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The Anatomy of Program Design

Jeremy Heffner, MEd, SCCC, CSCS

Part 3: Exercise Selection

Priorities! Priorities! Priorities! I realize there is no way for any of you reading this to know that as I begin the third installment of *The Anatomy of Program Design*, I am already 3 weeks past my deadline. Luckily the editors at The Optimal Athlete have given me a little wiggle room. I would however be doing myself and all of you out there an injustice if I did not take the time to tell you why I am 3 weeks past my deadline. On April 20th of this year, my brother SPC Chase Heffner was severely injured in the line of duty serving in the US Army in Baghdad. He spent 6 weeks in an Army hospital in Germany before he was able to travel back to the United States. Once his neurologist determined he was well enough to travel he promptly returned home to a heroes welcome!

So why on earth am I telling you this? It is not about politics or patriotism, it is about priorities! The minute I heard of my brother's return I too left for home. As a matter of fact I checked out for 10 wonderful sun filled days in Central Texas with a walking and talking real life hero! My dilemma could have been what to do about my teams that began their summer programs the Monday after I left, but because my priorities had been set long before I attempted to make the right decision, I returned home.

What does this have to do with program design?

It is simple really; training must be a priority in order for you to accomplish your performance and fitness goals. Within your training regimen there are certain types of exercises that you must prioritize in order to efficiently accomplish those training goals. I do not intend to give you a list of miracle exercises, but what I do intend to do is give you guidelines that will allow you choose each exercise carefully and then arrange those exercises efficiently within each workout. So, put your thinking caps on because here we go!

Needs Analysis

This is a five part series on program design, but volumes and volumes have been written on the subject and even a five part series only begins to scratch the surface. Even with all of the information available, trained professionals have been known to skip the most important part: performing a needs analysis. Ask yourself, what are your performance goals? I'm sure you are thinking bigger, stronger, and faster! Are you sure? Let's take a closer look. Start by asking yourself questions like: What makes your sports different than other sports? What physical qualities do successful athletes in your sport possess? What are the dominant movement patterns? What are the most common injuries and common causes of those injuries? Answers to these questions will begin to give you a platform from which to begin thinking about how to train for your specific sport, but it is just the beginning of the needs analysis. The next step is to look in the mirror, both figuratively and literally! What is your training age? How long have you been consistently training? What type of exercise are you familiar with? Conditioning? Speed work? Resistance training? Machines? Free weights? And at what in-

tensity have you been training? This begins to give you an understanding of what exercises you should start with. As we continue to get more specific to the individual, the questions become more complicated. What did your performance testing reveal? Was there a need for increased maximal strength? Or explosive strength? Or is speed a more important concern? In others words what is/are your limiting factor(s)? What is your injury history? What do you see in the mirror? Are you symmetrical? Are there any obvious muscular or postural imbalances that could lead to injury? Once the questions have been answered we must begin to look at organization and planning. How much time do you have to train? Equally as important, how much time do you have to recover before your next training session, practice or game? All of these questions and more need to be answered before you begin choosing exercises and designing programs for yourself and others and this is precisely why I can't give you an "end all, be all" program. I am aware that this is a lot of information to absorb, so let me walk you through an example.

I have just received a new client; he is a 16 year old baseball player 12 weeks out from a big college showcase. He has been training consistently with multi-joint compound movements for 12 months. His showcase is at the end of the summer and his games over the summer are on Saturday and Sunday with the occasional Friday required for travel. His high school strength coach sent some information with him, including his times from home to first, 4.5 seconds, and his front squat max, 315 lbs for 2 Reps! Luckily (and of course hypothetically) I have received a lot of information and know a few things right from the start. It is evident that based on the athlete's squat numbers, maximal strength is not his limiting factor. That is not to say he does not need to train maximal strength, just that it will not be a priority! However, his times from home to first will not even allow him to make it to the hitting portion of most showcases. So there is a definite need to lower his time from home to first, or increase his speed. Initially this would lead me to believe that speed work (sprinting and mechanics) exercises that emphasize power production (The Olympic lifts, MB throws, etc.) and exercises that enhance ones ability to use the stretch shortening cycle (enhance elastic properties) need to be prioritized over the next 12 weeks. If I stopped there I could possibly design a great training program for a young athlete that is all wrong for him. Based on the information given, I decided to test this individual's explosive and elastic qualities using an array of vertical jump tests.

