Rotational Javelin Throwing

The Fundamentals Garry Calvert

Garry Calvert is a Level IV ATFCA Throws Coach who was instrumental in producing 2 Australian athletes: Petra Rivers in 1982 (69.28m) and Jarrod Bannister in 2008 to (89.02m). He developed Jarrod Bannister from 11 years to 23 years of age as a Little Athletics junior to an international senior. He has coached athletes to 17 Australian titles. Garry himself won 3 Australian titles and trained in Hungary under world record holder Miklos Nemeth. He has lectured for the IAAF and ATFCA level II coaching courses. In this article Garry gives his views on contemporary javelin theory. (The views expressed in this article are not necessarily those of the editorial board.)

The history of the javelin event has seen the javelin reach 104.80m in 1984 beating Tom Petranoff's (USA) magnificent 99.72m. The IAAF decided to alter the centre of gravity and hence the dynamics. The result saw a drop in distance with the first world record being 76m, a drop of 28m. With the refinement of javelins and the emphasis on adjusting the technical model, we have seen the world record move to 98.48m by Jan Zelezny (Czech Republic).

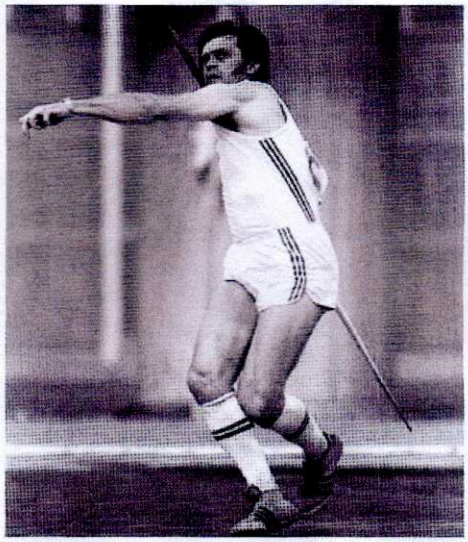
The frequency of 90m male javelin throwers has diminished since the change in centre of gravity. It seems to be increasingly more difficult for throwers to produce 90+m throws using the standard techniques being coached throughout the world. The question is asked why is the linear technique being employed by most coaches world wide? Is the answer that most senior coaches are still employing the same successful coaching methods for many years and that there are few new coaches with success at elite level or is coaching linear technique a safe approach towards high performance? Why aren't coaches around the world trying to use rotational technique? The technical model seems far too hard to control, too difficult to teach and with little references to go by. Most coaches are reluctant to either bring into their teaching model elements of rotational throwing or to adapt to full rotational technique.

Linear throwing in its purest form has its limitations. The seemingly unbeatable Andreas Thorkildsen with a near perfect linear model is still 7 metres behind Zelezny's World Best.

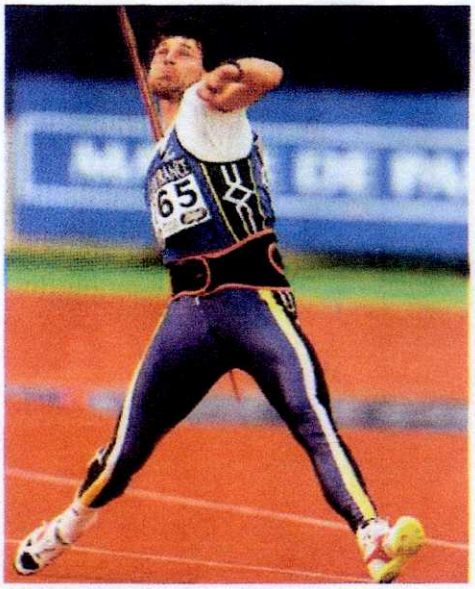
The successful throwers in recent times who have employed rotational concepts have been Jan Zelezny, Sergey Makarov, Konstadinos Gatsioudis, Alexandr Ivanov, Jarrod Bannister, Tero Pitkamaki, Petr Frydrych, Gavin Lovegrove to name a few. The pre 1986 era has shown Miklos Nemeth, Ferenc Paragi, Hanu Siitonen, Uwe Hohn with.3 being world record holders.

