

# Standing Javelin Throw

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## Introduction

The purpose of this project is to analyze the standing throw of a javelin. We will also compare the javelin throw with a baseball pitch. The standing javelin throw can be broken down into three phases. According to Liu and associates, the sequence of the lower extremities for female javelin throwers is (1) right hip internal rotation and abduction, (2) right foot touch down, (3) left tilt in the trunk, (4) right hip extension, (5) right ankle plantar flexion, right knee extension, and pelvis forward rotation, (6) left hip adduction, (7) trunk forward tilt and (8) left foot touchdown, (9) left hip extension, and (10) release of the javelin. The upper extremity sequence is (1) upper trunk forward rotation, (2) right foot touchdown, (3) left foot touchdown, (4) right shoulder abduction, (5) right shoulder horizontal adduction, elbow extension, and shoulder internal rotation, (6) wrist flexion and release of javelin.

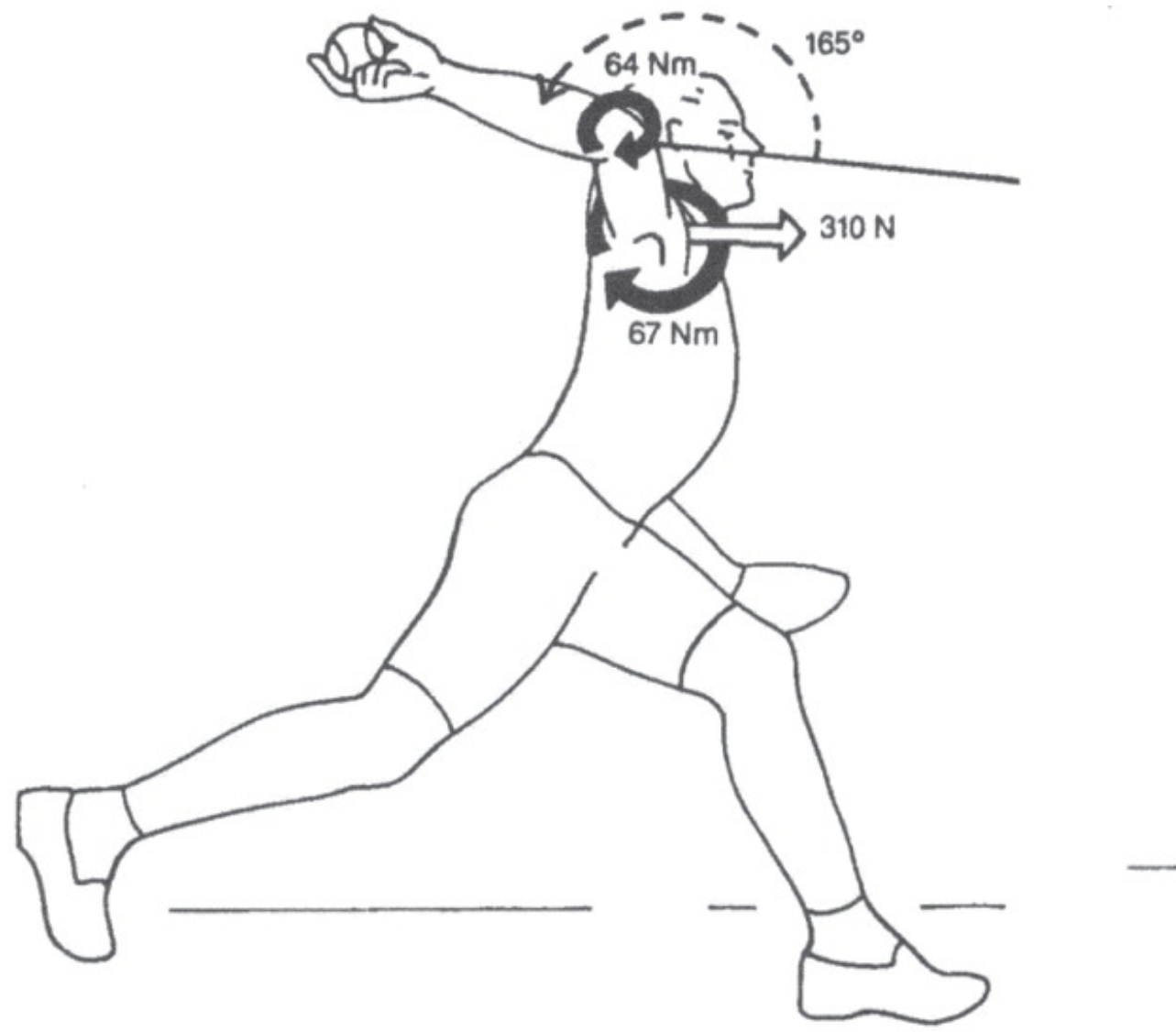
## Phase 1

According to Liu and associates, the sequence of the upper extremity motions in the javelin throw reported in the study is consistent with other overhand throwing events. There are three main cues used to teach the overhand throwing technique. 1) side to the target, 2) make a “T”, and 3) step toward the target. The first phase of the javelin throw shows all three of those cues. Having your side to the target results in external rotation with the back shoulder and hip and internal rotation with the lead shoulder and hip. Making a “T” with your arms results in supination of the back hand and pronation with the lead hand along with an eccentric contraction of the pectoral muscles. It also leads to adduction of the right scapula and abduction of the left which occurs in the sagittal plane. Step towards the target results in a load on the back leg with a concentric contraction of the quad resulting in knee and ankle flexion of that back leg. Additionally, the load leads to triple extension of the front leg as well occurring in the frontal plane. According to Torim, the right foot is 45°- 90° to the right of the throwing direction. Looking at the picture, you can see the right foot is at about a 90° angle from the throwing direction. For the standing throw, the core can be somewhat relaxed in this phase, but in an actual competition the core is always contracted for stability.