The testing results showes that his explosive and elastic properties are well above average for an athlete his age. After speaking with the athlete, he revealed that the he had a history of sprained ankles and pulled hamstrings. This could be as simple (or complex?) as a mobility issue! If I had stopped without delving further into his injury history and without performing some of my own performance testing, I would have trained a young athlete all wrong and probably decreased his chances of making a good showing at the end of the summer. Too much information, probably, but what I hope that you are beginning to understand is that there is a process that needs to happen in order to develop optimal training programs and that process always begins with an in-depth evaluation to determine what your limiting factors are and what you need to do improve performance! Now that I know what I need to improve, what exercises should I use?

Exercise Selection

There are so many exercises at your disposal, depending on your training status and availability of equipment that I can not begin to list them all. I believe a better approach is to set forth rules that will help you determine if an exercise is a good choice for you.

Rule #1: Emphasize multi-joint movements over single-joint movements.

Whether you are trying to change your body composition or prepare for an upcoming football season, this rule never changes. Simply put,

when an exercise requires movements from two or more joints it also requires activation of muscles that are responsible for movement at those joints and the muscles that surround each joint are responsible for stabilizing those same joints. That is a lot of bang for your buck! So what are some multi-joint exercises? All squatting, lunging, jumping, bounding, running movements, as well as all pressing, pulling, and throwing movements are all multi-joint exercises. Whereas single joint exercises only involve musculature surrounding and acting upon one joint such as curl variations, triceps extension variations, shrugs, dumbbell raises, leg extension/curls, calf raises, etc.

Rule #2: Emphasize movements that directly impact performance. This goes back to our needs analysis, but we want to chose movements that are as closely related to your sport in order to improve our efficiency of force application and transfer when on the field, court, ice, or in the water. What you will find is that most, if not all, ground-based sports have a lot in common. Most all ground based sports include triple extension of the hip, knee, and ankle joint such as running, jumping, and skating. Additionally, ground based sports involve some type of rotation or anti-rotation activities. Sports that can involve body to body contact like basketball, football and soccer, believe it or not, involve a great deal of resisting forces that cause rotation and have an increased need for anti-rotation/stabilization training. Sports like tennis, baseball/softball, and golf, on the other hand, can actually be categorized as rotational sports and will benefit more from some type of rotational training. Therefore, most, if not all, sports will benefit from exercises like the Olympic Lifts, Squat Jumps, Squats, Lunges, Step Ups, Medicine Ball Throws, and Core Stabilization exercises. I feel obligated to mention that just because a sport is categorized as a rotational sport does not mean that those athletes will not benefit from anti-rotation training nor will an athlete involved in contact sports decrease their performance by training rotational movements. As you have heard time and time again we are only as strong as our weakest link and regardless of what athletic qualities are emphasized in your sport you will be setting yourself up for failure if you do not design programs that address all athletic qualities at some point in time.

Rule #3: Balance your movements. We are a society that loves "beach" muscles, television, and the internet and for a variety of reasons all three of these instances have led to trends that predispose athletes (and everyone) to injury; injuries that can be exacerbated through improper training programs. There is a need for a balance (at the very least) between horizontal pulling and pressing (rowing movements vs. bench pressing), vertical pulling and pressing (pull ups vs. over head presses) and when in doubt err on the side of and increased ratio of horizontal pulling to pressing movements. Lower body training should be balanced between hip dominant and knee dominant movements (modified stiff-legged deadlifts vs. front squats).

The next two rules only reiterate the importance of a quality needs analysis.

