Form Follows Function

The javelin throw’s physical, functional and foundational elements explored from an evolutionary perspective

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Intro / Goals

• Who is Kurt Dunkel? Where is Shippensburg, PA?
• This session is designed to give you a better understanding of
  - Similarities and differences in the biomechanics of successful javelin throwers versus less successful javelin throwers.
  - This approach is done from an ‘evolutionary’ (change over time) standpoint and is based on ‘research’, which demonstrates the biomechanics of successful javelin throwers over time.
  - How to evaluate talent, understand growth edges and estimate performance ceilings.

This session will not:
  - Focus on drills, training methodologies, or additional tools to train athletes.
• These are my thoughts/methods at understanding the javelin throw, which may or may not work for others, but it is a lens to understand the javelin from a biomechanical frame of reference.
The Struggle is Real

• Evolution: the gradual development of something, especially from a simple to a more complex form

• Javelin throwers are highly evolved creatures.

• Coaches are generally attempting to promote change over time.
Evolution

• Macro Level: the human body and the most efficient physiological approach. “Know your history”

• Micro Level: The neuromuscular/mechanical patterns which are developed in many young athletes and the importance of rewiring & refining these patterns.

• Football, Baseball, Softball etc...
Promoting Change

• A coach should have an understanding of certain unique qualities:
  - Physical traits, learning/communication style, ability/desire to change motor patterns, big picture planning/goal setting, performance ceiling, assessing overall coaching needs.

• In order to change, an athlete needs to understand the javelin from the inside out and from the outside in (kinesthetic, visual, and ‘understanding’), which is connecting the seeing to the feeling.

• ‘Knowing what you’re getting.’ Novice, High School, Collegiate, Professional etc.

• Most athletes who throw the javelin have a background in other throwing sports such as baseball, softball, football etc.

• Javelin is the only throwing event where your athletes have pre-existing training in the throwing motion.
Biomechanics Within the Bigger Picture of Coaching

• Knowledge Base (including Kinesiology/\textit{Biomechanics}, etc) \rightarrow Development of coach-athlete relationship \rightarrow The act of teaching/coaching \rightarrow Physical Preparation \rightarrow Mental Preparation

• \textbf{Stationary} versus movement based view of Biomechanics

• Uniqueness of each individual athlete
  - Visual learners versus kinesthetic learners, thinkers versus doers, appropriate use of cues and linking seeing to feeling

• Don’t overanalyze or stay stuck ‘in the head’

• Understanding how to throw other things i.e. a football or baseball
Evolution...
Evolution cont’d...
Evolution cont’d...

Rules changes to men’s & women’s javelins have required throwers to focus on:

- Lower delivery angle to produce optimum flight
- Faster tempo of right to left
- Increased speed on runway
- Higher carrying/delivery position

Many of the fundamentals have remained the same.
Evolution cont’d…

• The mechanics and motor patterns of young athletes have evolved to meet the demands of their particular sport.
• The abilities/skills that helped in one sport can initially help but over the long term they can be detrimental.

• Rewiring the body and developing new patterns and new skills which meet the demands of the event.
• Understanding the demands and unique characteristic of ‘new’ event/patterns.
• Being patient
• Embracing ‘different’.
• ‘Weird’ becomes ‘interesting’.
• Redshirt season.
Path of Energy – working from the ground-up

- Power is generated via contact with the ground
- The ground is used to generate and redirect power (i.e. starting & stopping)
- Beginners should focus on the lower body first
Fascial Lines & The Spiral Line

• The least understood and most overlooked aspect of javelin
• The spiral line is responsible for the tremendous rotational power the body can create.
• The only way to tap into this power is by setting up the throw in the correct positions from the ground up.
Your Base is Your Foundation

Shooting a cannon from a rowboat

Throwing from two feet
Function/Importance of Rear Leg

• Keep C.O.M. behind block leg
  - Straightening rear leg is a fundamental flaw
• Sets up sling in spiral line. Stretch reflex is set up in combination with back muscles of block side.
• Zelezny: ‘throwing from two feet’
• Baseball pitchers
Block Leg

• All factors being equal, the thrower with the straighter block leg will throw farther

• A straight/effective block leg is one of the most important factors to the javelin throw

• Most sports do not embrace a straight block leg mindset
Block Leg cont’d...
Relationship Between Block Arm / Plant Leg

- Hiding the right side / exposing the left side....
- The block arm should not be rushed/pulled outside of the leg prematurely.
- Shoulder alignment may be the more important aspect.
Arm / Leg Relationship cont....
Arm / Leg Relationship cont...

- A successful javelin throw is more like hitting than throwing....
‘Role/Roll’ of Right Foot / Knee
‘Role/Roll’ of Right Foot / Knee
Javelin hidden behind shoulder/hip

Triangle shapes
Javelin hidden behind shoulder/hip

- Leverage is attained
- Large muscle groups are utilized
- Arm is placed in proper delivery position
- Forces are aligned through block more efficiently
Delivery of the javelin

• Javelin throwers are born....
• Previous slides showed positions, which ‘set up’ the delivery of the javelin....aka the strike or the hit
• 6 inches behind the shoulder
• Position of head
• Front fascial line
Muscles of the Chest & Shoulder Girdle

Pec Major/Minor/Deltoid

Rotator Cuff / Teres Major
Rhomboids

Coracobrachialis, Serratus Anterior
Latissimus Dorsi
Latissimus Dorsi cont’d…

• Attaches to humerus – adduction
• ‘Pulls the javelin’
• Back fascial line
• Balance between movement / stabilization of ribcage and spine
• Rotation and bracing
• Throwing arm must be behind torso to be able to pull
Triangles everywhere...

- Both arms, both legs, delivery (side view and overhead)
- Flex of javelin. Where / when does it occur?
- Deviation in the path of the javelin before impulse
Final Thoughts

• Positions are **vital** (both understanding and being able to replicate).
• Visual learning and basic understanding of mechanics are critical.
• Training should be geared toward developing the ability to put the body into these positions, support the body in these crucial positions, and develop/increase release velocity and improve release angle.
• Always question the relevance of training.
• What is the end game?
• Assess strong/weak links in the muscle chains.
• Think creatively.
• Look outside of track and field for potential.
Final Thoughts cont’d...

• Assess understanding and ask athlete to coach and assess.
• Be mindful of coaching for the sake of coaching a.k.a. ‘overcoaching’.
• Injury patterns: what to watch for and what are you learning?
• What comes before and after evaluation process (i.e. before and after the ‘coach’s eye moment’)?
• Do ‘qualitative research’ (interviews)
• Embrace opportunities – everything is an opportunity

• Questions?