

## A Coach's Ability: How to Prepare Athletes for Peak Performance

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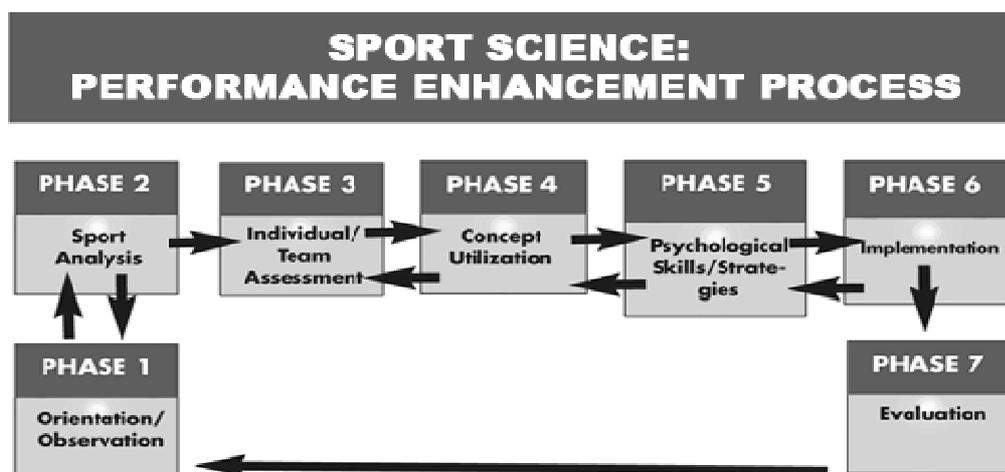
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### Abstract

Sport Science employs scientific research in the challenge of developing world-class athletes. Education and training programs have been created, over the past 30 years, in an effort to assist coaches and athletes with the development of methods and strategies for achieving peak performance. The six courses focus on sports administration, coaching methods, sports medicine, strength and conditioning, sports psychology, science of coaching, Biofeedback, Neurofeedback and athlete development. With the addition of these new disciplines, training athletes has become a holistic activity focusing on the entire athlete. Therefore, in today's sports world, several disciplines have been integrated into the science and art of training athletes. Training athletes to become "champions" in sport, and more importantly life, can provide many individuals with opportunities to produce peak performance.

### Introduction

Since the beginning of sport competition, athletes have sought to acquire the skills and knowledge of sport in order to become "champions." As sport evolved into organized activity, coaches began working more closely with athletes on sport skill development. Sport Science employs scientific research in the challenge of developing world-class athletes. Education and training programs have been created, over the past 30 years, in an effort to assist coaches and athletes with the development of methods and strategies for achieving peak performance. Optimal performance hinges upon careful analysis of the athlete's adaptation processes to training, travel and competition. When designing a coaching education program, however, one must ask what do coaches need to know; what are the essential elements of athletic coaching?



In early days, training Patterns focused on physical components of training; namely, speed, skill, stamina, strength, and suppleness (i.e., flexibility). Over time, our knowledge

of how to train these five components has become more comprehensive and has been expanded into other disciplines as coaches continue striving to develop exceptional athletes (i.e., “champions”). The biofeedback and neuro-feedback thought Technology equipment available today is being utilized in research, education, sports medicine. Other technologies such as Vision Training, Decision Training, Reaction Time, Training, Rest, Recovery and Regeneration technologies are what set Mindroom at the leading edge of Sport Technology. The purpose of this article is to examine the aforementioned components and introduce the world to the newly revised Coaching Patterns.

New Coaching Patterns is a six-course program, encompassing six fundamentals of training: stamina, strength, suppleness or flexibility, agility, speed and skill. The six courses focus on sports administration, coaching methods, sports medicine, strength and conditioning, sports psychology, science of coaching, Biofeedback, Neurofeedback and athlete development. With the addition of these new disciplines, training athletes has become a holistic activity focusing on the entire athlete (i.e., mental and physical aspects).

