1	36°	41,44	34,75	37°	39,21	34,91	35°	34,14	35,10	32°	42,34	42,21	31°	40,21	40,17	33°	40,18	40,13	32°	40,93	40,91
2	40°	37,27	33,01	44°	33,41	33,12	33°	39,43	39,38	30°	40,53	40,40	32°	40,18	40,04	35°	40,50	40,44	31°	42,32	41,28
3	33°	39,75	36,82	33°	39,80	40,22	40°	36,03	35,80	31°	39,38	37,83	30°	38,39	38,26	31°	40,39	40,31	33°	41,48	41,43
4	30°	40,21	39,98	38°	38,83	38,4°	33°	36,43	36,41	30°	40,17	40,12	33°	41,57	41,54	33°	40,49	40,46	34°	44,19	43,98
5	43°	38,31	32,16	43°	39,30	31,11	43°	38,15	32,11	39°	39,56	38,08	34°	41,87	41,55	34°	40,64	40,15	34°	43,19	42,09
6	41°	38,31	34°	40,31	41,01	41°	38,92	34,14	41°	39,09	34,90	31°	40,99	40,68	35°	40,12	40,01	34°	42,31	41,97	

Information:
 AR : Angle Release
 SR : Speed Release (m/s)
 HL : Throw Achievement (m)
 Red Box : Throw outside angle 30° among 36°
 Green Box : Best throw
 White Box.: Throw inside angle 30° among 36° |

A. Before Being Given an Intervention

Based on the table of 6 (six) throws there are only 2 (two) throws at an angle of 30° to 36°, namely the third throw at an angle of 33° with the speed of releasing the javelin 39.75 m/s to get the result of a throw of 39.82 meters and the fourth toss at an angle of 30° with the speed of releasing the javelin 40.21 m/s was obtained as far as 39.96 meters. The remaining 4 (four) inefficient throws are the first throw at an angle of 39° with the speed of releasing the javelin 41.44 m/s producing a

throw of 39.75 m, the second throw of an angle of 40° with the speed of releasing the javelin 37.27 m/s producing a throw 35.61 m, the fifth throw at an angle of 45° with a speed of releasing the javelin 38.55 m/s produces a throw of 32.10 m, and the sixth throw at an angle of 47° with a speed of releasing the javelin throw of 38.31 m/s where the result of the throw is not counted

B. After Being Given an Intervention

1) Observation in the first week

Observations obtained in the first week there are 2 (two) that enter an angle of 30° to 36°, i.e., the third throw is at an angle of 33° with a javelin speed of 39.80 m/s with a throw of 40.22 meters, and sixth to an angle of 35° with a javelin speed of 40.87 m/s obtaining a throw of 41.01 m.

2) Observations in the second week

The results of observations in the second week that there were only 2 (two) right throws entered at an angle of 30° to 36°, namely the second throw at an angle of 35° with the speed of releasing the javelin 39.80 m/s succeeded in getting the result of a throw of 39.38 meters and the fourth toss at an angle of 33° with the release speed of the javelin 39.80 m/s obtained a throw as far as 39.47 m.

3) Observations on the third week

In the third week from 6 (six) throws increased to 3 (three) managed to obtain an angle of 30° to 36°, i.e., the first throw at an angle of 33° with the speed of releasing the javelin 42.36 m/s to get a throw of 42.22 meters, then they toss the second at an angle of 36° with a javelin release speed of 40.53 m/s obtained a throw as far as 40.40m and the fourth throw at an angle of 35° with a javelin release speed of 40.17 m/s successfully reaching a distance of 40.12m.

4) Observations in the fourth week

In the fourth week, 5 (five) of 6 (six) throws are at an angle of 30° to 36°. At the first throw, the javelin angle is 31° with the javelin release speed of 40.21 m/s to get the result of a throw of 40.17 meters. The second throw of the javelin is at an angle of 32° with the speed of releasing the javelin 40.16 m/s resulting in a throw of 40.04 m. The fourth throw is at an angle of 34° with the speed of releasing the javelin 41.57 m/s to get a throw of 41.55m. The fifth throw angle of the javelin is at 34° with the speed of releasing the javelin 41.67 m/s producing a throw as far as 41.55m, and at the sixth angle of the release angle at 31° with the speed of releasing the javelin 40.99 m/s and producing a throw as far as 40, 68 m.

5) Observations in the fifth week

In the fifth week, all throws are at an angle of 30° to 36. The first throw at an angle of 33° with the speed of releasing the javelin 40.18 m/s produces a throw as far as 40.13 m, the second throw of the javelin at an angle of 35° with the speed of releasing the javelin 40.50 m/s produces as far as 40.44 m. The third throw of the javelin at an angle of 31° with the speed of releasing the javelin to throw 40.39 m/s yields a throw of 40.31 m. The fourth throw of the javelin at an angle of 33° with the speed of releasing the javelin 40.49 m/s obtained the result of a throw of 40.46m. The fifth javelin throw at an angle of 34° with a javelin release speed of 40.64 m/s produces a throw of 40.52 m, and the sixth javelin at an angle of 35° with a javelin release speed of 40.12m/d yields 40.01 m/s throw.

