Strength Training for Throwers



Presented by: YINGBO ZHANG, Prof. & Dr. of BSU

Education Manager Regional Development Centre-Beijing International Association of Athletics Federation





SOMEONE MIGHT THINK: BUILD "EXPLOSIVE" POWER ! BUT IT IS NOT ENOUGH !!

Drawing reprinted from Blachon

4 of 4





WHAT

are the physical phases and load requirements of strength development for throwers?

3 of 4



Factors influencing Specific Strength Development of Throwers



- Temporal & Spatial Structures of Technical Movement
- Dynamics
- Muscular Strength
- Coordination
- Motor Programme
- Proprioception
- Reflexive Modulations
- Mental Adjustment
- Athletic Form or Condition







Electromyographic (EMG) responses to stretch of the biceps muscle and change in arm position when a load is suddenly applied.

Types of Compensations



M1 Response – The monosynaptic stretch reflex, with a latency of 30ms to 50ms.

M2 Response – The polysynaptic, functional stretch reflex, with a latency of 50ms to 80ms.

Triggered Reaction – The reaction to perturbations, with a latency of 80ms to 120ms; it is flexible, yet faster than the M3 response.

M3 Response – The voluntary reactiontime response, with a latency of 120ms to 180ms.





Characteristics of Different Classes of Muscular Responses to Perturbations during Movement

Response Type	Latency(ms)	Flexibility & Adaptability	Role of A Instructions	Effect of Number of Choices
M1 Response	30-50	Almost None	None	None
M2 Response	50-80	Low	Some	None(?)
Triggered Reaction	80-120	Moderate	Large	Moderate
Reaction-Time Respo	onse 120-180	Very High	Very Large	Large

Technical Features:



- Natural Speed
- Timing
- Rhythm
- Balance
- Proprioception
- Reflexive Modulations Angle
- Ambient Vision Quick Position

Developed Capabilities

- Force
- Sequence
- Amplitude
- Direction
- Path
- Focal Vision Slow

Three Levels of Throwers' Specific Strength Development



Specific Throwing Strength

Explosive Strength, Speed Strength, Reflexive Strength

(Implement Released)

Specific Skillful Strength

Maximum Power, Explosive Strength, Proprioceptive Strength (Implement not Released)

Specific Fundamental Strength Maximum Power, Maximum Strength, Balance Strength (Extensive Exercises of Various Forms) **Specific Fundamental Strength-** To Develop **Maximum Power**, Maximum Strength, **Balance Strength of Major Body Segments Exercises including** snatch, power clean, clean and jerk, bench press, squats, trunk rotations, depth jumps, stand long jump, stand triple jump, bounding, core stabilizations, etc..













Specific Skillful Strength-To Develop Maximum Power, Explosive Strength, Proprioceptive **Strength (Implement not Released**) **Exercises including** specific strength machine drills, Bundachuks, one arm and double arm flies, release movement imitations with or without implements, quick successive rotations, etc..











Specific Throwing Strength- To Develop Explosive Strength, Speed Strength, Reflexive Strength (Implement Released)

Exercises including kettle bell put or throw, overhead shot throwing forward and backward, rotational medicine ball put, sling bar bell plate, heavy and light implements throw, rubber ball throw toward net or wall, etc..







Specific Temporal Reinforcement



- The objective is to induce throwers' Hereditary Abilities to meet specific technical demands.
- Drills designed according to the specific events' deep-structured variables, such as, Speed, Timing, Rhythm, Balance, Proprioception, Reflexive Modulations and Ambient Vision, etc..
- These exercises always take the priority in development of throwers' specific strength, especially in their early stages.





Specific Spatial Reinforcement



- The objective is to fortify throwers' Developed Capabilities to meet the specific technical demands.
- Drills designed according to the specific events' superficial parameters, such as Force, Sequence, Amplitude, Direction, Path, Angle, Position and Focal Vision, etc..
- These exercises should be of the fundamental part in development of throwers' specific strength.





Specific Spatial-Temporal Combination



- The objective is to combine throwers' Hereditary Abilities and Developed Capabilities together, to foster "motor sense and schema" to meet the specific technical demands.
- Drills designed according to the specific events' movement, such as throwing implements with different intensities, distances, shapes and weights, etc..
- These capabilities are extremely important for top-level throwers.











Specific Effect-Transferring Combination



- The objective is to obtain optimum synergetic effect from well-ordered exercises based on training principles, to meet the specific technical demands.
- Drill combinations designed according to the specific events' dynamics, such as:
- Baximum Strength → Power → Explosiveness
- General → Special → Specific
- Technical Positive Transferring Combinations
- These exercise combinations should be of the main contents in development of throwers' specific strength.

Maximum Strength → Power →



- It is a kind of contrast training method, making use of optimum psychological arousal, maximum neuromuscular coupling effect and maximum number of activated motor units e.g.,
- Squat with heavy load
- Lunges or stepping upon stairs with light barbell on shoulders
- Standard or light implement throwing or putting

General →Special →Specific



Converting all the human abilities and capabilities into events' specific demands, increasing difficulties in movement control e.g., Bench press Jerks with light load Standard or light implement throwing or putting

Technical Positive Transferring Combinations



Specific strength exercises conducted in order to induce positive transfer of sequential technical movements e.g., **Simulator Practice Fractionization Simplification Segmentation** $\blacksquare \blacksquare Parted \rightarrow Transitional \rightarrow Whole$