#### **Risk Management:**

Risk is defined as ‘the chance of something happening that will have an impact on objectives’. Participating in sports involves a certain level of risk, even when reasonable precautions have been implemented. Risk increases as the consequences and probability of occurrence increases. Coaches have some level of responsibility for all aspects of their athletic program. For example, coaches need to be concerned about the welfare of their players and the maintenance of athletic equipment and facilities. These responsibilities fall under the umbrella of risk management and the controlled evaluation of the athletic environment. Risk management is a systematic way of identifying, assessing, treating and monitoring risks. Following a systematic process helps organisations to identify likely risks and to make plans to reduce the potential consequences.

Evaluating risk management in the athletic environment is a significant administrative element for coaches. The inherent nature of sport means that risk areas are broad. While risk can never be fully eliminated, these individuals must be aware of, and must seek to limit the chances liability exposure. Hence, coaches must exert significant effort to monitor all components of their athletic programs.

Several risk management measures can be employed by coaches in order to minimize external risks. Examples Always inspect and clear the playing field or arena of visible dangers. Consider reducing the size of the playing field if necessary (eg if broken glass was found in the “in goal” area of a football ground it is difficult to know that all the glass has been picked up so consider shortening the field); Cancel the contest or event if there is inclement or dangerous weather (eg extreme heat or thunder storms where lightning is likely); Inspect and control use of both competition and protective equipment; Enforce the rules of the sport and control the conduct of participants (a warning to “tone down” behaviour before things get out of hand can be effective); Be able to provide basic first aid if required and to deal appropriately with potential and actual injuries; Keep an officiating diary and record any incidents that occur during a competition; Seek regular

evaluation of your performance and make sure you know about changes to the rules; Undertake a course on “conflict management”; Ensure you have a “balance” in your life and give yourself sufficient time away from officiating to avoid “burn out”; Have insurance to cover both if a claim is made against you and also to cover medical expenses or lost income if you are injured.

Therefore, coaches should be aware of the factors associated with risk management. Coaches can limit the amount of risk involved with their programs by implementing effective management processes and staying up-to-date on changes occurring in the external environment. It is important for coaches to have a positive outlook concerning the future of their programs. In order to gain additional knowledge and remain current with issues concerning risk management, coaches should review literature published by their school or university, athletic associations, or national sport governing bodies regularly. This will help coaches minimize external risks while preparing their athletes for competition which is critical for the development of a successful program.

### **Injury Prevention**

Therefore, coaches should gain knowledge concerning first aid care and the prevention of injury. When coaches teach their athletes sport skills, these athletes must develop precise technical movements in order to produce peak athletic performance. Such movements, along with the demands placed on athletes’ muscles when accelerating, decelerating, or changing direction, increase the risk of injury. These performance demands create internal forces on athletes’ bodies and when combined with external forces, injury risk can significantly increase. Coaches need to be aware of these potential risks when developing training regimens for participants competing at any level of sport.

Today, young athletes train like elite professional athletes. Specifically, many adolescents are undertaking physical and mental conditioning regimens for several hours a day in order to produce peak athletic performance. Additionally, some individuals are specializing in one sport at an early age and participating on several teams during a single athletic season. While others participate in several different sports year-round without allowing the body and mind enough time to sufficiently recover from the rigors of athletic competition.

Thus, sport participation and demanding athletic training regimens can produce significant sport injuries for athletes. Experiencing a sport injury may affect an athlete physically and psychologically once the individual returns to athletic competition. Without question, coaches should realize athletes need athletic healthcare. In addition, this healthcare should be considered an investment toward individuals maintaining a physically active lifestyle in the future.

Proper management only comes from being prepared and trained on how to respond prudently to a situation. Coaches and medical personnel (e.g., athletic trainers) must provide a safe environment for sport participation and be prepared to respond when an injury occurs.