Rule #4: Progression, progression, progression! An athlete that cannot perform a body weight squat with perfect form will certainly not be able to front squat with perfect form and can exponentially increases his/her risk of injury by doing so. Just because an exercise looks cool or because you have seen famous athletes do it does not mean that it needs to be included in your training menu. An athlete on the injured reserve can not do much to help his/her team or their own chances to make it to the next level.

Rule #5: Injury prevention! The fact is decreased injury potential is the greatest performance enhancement tool in our business. Determine early on what injuries participants

in your sports are predisposed too, what you or your client's injury history consists of, and what postural imbalances you possess that can increase incidence of injury and then select exercises that will counter act those injuries. A primary example of this is a baseball pitcher. Pitchers are notorious for developing chronic shoulder, elbow and back problems and because of this most programs designed for these athletes directly address these issues. (In regards to rule #5 a balanced training program that follows each of the aforementioned rules will likely result in decreased injury potential and increased performance.)

Exercise Order

There are very few hard and fast rules in any profession, but I am firm believer in putting your training priorities first.

Rule #1: Putting priorities first. That means first in the week and first in a session. If you have determined that lower body strength is your limiting factor, then exercises that emphasize lower body strength should be done early in the week or at the very least after a day of recovery and early in a training session.

Rule #2: Exercises that require the largest neural drive, coordination, and speed of movement should come first in a session. The key is to be fresh when you need to be. Any speed work should always be done first in the session when you are the freshest and have the ability to concentrate without distraction from neural or muscular fatigue. If we are progressing through a daily training session, based on rule #2, next would be power exercises such as power cleans/snatches/jerks and other type of explosive movements where the goal is to move the body or implement as explosively as possible.

Rule #3: The larger the muscle mass used for completion of the exercise, the earlier in the training session it should be programmed. Again, we are looking at multi-joint versus single-joint exercises. If maximal strength is the goal, it would make very little sense to do 3 sets of heavy bicep curls before doing 3 sets of weighted chin ups. In this particular situation the chin up is a multi-joint exercise that requires a greater force output, increased neural drive and due to the larger muscle mass used will deplete energy stores more quickly than the bicep curl. There are exceptions to the rules, but they generally only occur when performance enhancement is no longer the goal and aesthetics become more important. However, there are still exceptions, but most of the exceptions can be explained by one rule overruling another. For instance, with swimmers and depending on the time of year, I will emphasize either a heavy horizontal or vertical pulling movement before I do my power exercises or lower body strength exercises. And in fact in this instance I am following rule #1 in lieu of rule #3. For me, with my swimmers, pulling is the number one priority as it is the nature of their sport. Therefore, I want them to be the freshest when executing these exercises. What this also allows me to do is perform one pulling movement early in the session and one late in a training session.

Again, this is just an example, but hopefully it will lend itself to your thought process as you prepare for the upcoming season or for your next training session. The key is to gain an understanding of the rules and use them as a foundation for your own creativity and if it works, well, then it works! Play Hard and Train Smart! As for my next installment of *The Anatomy of Program Design,* I will be addressing program planning and periodization.

Jeremy Heffner, MEd, SCCC, CSCS *is currently the First Assistant Strength and Conditioning Coach for Olympic Sports at the University of Georgia. Heffner earned his B.S. degree in Kinesiology in 2002 at the University of North Texas. While earning his M.Ed. in Exercise Physiology at The University of Texas, Heffner served as a Graduate Strength and Conditioning Coach. Heffner also worked as a Strength and Conditioning Coach for the Houston Astros Triple AAA affiliate, the Round Rock Express. Heffner is a member of the National Strength and Conditioning Association (NSCA), the Collegiate Strength and Conditioning Coaches Association (CSCCa), and USA Weightlifting. He is a Certified Strength and Conditioning Specialist (NSCA), Strength and Conditioning Coach Certified (CSCCa), and a Level I Club Coach (USAW).*