Speed vs. Power Jumpers in High Jump, Part II

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Introduction

This article serves as a continuation of the discussion on the importance to distinguish between different types of high jumpers. In Part I, the importance of both speed (velocity) and power (force) as key high jump variables were discussed. The mechanics of the jump – with a specific focus on the speed and force variables – and how the different applications thereof in jumpers can be identified – were investigated. It was argued that by sub-categorising jumpers, improved specialisation and individualisation of training can be obtained.

Part II of this article will build on this foundation, and provide further material for practical consideration and application in athlete development. These were derived from my own time as an athlete and coach, and supported by literature.

The importance of other training components, such as case specific high jump technique and periodisation, has purposefully been excluded from this discussion.

Key physiological components

towards continual jump improvement

There is no single piece of advice towards an optimal training program, as each athlete operate in a specific environment with and have a unique force-velocity-coordination-stability profile. The difference of an individual's physiological make-up (including jumper size, strength, body type, limb lengths, and fast twitch fibre ratio) will furthermore predictably determine what type of training stimuli he/she responds best to.

As a starting point, let us consider which key components must be addressed to continually improve jump performance:[i]

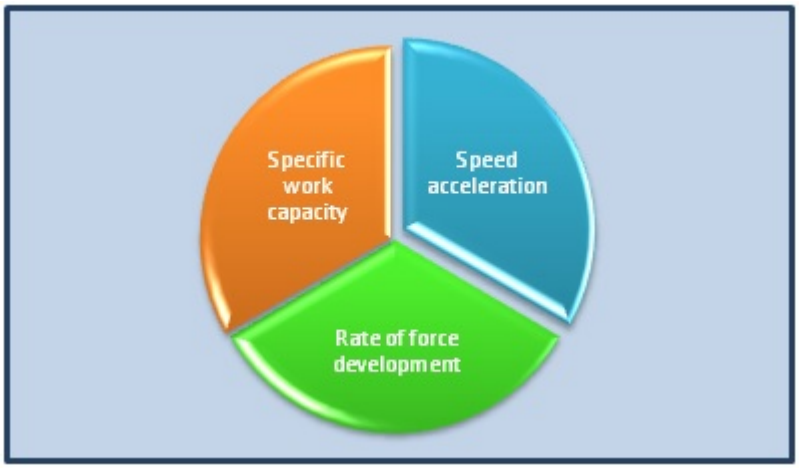

Figure: Key physiological components towards jump improvement

The first component, specific work capacity, refers to building a tolerance/ability to jump maximally and in sufficient volume to deliver repeated results. This needs careful consideration in the program periodization.

The second component is speed (velocity), with a focus on the acceleration component. As argued in Part I, this component is crucial, and improvement of the controlled velocity at plant and take-off – if all other variables stays constant – will result in jump improvement.

The third component refers to the rate of force development to

enable the jump. Note that its focus is not merely on force itself, but the ability to translate this force into vertical velocity.

Let's look at the velocity and force components in more detail; with advice generic in nature to be applicable to both the speed and power jumper:

To sprint or not

This is a no brainer – as illustrated in Part I, velocity is a key element of jumping, and as such should form part of any jumpers program. Short sprints remain the best way to develop and maintain sprinting speed,[ii] and jumps at speed is key.

For those jumpers needing improvement in max velocity, flying sprints (gradually acceleration coupled with high velocity sprints in a relaxed state) will be beneficially. For those needing force, a combination of accelerations, absolute speed and starts are recommended.

To lift or not

The benefits (or not) of lifting for the high jumper has been the debate around various coffee tables. The intention of gym work should however not only be towards gaining of strength, but rather to transfer skills to the event. Various benefits could be realised, including improvement of *inter alia:* posture and body awareness, coordination, joint stability, strength at key joint angles and torques, energy– laying the foundation for speed, jump and power progression.[i],[iii],[iv],[v]

Both speed and power jumpers rely on a strength base to add stability to absorb eccentric forces created on planting and generate force to the ground at plant. Improving the athletes short response explosive ability will improve the jump.[vi],[vii]

Emphasis should be on exercises which will promote the

greatest force over the range of motion at plant. Generic speaking, to be most effective, strength training should be in the 60-80% range (hypertrophy) and should be coupled with plenty of explosive plyometrics (0-30%), and reactive strength training (including speed drills and jumping). Care should be taken towards correct lift mechanics and doing the lifts at manageable volumes.