## Phase 2

Load is beginning to transfer from the back foot to the front foot. The load transfer starts with plantar flexion of the right ankle, which then leads to triple extension of ankle, knee, and hip at approximately 142°. This occurs in the frontal plane. The right shoulder also rotates from external to internal in the transverse plane. Due to similar throwing patterns, we compared the standing javelin throw to a baseball pitch. The main difference is the angle of release causing the elbow and shoulder angles to be different. Elbow of the baseball pitcher would be more flexed, and the rotation of the shoulder is a little different. According to Barber, the optimal angle of release should be between 32°- 36°. As we can see in this picture, the angle of release is approximately at 34° and it leads to a concentric contraction of the pectoral muscles and biceps along with a flexed core.



## Phase 3

According to Liu and associates, the sequencing of joint and segment motions during the delivery phase is believed to have a significant effect on javelin throwing performance. The load has fully transferred from the back leg to the front leg to produce force to throw the javelin. This results in triple extension of the back leg, again occurring in the frontal plane. Additionally, the right shoulder and hip are fully internally rotated and abducted which occurs in the transverse and frontal plane. The left hip is now adducted as well. The elbow is extended, and the wrist is flexed for the follow through and release resulting in a concentric contraction for the right tricep and flexed core for stability. Wrist flexion results in more force production at the release. Lastly, the scapula's have rotated with the right one abducted and the left one adducted in the sagittal plane.



## Exercises

According to Kim and associates, eight weeks of specific physical training for dynamic stabilizer muscles enhanced the rotator cuff muscle strength, core stability, throw distance, and flexibility of javelin throwers. These results suggest that specific physical training can be useful for preventing shoulder injuries and improving the performance for javelin throwers. Measurements comprised anthropometry, isokinetic muscle strength measurements, the function movement screen test, and movement analysis.

## Conclusion

In conclusion, the standing javelin throw is a quite complex movement where the sequence for the upper and lower extremities is vital for a proper throw. Additionally, shoulder and elbow warm-up exercises are crucial for shoulder flexibility and injury prevention. The subject of the video does not throw a javelin in competition but has experience. Things that were done correct include: stance, pronation and supination, load transfer, angle of release, triple extension and rotation of shoulders and hips, and follow through. Things that could be improved include knee flexion of the front leg in phase 1.

## References

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