6) The observations in the sixth week

On the 6th week, all the tosses taken are entirely stable at an angle of 30° to 36°. The first throw of the javelin at an angle

of 32° with a javelin release speed of 40.93 m/s produces a throw as far as 40.91m, the second of the javelin at an angle of 31° with a javelin release speed of 42.32 m/s produces a throw of 42.28 m. The third throw of the javelin at an angle of 33° with the speed of releasing the javelin 41.46 m/s produces a throw as far as 41.43m. The fourth javelin throw at an angle of 34° with a javelin release speed of 44.19 m/s produces a throw of 43.98m. The fifth throw of the javelin at an angle of 36° with the speed of the arm releasing the javelin 43.19 m/s produces a throw as far as 42.09 m, and the sixth of the javelin is at an angle of 34° with the speed of releasing the javelin 42.37 m/s resulting in a throw of 41.97 m.

C. Throwing Observation Results

Based on data obtained from the first week to the sixth week, it was found that there was a very significant change in the javelin angle. In the javelin angle graph that has been presented, it is seen that there is a difference in the consistency of the angles from the first, second and third angle of the throw is still unstable, while the fourth and sixth week of the corner of the javelin jaw release at an angle of 30° to 36°.

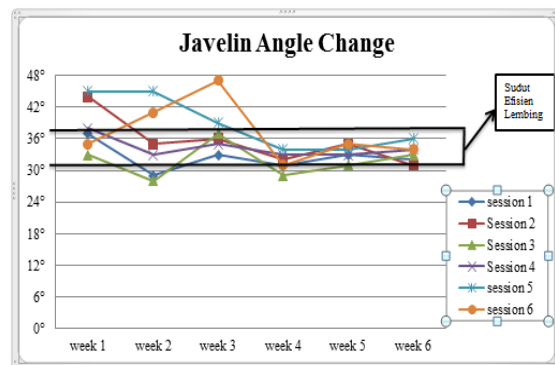


Fig. 1. Javelin Angle Change

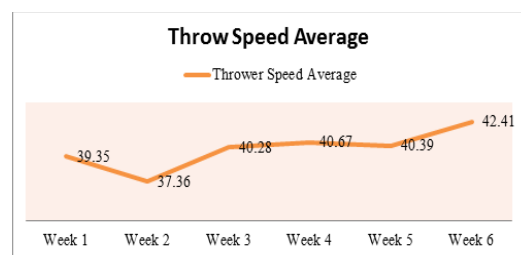


Fig. 2. Throw Speed Average

In the graph above, there is a change in speed. In the first week, the average speed was 39.35 m/s. In the second week, the average speed was 37.36 m/s. In the third week, the average speed was at 40.28 m/s. In the fourth week, the average speed was 40.67 m/s. In the fifth week, the average speed is 40.39 m/s, and in the sixth week, the average speed reaches 43.41 m/s.

D. Throw Results

Based on the javelin angle obtained is supported by the javelin velocity, then it affects the outcome of the toss. In the first week occurs in the sixth throw of 41.01 m. Then in the second week, the best throw occurs in the fourth toss, 39.47 m. In the third week, the best throw occurs at the first throw, which is 42.22 m. In the fourth week, the best throw occurs at the fifth throw, which is 41.55 m; in the fifth week, the best throw occurs at the fifth throw, which is 40.52 m. In the sixth

week, the best throw occurs at the fourth throw, which is 43.98 m.

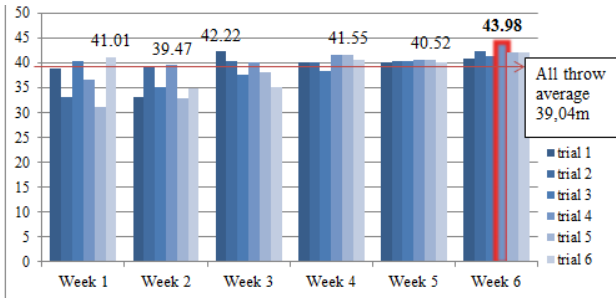


Fig. 3. Throw Result

TABLE II. THE MOST EFFECTIVE JAVELIN RELEASE ANGLE

Angle	Throw (Meter)	Throw average (Meter)
31°	40.17	40,86
	40.68	
	40.31	
	42.28	
32°	40.04	40,48
	40.91	
33°	40.22	40,78
	39.47	
	42.22	
	41.54	
	40.13	
	40.46	
34°	41.55	Best Angle Throw 42,00
	40.52	
	43.98	
	41.97	
35°	41.01	40,2
	39.38	
	40.12	
	40.44	
36°	40.4	41,25
	42.09	

Based on the table, the most effective javelin angle is 34°. The reason for the researchers is because from that angle, the results of the throw appear to have the farthest average of 42.00 meters.

IV. CONCLUSION

Based on research that has been done, it has been proven that the training of javelin throwing simulation using a wrist forearm can have an impact on the consistency of the ability to release the javelin at an angle of 30° to 36°.

REFERENCES

- [1] Hans Joacim Hanzel, Biomechanics of Javelin Throwing, IAAF, 1986
- [2] C. Morris and R. Bartlett, *Sports Medicine*, vol. 21, 1996.
- [3] S. S. Udin, Penerapan Simulasi Animasi, Bina Sarana, 2005.
- [4] H.B. Bafirman “Kontribusi Fisiologi Olahraga Mengatasi Resiko Menuju Prestasi Optimal,” *Jurnal Media Ilmu Keolahragaan Indonesia*, vol. 3 no. 1, 2013.
- [5] Q. Zhu, J. Dapena, and G. P. Bingham, “Learning to throw to maximum distances: Do changes in release angle and speed reflect affordances for throwing?,” *Human Movement Science*, vol. 28 no. 6, 2009, pp. 708-725.