

Complex Training for the Elite Athlete

These notes form the basis of many of the lectures I give to senior professional sports teams often during major operational reviews. I try to get them to understand the background and rationale as well as the ideas that they could consider.

As clumsy an interpretation as this is, I have had success with it now for over 20 years. You have to assume that the athlete concerned has brought very few 'limitations' forward from their development years – (in reality I found none who did not have many errors in their foundation movement efficiency!). This is why I continue to push for the development of an effective and efficient 'movement vocabulary' throughout the development years.

What has gone before

This movement vocabulary will see the following achieved:

1. Movement efficiency in Squat, Lunge, Pull, Push, Brace, Rotate, Hinge and Land
2. The above movements adapted to in:
 - a. Every direction
 - b. Every plane
 - c. All amplitudes
 - d. All speeds
 - e. A large range of complexities
 - f. Along the entire force continuum
 - g. Implicitly and explicitly learned

Relevant thoughts

If this part of the journey is done well then the coach needs to consider the following issues when assembling the program of athletic development in the senior stages of the journey. By spending some time agreeing or disagreeing with the following questions and observations the coaches tend to be a little more 'pliable' when we look for specific answers in their exercise prescription:

- *Remember – 'maximum' anything can be dangerous*
- *Maximum strength training is notorious in athletics circles for causing injuries and draining the neural bank. The neural bank issue is tied to all kinds of other complications such as interference in motor learning, depletion of specific energy reserves, etc.*
- *How strong is 'strong enough' – 'how much you can use' is more pertinent.*
- *Our athletes- like all other sports – only have a finite reserve of energy to put into training. We have to think like economists to get the biggest bang for our buck.*
- *It is the rate of use / delivery that is the key – not just 'how much'. For example - The way sprinters apply force onto the ground (technical ability) seems to be more important to sprint performance than the amount of total force they able to produce (physical capability).*
- *Whatever the load – move it as fast as possible.*
- *Most lower limb injury occurs during fast motion (running). The longer the foot is on the floor the more bad things happen - therefore teach appropriate strength and stability in running technique.*

In general terms you need athletes who have:

- Appropriate body awareness (balance, coordination)

- Appropriate general and specific strength
- Appropriate stability during motion
- Continued adaptability

Therefore you should develop athletes who:

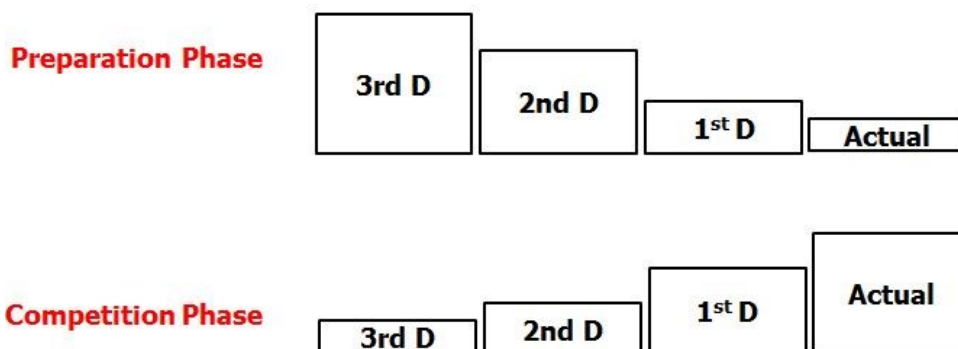
- Have appropriate body awareness and proprio-ability.
- Can solve locomotion, non-locomotion and manipulative movement puzzles.
- Can do actions:
 - At the right time
 - In the right direction
 - With the appropriate amount of force
- Have no 'energy leaks' along the entire kinetic chain

Understand Specificity

Exercises with the highest transfer (example of Sprinting and Jumping)

- Actual – Sprinting /Jumping
 - Acceleration
 - Max Velocity
 - Take-Off – Flight - Landing
- 1st Derivative - Special exercises
 - Sled Pushes
 - Weighted jacket sprinting
 - Assisted sprinting
 - Short contact Plyo
- 2nd Derivative - Supportive Exercises
 - Clean and Drive
 - Longer contact Plyo
- 3rd Derivative - General Exercises
 - Squat, Lunge, Pull, Push, Brace, Rotate, Hinge and Land

Include all 4 'layers' all through the year. Just manipulate the emphasis e.g.



After this package of questions and guidance we then start to create a program that satisfies as many of the issues as possible. The 'bang-for-buck' point leads us to the creation of economical use of time where in each session the athletes face (a) a range of forces from the continuum (which in turn sees a range of speeds and amplitudes being created) (b) a range of the 'derivative' issues.

Week 8			
Day 1		Day 2	
OHD Squat	3x5@90%1RM	Single Leg Box Squat	3x5 @70%Bwt
BB Wheel Jump Lunges	3x4 (L&R) @30% 1RM	Clean & StepUp	3x3 Each Leg @40%1RM
Accel	3x3x20m Sled Push	360 Lunge & BB Press	3x6 (Clock)
Hurdle Hops	3x4 (L&R)	30m High Knees	3x3x20m

Above is an example of the exercise system illustrating 2 sessions per week at least 72 hours apart.

Day 1

Exercise 1 will be the slowest against the greatest resistance.

Follow this with a more 'elastic' exercise against a reduced resistance.

Followed by a faster movement that is closer to that seen in the sport.

Followed by a bodyweight unit where foot contact work is emphasised.

Day 2

A similar variety of exercises

The key is that there are 3 sets per session with each exercise being done directly after the previous one to create the set. Put another way each set contains the range of forces and speeds and derivatives (follow the arrow).

Using this process each exercise can have its own journey in terms of intensity and/or volume and at the same time, each collective 'set' can have a journey. The above illustration shows a 3-set day. This probably started with a 2-set session and could develop to a 5-set session if required.

Seems to work for me with the top-end athlete.

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