Focus should be on max, explosive and reactive strength improvement. Essentials are:

- Barbell hip thrusts to activate the glutes.
- Olympic lifting for hip extension.
- Ankle rocker drills (to improve the ability of the ankle or body to get the centre of mass through the mid-stance phase and create forward movement).[viii]
- Tendon enhancement for plant maximisation.
- Doing plenty of lifts with extension of the plantar flexion.
- Supersets combining lifting with plyometrics has been found to be especially effective (and enjoyable).

Specific training interventions

Specific training interventions for speed and power jumpers are outlined below:

Speed jumper do’s

Usually your lanky athletes, these individuals have the advantage of a high centre of gravity (typically at hip height) at the initiation of the jump, and must build on that advantage by enhancing their natural strengths, which typically include strong hips and ankles, elastic strength and speed at take-off.

As a typical ectomorph[ix], these athletes might experience an initial rapid improvement via lifting, however, these results will quickly taper off (especially compared to their power Jumper counterparts). Their preference – and ability – lies in specific plyometric based movements and they will naturally take to these types of training regimes.

For strength gains, they may benefit from compound movements

to maximise growth hormone release (e.g. Olympic lifts, deadlifts), plyometrics and running jumps (with a focus to reduce time at plant) and increased speed-strength training coupled with sufficient protein intake.[x]

Speed drills should form a significant portion of the training regime, and acceleration, max speed efforts and flying sprints will strengthen the velocity variable. Cardio should be limited.

Power jumper do's

As your typical mesomorph, these athletes' fast twitch muscles respond well to strength training. With their deeper knee bend at plant, they should do targeted strength training to ensure that their natural strength ability is fully developed and maximum power can be transferred to the jump.

They usually prefer and respond rapidly to barbell oriented movements (low volume of high intensity and power reps), and these can effectively be used. Further gains can be achieved through plyometrics and accelerative training methods (e.g. depth jumps which will improve longer response plyometric ability).[ix]

As with their speed jumper counterparts, speed drills should form a significant portion of the training regime, and acceleration, max speed efforts and flying sprints will strengthen the velocity variable.

Further force-velocity training recommendations

Regardless of being a power/speed jumper, each athlete will have a unique force-velocity profile. Within their ability range, plenty of athletes are imbalanced towards either force or velocity, and an individualised training program to address

the weaknesses is needed.[xi] Consider to:

- Apply Michael Yessis's 1×20 training regime for high schoolers.[xii],[xiii]
- Improve the athlete's ability to yield a high force value in the plant by performing exercises such as a seated box jump.
- Improve accelerative strength (velocity of ca. 0.5-0.7m/s) by performing a heavy compound movement (e.g. barbell squad/deadlift).
- Improve strength-speed by using the Dynamic Effort Method (at ~0.8-1m/s velocity -dependant on the type of exercise); effort in the 20-60% range.
- Improve reactive strength through depth jumps.
- Improve isometric and trunk strength to prevent force leakage.
- Perform deceleration based movements (with an eccentric emphasis), including high altitude landings with jumps or velocity overload exercises like Kettle Bell power bomb swings.
- Improve force ability transfer by targeted sledge work on the track (max and acceleration based speed drills).
- Remember full approach high jumps.Other exercise components must be kept in the program towards its building or maintenance. Keep in mind that all movements have a strength, speed and skill component, and where possible, these must be manipulated to improve the high jump range of movements.

Conclusion

No matter what your athletes' dominant qualities are, improvement in jumping performance rely on targeted speed and strength training at such a volume and intensity to promote adaptation and progression. The relative ratio and nature thereof will differ based on the athlete's individual ability and make-up.

The differentiation in exercise regime for your speed and power jumpers will be to their advantage. Further consideration towards technique application is required.

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