



Pre-Season Gym Based Programming

Karl Gilligan

www.kg-elite-performance.ie

Introduction

Pre-Season is that time of year which places considerable physical stress on players in order to get them adequately prepared for the forthcoming season. Over the years, there has been a tremendous variety of training interventions adopted by coaches who were looking for improved fitness adaptations from their players. Some coaches have used more aerobic dominant regimes involving hill running and aerobic based conditioning games, whilst others have favoured anaerobic dominant training such as Strongman training and speed intervals. Coaches have also diversified in their approach to strength training programmes for their players. In particular, players and coaches alike feel there is a strong need for players to get physically bigger. I remember coaches often complaining about our players being physically inferior to other International teams at underage level. This has been the case as some of the other National S&C coaches had greater access to their players when they were in school, therefore, their physical maturity was more advanced than our players. So the temptation for young players and inexperienced coaches is to go for a quick fix body building type programme which increases muscle size in the players quickly. In this month's article we will look at effective gym based strength programme prescription and critically analyse why "body-building type" programmes have no place in high performance sport.

Functional vs Non-Functional Hypertrophy

As coaches we may want our players to get physically bigger to improve their ability to dominate the contact area as rugby is rapidly becoming a collision sport. How can we do this? Prescribing a well designed "functional hypertrophy" programme is a good place to start. So

what's the difference between this and your typical body building or "non-functional hypertrophy" programme? Table 1 below highlights the intra-session variables which explain the differences between the two types of programmes and how S&C coaches can manipulate these variables to create specific adaptations.

Table 1 - Intra-Session Variables:

<u>Objective</u>	<u>No of Ex's</u>	<u>Sets</u>	<u>Rep</u>	<u>Rep Vol</u>	<u>Intensity</u>	<u>Rest</u>
Functional Hypertrophy	5-6	3-5	4-8	150-300	80%+	2-3mins
Body Building	6-8	3	10-12	400-600	60-75%	75secs

The session below gives you an idea of a functional lower body hypertrophy session with exercise sequence moving from bilateral (squat and deadlift) to assistance (step up) to posterior chain (good mornings) to unilateral (single leg calf raise). The rationale for this exercise sequence is based upon motor unit recruitment, in particular the size order. The squat and deadlift exercises demand the largest amount of motor units to be recruited and hence a large amount of corresponding muscle fiber activation. Imagine it as a flight of stairs. The larger faster units are at the top of the stairs with the smaller slower units at the bottom of the stairs. The larger faster units allow our players to sprint faster, tackle harder and clear out rucks with more dynamism. This is why the squat and deadlift are placed first in the session. The larger faster units cannot be activated when fatigued so as the session progresses muscular fatigue builds up resulting in reduced activation of these units. In body building programmes, the emphasis is on fatiguing the lower to middle order motor units as best they can so they never get a chance to activate the larger motor units. This has considerable consequences for the elite level rugby player. They may get bigger and more aesthetically pleasing on the eye however, they will not improve any athletic characteristics consistent with the sport.

Functional Hypertrophy Session:

- Back Squat 4 x 6 @ 80%
- Deadlift 4 x 6 @ 80%
- Step Ups 3 x 6 (each side)
- Good Mornings 3 x 8
- Single Leg Calf Raise 3 x 8

With “functional” hypertrophy, the increase in size of muscle mass is as a result of myofibril increase within the muscle fiber (ie the contractile component of the muscle). There is also a preferential increase in Type II muscle fibers (Type IIA & IIX) which means the muscles can express force better with equivalent strength gains. In “non-functional” hypertrophy or body-building type programmes, the increase in size of muscle is as a result of sarcoplasm volume increase (ie the non-contractile component of the muscle). There is an increase in Type I and Type IIA muscle fibers, however, players often don’t see much change in strength or power. Coincidentally, player’s who get bigger using body-building techniques often breakdown with soft tissue injuries during pre-season training. Research from Zalessky & Burkhanov (1981) has shown that adaptation to non-functional hypertrophy occurs more slowly in tendons and ligaments compared to muscle tissue. Fast increases in muscle mass gain can result in increased tension being placed upon tendons and ligaments which can result in injury. Zalessky & Burkhanov (1981) also found that with non-functional hypertrophy, the increase in muscle mass outstrips the development of the vascular system. This results in reduced oxygenation and nutrition of the muscle, with less efficient disposal of metabolic waste.

Summary

So the message should be clear: body-building type training leads to slower muscle recovery after exercise, deterioration in speed and speed-strength as well as increased risk to injury. If your goal is to increase muscle mass with some or all of your players choose the “functional” hypertrophy approach rather than the basic “body-building” type programme. This will mean a far greater transfer to the pitch from what they are doing in the gym and they won’t breakdown as much through injury.