Risk of injury can be reduced by completing an effective warm up consisting of a heart raiser to get your pulse up, followed by sport specific dynamic stretches (stretches whilst moving). To reduce the risk of injury:

Plan to have at least 1 day off per week from a particular sport to allow the body to recover.

Wear the right gear. Players should wear appropriate and properly fit protective equipment such as pads (neck, shoulder, elbow, chest, knee, shin), helmets, mouthpieces, face guards, protective cups, and/or eye wear. Young athletes should not assume that protective gear will protect them from performing more dangerous or risky activities.

Strengthen muscles. Conditioning exercises before games and during practice strengthens muscles used in play.

Use the proper technique. This should be reinforced during the playing season.

Take breaks; rest periods during practice and games can reduce injuries and prevent heat illness.

Strict rules against headfirst sliding (baseball and softball), spearing (football), and body checking (ice hockey) should be enforced.

Stop the activity if there is pain.

Avoid heat injury by drinking plenty of fluids before, during and after exercise or play; decrease or stop practices or competitions during high heat/humidity periods; wear light clothing.

#### Sports-Related Emotional Stress

The pressure to win can cause significant emotional stress for a child. Sadly, many coaches and parents consider winning the most important aspect of sports. Young athletes should be judged on effort, sportsmanship and hard work. They should be rewarded for trying hard and for improving their skills rather than punished or criticized for losing a game or competition.

Using proper equipment is key in preventing injury.

Doctors believe fatigue can be a contributing factor in sports injuries because it is more difficult for the body to protect itself when fatigued. Stopping an activity at the first sign of fatigue can prevent sports related injuries.

#### **Goal Setting:**

It is one of the better known but least underused tools in sports. A goal is an objective defined as attaining a specific standard of proficiency on a task, usually within a specified time limit. There are three types of goals. The most commonly used goal in sports are outcome goals which focus on the outcome of performance (i.e. winning a game, placing in the top three of a race, etc.). The second type of goal is performance goals which focus on improvement relative to one's own personal best (i.e. faster time in the 1500m, number of shots per period, etc.) Finally, process goals focus on the tasks that an athlete will engage during performance (i.e. going through their pre-start routine, focusing on their cue words, etc.). Goal-setting research has found that setting specific, difficult goals

leads to higher levels of performance than setting easy, vague goals (Locke and Latham, 1990).

As Locke and Latham stated, practitioners and researchers have examined empirical research concerning goal setting for almost four decades. During this time, Locke and Latham developed a goal setting theory that is well established on the review of approximately 400 laboratory and field research investigations. Even though a majority of these investigations occurred in industrial/organizational psychology, “goal setting can be used effectively on any domain in which an individual or group has some control over the outcomes”. Goal setting investigations examining Locke and Latham’s theory have occurred in sports settings. Results indicate assigned specific, difficult goals lead to a higher level of performance in comparison to easy and vague goals. Interestingly, a positive, linear relation between goal difficulty and performance is evident when an individual is committed to the goal, has developed the ability to attain the goal, and no conflicting goals are present.

An individual’s level of success in athletic competition is primarily dependent upon skill and motivation. Therefore, a primary responsibility of coaches is to motivate their athletes to perform at optimal levels. Motivation is the direction and intensity of an individual’s effort.

Some athletes and/or coaches utilize outcome goals, which refer to outcomes of games (e.g., focus on winning) where a comparison to others is predominant, in an effort to win. However, researchers have demonstrated that we have no control over outcome goals which are often accompanied by pressure and tension, and often disrupts optimal functioning. Utilizing a performance goal means utilizing a self-referenced standard as performance game plan for competition.

Recent research as demonstrated that adherence to such a process-oriented approach may contribute to reduction of the athletes’ susceptibility to somatic anxiety in pressure situations, increased confidence and improved concentration on the task and ultimately performance on demand. Coaches should also realize group goal setting may be an effective strategy for enhancing group performance in sport and physical activity. For example, members of a team may establish a goal to score at least 50 points per game for the next four weeks. As goal setting research continues, Locke and Latham’s goal setting theory can provide coaches with additional knowledge concerning individual and group performance enhancement. Setting goals should follow this simple rule Be-SMART.