Many of these throwers only use various aspects of rotational throwing but with phenomenal effect. But the hardest rotational model to employ is definitely starting from the feet upwards. The best exponents of this method unquestionably are Miklos Nemeth 94.58m and Jan Zelezny 98.48m. With the women Tina Lillak (Finland) and Joanna Stone (Australia) were arguably the best exponents of rotation from feet upwards.

The majority of rotational throwers mainly rotate through the shoulders and secondly the hips.



Miklos Nemeth (Hungary 1976 WR 94.58m)



Jan Zelezny (Czech Republic 98.48m WR)

Steps in understanding rotational throwing

A. Cross stride / Landing position

B. Horizontal rotation

C. Vertical rotation

D. Three left leg action / acceleration

E. The Block

A. Cross stride / Landing position

The most important factor is to establish a landing position that enables a very active right leg action, not one of the conventional soft step or slide step actions. This will enable the action of the right leg to become proactive in enacting a horizontal rotation. The horizontal action creates torque from right foot upwards and is clearly a force that is new and unusual in javelin throwing. Most throwers attempting to use rotational concepts, over rotate the right foot to 90 degrees or further and are unable to use it properly. Only Nemeth, Siitonen, Stone, Lillak, have been able to successfully use the right foot from 90 degrees.

Steps are-

1. A very active penultimate step with a cocked right leg
2. A dominant loaded and coiled right leg with the foot landing at 45 degrees (or at 1.30pm)
3. Position of landing to be left shoulder at a minimum perpendicular to right foot
4. Loaded right thigh and gluteus - not as per "Soft Step Concept"
5. Shoulders rotated at 1.30pm

B. Horizontal Rotation

The right leg is critical to set up a horizontal rotation into the throwing position. The right foot and knee action is anti clockwise and assists in keeping the COG low and driving around and forward. The force created is the greatest experienced in a throwing position and would become useable when the thrower has created a very strong left side block. If the thrower is unable to "hit" the block hard with this horizontal action, as per all rotation events the torque is lost during unwinding of the premature action. Movements are -

1. Right foot and knee to rotate anti clockwise from 45 degrees to zero degrees, or from 1.30pm to 12pm. Throwers rotating from 90 degrees or 3pm usually miss the full effect of the horizontal rotation, and pass over the right foot and lose the forces created by a timed initiation of the right foot.
2. Right hip to hit the closed left leg block very hard.
3. Right knee to remain bent at 90-120 degrees and does not extend as per other techniques.
4. Right heel to turn outwards very fast initiating knee and hip.
5. Torque created upwards from right leg through hips and chest.
6. Vertical position and / or thoracic chest lean back maintained.

C. Vertical Rotation

With the use of linear momentum, we can gain forces that are driving upwards from the horizontal rotation and across the chest. To bring in a secondary and resultant force, we use the vertical axis of the body and the anterior rotation of the shoulder and elbow. This creates a dominant blocked position against the left side, one that promotes a solid platform to deliver a very hard throwing action. Main movements -

1. Rotate right shoulder anti clockwise.
2. Ensure the javelin remains at 1.30pm and aligned against the head.
3. Right elbow also rotates anti clockwise towards the vertical axis.
4. Important to hold the left side blocked whilst both rotational forces are combining.

D. The 3 Left Leg action

To ensure a balanced athletic position whilst running and withdrawing the javelin the last 6 steps must be accelerating.

This is achieved by a dominant left leg action.