SMART usually stands for:

S - Specific (or Significant).

M - Measurable (or Meaningful).

A - Attainable (or Action-Oriented).

R - Relevant (or Rewarding).

T - Time-bound (or Trackable).

### ***Training Stages:***

Athletes progress through several training stages as they get older and become more accomplished in their sport. For the most part training stages are age related (3,5). Each stage's curriculum should help athletes transition to the next stage by providing what they will need at their present training stage as well as preparing them for the proceeding one. No athlete, even an Olympic-caliber athlete, can maintain peak fitness year-round. True peak performances are planned and can occur about two or three times per year.

### ***The Phases Of Training:***

When coaches periodize an athlete's training plan, they break the plan into blocks of time. Using terminology common to coaches around the globe, in multiple sports, let's take a look at defining the phases of training time.

This phase is often one to four weeks in length for the competitive athlete. Reductions of 50–70 per cent in total training volume have been reported to maintain or improve training-induced adaptations in elite runners and cyclists (Martin 1993; McConnell 1994). Other studies have reported benefits with reductions of up to 85 per cent in total training volume (Mujika 2000). *General Preparation:* Many athletes cross-train during this phase, with the goal of building or maintaining cardiovascular fitness. There can be several blocks within this phase such as general preparation 1, 2 and 3. Intensity during this phase tends to be mostly aerobic. Both general preparation and specific preparation are often called base training. *Specific Preparation:* The goal of this phase is to move toward sport-specific training, reducing or eliminating cross training. There is more race-paced training added in this phase, but the race-paced work segments tend to be short with ample recovery at the beginning of the phase. There can be several blocks within this phase such as specific preparation 1, 2 and 3. *Pre-Competitive Preparation:* The goal of this phase is to prepare the athlete for his or her specific race requirements. An athlete that has minimal conditioning has different requirements than an athlete that is highly conditioned. There can be several blocks within this phase such as pre-competitive 1, 2 and 3. *Competitive:* This phase may include a series of races over the course of six to eight weeks, such as in a sprint-distance race series.

### ***Nourishment:***

As coaches establish a positive relationship with their athletes, many athletes begin to realize the importance of training the body physically in order to produce peak performances. Hence, every coach should consider performance enhancement to be the number one priority when developing a strength and conditioning program. However, without adequate nutrition, training results may be suboptimal due to a lack of recovery and reduced ability to perform due to depleted energy. Therefore, nutrition is the foundation of performance enhancement. Without optimal nutrition, athletes cannot compete to their full potential.

Differing conditions and objectives suggest the need for athletes to ensure that their sports nutritional approach is appropriate for their situation. Factors that may affect an athlete's nutritional needs include type of activity (aerobic vs. anaerobic), gender, weight, height, body mass index, workout or activity stage (pre-workout, intra-workout, recovery), and time of day (e.g. some nutrients are utilized by the body more effectively

during sleep than while awake). Most culprits that get in the way of performance are fatigue, injury and soreness. A proper diet will reduce these disturbances in performance. The key is to get a variety of food, to get all the macronutrients, vitamins, and minerals. According to Eblere's article (2008), it is optimal to choose raw, unprocessed foods such as oranges instead of orange juice. Eating foods that are natural means the athlete is getting the most nutritional value out of the food. When foods are processed it normally means that nutritional value is reduced.

During anaerobic exercise, the process of glycolysis breaks down the sugars from carbohydrates for energy without the use of oxygen. This type of exercise occurs in physical activity such as power sprints, strength resistances and quick explosive movement where the muscles are being used for power and speed, with short time energy use. After this type of exercise, there is a need to refill glycogen storage sites in the body (the long simple sugar chains in the body that store energy), although they are not likely fully depleted.

To compensate for this glycogen reduction, athletes will often take in a large amount of carbohydrates in the period immediately following exercise. Typically, high glycemic index carbohydrates are preferred for their ability to rapidly raise blood glucose levels. For the purpose of protein synthesis, protein or individual amino acids are ingested as well. Branched-chain amino acids are important since they are most responsible for protein synthesis. According to Lemon et al. (1995) female endurance runners have the hardest time getting enough protein in their diet. Endurance athletes in general need more protein in their diet than the sedentary person. Research has shown that endurance athletes are recommended to have 1.2 to 1.4 g of protein per kg of body weight in order to repair damaged tissue.

Spada's research on endurance sports nutrition (2000) advises that carbohydrates to be unprocessed and/or whole grains for optimal performance while training. This is because these carbohydrates offer the most fuel, nutritional value, and satiety. Fruits and vegetables contribute important carbohydrate foundation for an athlete's diet. Intense activity can cause significant damage to bodily tissues. In order to repair, vitamin E and other antioxidants are needed to protect muscle damage. Oxidative damage and muscle tissue breakdown happens all the time in endurance running so athletes need to eat foods high in protein in order to repair these muscle tissues.

Understanding nutrition is a start towards reaching optimal performance. Multiple factors can influence overall performance; however, starting with the basics, such as nutrition, can lead to greater improvements in performance regardless of the training program. Utilizing an ideal training program while implementing a proper nutritional program will enable athletes to realize optimal enhancements in performance.

### **Communication:**

There is nothing worse than a player who won't or can't listen. Because successful communication with your players is crucial, it pays to have some insight into the field of knowledge called communication. This field of knowledge has much to teach

us, including the fact that, although we all have the ability to receive as well as transmit messages, many of us—especially coaches—are more skilled at transmitting than receiving! We might improve ourselves as coaches simply by becoming better listeners! Also, we know that body language, posture, and gestures (nonverbal communication) are all very important in transmitting messages to others, especially messages of enthusiasm and commitment.

Being available to athletes and other team personnel is only as effective as the communication that takes place. Coaches must remember that communication is a two-way street; it requires listening as well as talking because it involves both inputs and outputs. If managed effectively and by making an effort to develop positive relationships with their players, coaches can increase the chances of team success.

We want to highlight three types of communication that will enable you to gain access to the minds of your players. These three types, which are often combined, are verbal, visual, and physical communication.

*Verbal Communication:*

As coaches, we probably use verbal communication more than any other method. We know from experience that talking with players, rather than at them, can be one of the most effective means of communication. When you tell players what to do, always consider how they will receive your message; try to anticipate their reactions.

*Visual Communication:*

Good visual communication—the ability to demonstrate well—is a priceless gift. Not only does a good demonstration provide a picture for your players, but it also adds to your credibility and prevents the boredom of long verbal explanations.

*Physical Communication:*

Physical communication, such as shaping, involves guiding players' limbs through the correct movement. This is more important when coaching younger players. Young children must discover how to perform new skills, and they learn more by doing and feeling the correct pattern or shape of the movement than by listening.

Crookes (1991) believes that coaches should:

- Develop their verbal and non-verbal communication skills
- Ensure that they provide positive feedback during coaching sessions
- Give all athletes in their training groups equal attention
- Communicate as appropriate to your athlete's thinking and learning styles
- Ensure that they not only talk to their athletes but they also listen to them as well

**Help of a Sport Science Team:**

The Sport Science team offers advanced human performance testing and intervention support to athletes and coaches towards achievement of their sport performance goals. Consequently, a multidisciplinary team provides a range of services in an integrated and cooperative manner that allow the coaches and athletes to improve their understanding of

how they perform and what can be done to optimize training efficiency and maximize both individual and team performance.