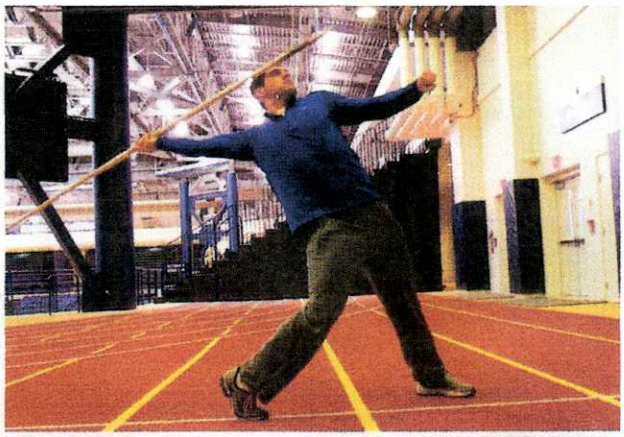
1. Driving out in front with each of the last 3 left leg actions ensuring that the Centre of Gravity is always in front of the upper body.
2. The penultimate stride is a dominant part of setting up the throw. The final two strides create as much force as possible.
3. This "Coiled" and "Cocked" action creates an immediate spring action into the throwing position.

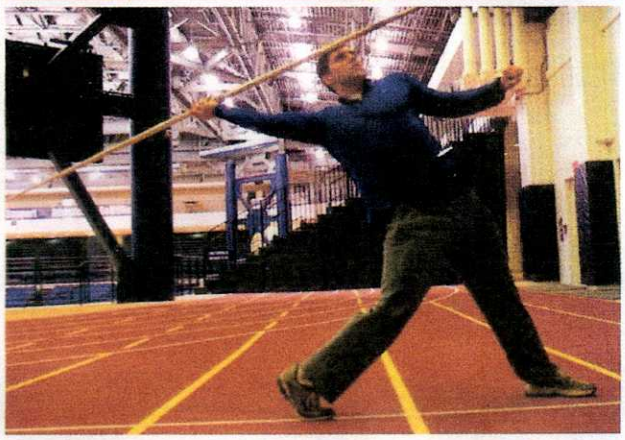
E. The Block

The Block is the most important part of a throwing event. Without a stable and straight left side the throw loses 30-80% of all energy created during the run up and the acceleration over the last 6 steps. The importance here is to ensure that the lean back on the left leg is not lost by straightening towards vertical or bending at the knee or hips. Focus is on -

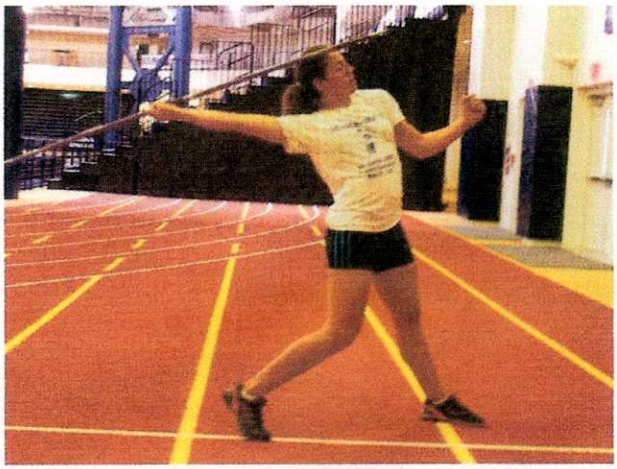
1. Left leg hits the ground hard.
2. Left foot hitting through the heel and flat of foot not the ball of the foot.
3. All the left side braced.
4. Allow the right side to rotate fast and free against the left side "Hinge Effect".
5. Ensure a double support position and avoid allowing a single support.
6. Left side must be "Closed' during the initial rotation and hit into the block and throwing position.
7. Hips must rotate parallel to the ground. Avoid the right hip lifting.

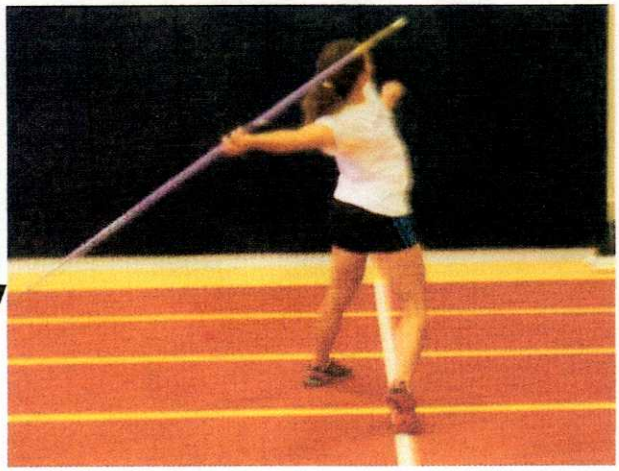
Current athletes photos and development – Bobby Smith 2008 USA Champion/Olympic Aspirant





2001 USA Junior Rep/Olympic Aspirant – Jen Austin





Why rotation over linear?

Rotational javelin is the future of javelin throwing in that linear javelin throwing has been analysed infinitum and its development has stagnated for 30—40 years. Linear throwing is limited by the nature of the technique and the forces it creates along with the almost impossible task of controlling speed during the throwing position and at the moment of the block.

The forces created and the resultant torque, promotes rotational throwing as the technique which will continue to revolutionise the event of javelin. As in the Fosbury Flop and the rotational shot put, rotational forces promote faster biomechanical movements, higher forces, increased torque, long pull on the javelin and faster velocities. When this technique is mastered and skills honed, the hip action and block provides a superior delivery position to conventional linear throwing. There are various types of rotational technique dependant on the thrower's skill level and the coach's capacity to teach the technique.

First style - feet running frontal as per linear technique. Hip also frontal with shoulders turned.

Second style - Left hip and knee turned between 30-45 degrees. Chest turned at 45 degrees plus.

Third style - Advanced with feet 45-90 degrees, hips turned 45-60 degrees. Chest and shoulder turned to 45 degrees, javelin axis of rotation complex horizontally, vertically and linearly.

Why isn't Rotational Javelin being coached?

Predominately rotational throwing has been classified as "not for basic beginners and novice throwers" We have many junior sports people who had experience with sports such as baseball, cricket and US football, with the winding up and twisting body action that lends to more rotation and torque. The issue seems to be the elbow arm and hand action of these sports which forces the arm action to slide outwards and enact a slinging action.

Re teaching these sportsman the correct biomechanical movements of throwing is the big issue. The amount of injuries in javelin throwing world wide is epidemic with "Tommy John" elbow, lap tear/capsule, and lower back L4/L5 injuries dominating.

Coaches tend to follow coaching principles based on how they threw themselves or what they were taught through their education and readings. Even though the major break throughs that have occurred in javelin through the 70's and 80's and through the 90's and 00's have been through East German coaching and equally importantly through Hungarian and Czech Republic rotational technique. Miklos Nemeth continued to coach after his stellar career and now Jan Zelezny has taken over coaching the national squad in the Czech Republic and has already influenced their throwing techniques.

There is a basic assumption in that all coaches and throwers need to have a clear understanding of all facets of the linear throwing style prior to embarking on the advanced movements within rotational throwing.

Major areas of concern with athletes using elements of rotational technique

1. Alignment of the javelin is critical.
2. Slinging of the javelin is a bi-product of rotation, therefore control of the vertical and horizontal rotational force, needs to be a priority.
3. Lack of knowledge of vertical and horizontal planes.
4. Lack of agility, flexibility, dynamic and athletic skills.
5. Basic throwing position understanding at low level .

Jarrod Bannister

http://www.youtube.com/watch?v=a57zBFpyr58

http://www.youtube.com/watch?v=2_0e0cyaPQU&feature=related

Jan Zelzney

http://www.youtube.com/watch?v=V6P9WbTPeLA&feature=related

Miklos Nemeth

http://www.youtube.com/watch?v=0olXUfNTk0g

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