<b>Example of Multidisciplinary Sport Science Teams</b>	
<b>Domain</b>	<b>Function</b>
Sports Medicine	Medical Screens, Assessment & Injury
Athletic & Physiotherapy	Injury Rehab and Prevention
Biomedical	Acupuncture, Chiropractor, Podiatrist, Massage
Talent Identification & Development	Scouting, Drafting & Player Skill Development
Strength and Conditioning	Athlete Training Programs
Sports Nutrition	Player Nutrition Profiles
Sport Psychology	Mental Skills for Peak Performance
Sport Physiology	Physiological Analysis & Fitness Testing
Biomechanics of Sport Performance	Video Analysis of Skill Performance
Sport Performance Analytics	Scouting, Player Analysis, Team Info. Systems
Player Resource Center	Athlete Career & Education Services
Equipment Technicians	Purchase and maintenance
Coaching Staff	Feedback

### **Burnout and Dropout:**

The terms “burnout” and “dropout” are frequently used as if they mean the same thing. However, burnout refers to the long-term effects of overtraining or inappropriate training based on the age of the athlete. Symptoms of burnout are frequent or chronic injury, lack of progress in training and competition, and general dissatisfaction with the sport; the key component is long-term involvement in training programs. Dropout refers to the phenomena of athletes simply quitting their sport participation prematurely. Coaches should realize dropout is more detrimental to the athlete and the sport governing body. Following accepted athlete development guidelines and constructing career periodization plans which adhere to these guidelines, coaches can reduce both dropout and burnout.

### **PSYCHOLOGICAL STRATEGIES FOR PEAK PERFORMANCE:**

Psychological strategies consist of the application of several psychological skills within a specific mental preparation routine or game plan. Several psychological strategies have been identified by researchers that include the following: performance routines, automaticity of performances, performance simulation, association/dissociation strategies, mental preparation routines, self-talk, performance attributions, performance

accomplishments, quality training/over training, motivational climate, social support, team building, etc. Significant improvements in the Profile of Mood States measures of tension, depression and anger were observed after one week of tapering, with significant improvements in total mood disturbance and fatigue (Hooper et al. 1998). Recent research in sports psychology shows that athletes learn to develop consistent, highly systematic preparatory routines utilizing a preplanned sequence of psychological skills and strategies for peak performance in sports. Halvari concluded that a lack of mental preparation might result in poor performance of a specific task. He showed that poor performance is related to anxiety, which increases the number of performance errors committed during a task. (Halvari, 1996)

### **Biofeedback:**

Biofeedback is a process that enables an individual to learn how to change or self-regulate specific physiological activity (e.g., heart rate, respiration, muscle tension, skin temperature & skin conductance) for the purposes of improving health and performance. Precise biofeedback instruments measure your physiological activity which rapidly and accurately as "feed back" information to the athlete. The presentation of this information — often in conjunction with changes in thinking, emotions, and behavior — supports desired physiological changes. Over time, these changes can be self-regulated by the athlete/client without continued use of any equipment.

### **Neurofeedback:**

Neurofeedback, also called EEG Biofeedback also known as electroencephalograph (EEG) Biofeedback, is a learning strategy that enables a person to alter their own brain waves. For over four decades, EEG has been used in research and medical settings to help train individuals to change brain wave patterns. Only recently, have advances in computer technology made it widely available for the general and athletic populations. Thus, neurofeedback can be referred to as brain exercise or mental training. Neurofeedback is training in self-regulation. Good self-regulation is necessary for optimal brain function and performance optimization. Self-regulation training enhances the function of the central nervous system and thereby improves mental performance, emotional control, and physiological self-regulation.

### **Conclusion**

Ultimately, coaches should be passionate about teaching sport skills to their athletes. Coaches must be life-long learners of sport in order to properly train their athletes for peak performance. As the profession of sport coaching has evolved and sport has become a multi-billion dollar industry, many coaches have discovered sport incorporates both physical and mental training. Therefore, in today's sports world, several disciplines have been integrated into the science and art of training athletes. Training athletes to become "champions" in sport, and more importantly life, can provide many individuals with opportunities to produce peak performance.

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