



# SPORTS SCIENCE



2023

## Introduction to Sports Science

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Sports science is a multidisciplinary field that involves the scientific study of physical activity, exercise, and sport. It applies principles and techniques from various fields, such as physiology, biomechanics, psychology, nutrition, and anatomy, to understand how the human body responds to physical activity and to optimize athletic performance.

Sports science aims to improve athletic performance, prevent injuries, and promote overall health and well-being. Researchers in this field use scientific methods to study various aspects of physical activity, such as the effects of exercise on the body's systems, the biomechanics of movement, the psychological factors that influence athletic performance, and the impact of nutrition on athletic performance.

Sports scientists work with athletes, coaches, and other sports professionals to develop training programs, monitor performance, prevent and treat injuries, and optimize recovery. They may use tools such as biomechanical analysis, physiological testing, and psychological assessments to understand the unique needs of individual athletes and develop personalized training plans.

Overall, sports science plays an essential role in advancing our understanding of human performance and promoting optimal health and well-being through physical activity and sports.

ASA is continually developing and striving to provide our membership with information and tools that will contribute and enhance learning and education with respect to understanding and applying sports science best practices.

Along with the establishment of an Integrated Support Team (IST), we continue to grow our online (website) information under the member's tab (Player & Coach pages) and we are proud to present the following information contained within this booklet.

ASA is extremely fortunate to have garnered the support of a talented group of sports medicine professionals that will provide education to our athletes regardless of their age, gender or competition level. It takes a team, a community, to develop our athletes' true potential and ultimately, maintain their love of the game, their love of participating and most importantly support their long-term health.

The IST works with players and coaches (and in some cases, the parents), to help players achieve their peak performance. Launching in Fall 2023, ASA members will have the opportunity to receive specific guidance, information and feedback from our IST members via several online, in-person and on field webinars/seminars and presentations. Members of the IST will be available to ASA membership for individual follow up on specific subject matter. Further details will be communicated to membership, as dates and schedules become available.

### **Integrated Support Team**

**Medical Doctor** - **Dr. Reg Peters**

**Physiotherapist** - **Todd McGladdery** MSc.PT, FCAMPT, CGIMS

**Performance Analyst (Physiology and Biomechanics)** - **Jeff Huynh** RMT, B.Kin, CSCS

**Mental Skills Training** - **Dr. Carl Nienhuis** - Assistant Professor, Faculty of Health Sciences, Kinesiology at UFV.

**Nutrition** - **Vanessa Brown**, RD - Owner, Summit Nutrition Consulting.

## **Fitness Testing & Assessment**

Fitness Testing is to be introduced to our youth aged athletes (Divisional team U13+), as well as within our Development Academy programming, from Fall 2023. ASA's IST member, **Jeff Huynh** will oversee and manage the implementation of the club's Fitness & Assessment program.

At the younger ages (U8-U12), we intend to provide our children with a fun and stress-free introduction to fitness testing, with the introduction of a Skill Centre 'Skills Test' program.

As our athletes age and the demands of their chosen performance level increase, fitness testing will be adapted to each program in a way that is appropriate to the level of play for that player.

An example of BCSPL-level fitness testing, to be conducted (2x/season min), will include the following elements:

### **1. Physical Characteristics**

- a. Body Mass
- b. Standing Height

### **2. Speed**

- a. 40m Sprint

### **3. Leg Power**

- a. Counter Movement Jump
- b. Standing Horizontal Jump

### **4. Upper Body Strength**

- a. Maximal Push Up

### **5. Fitness**

- a. Intermittent Fitness Test- 30-15 IFT

This testing protocol permits technical staff the opportunity to gauge growth and improvement throughout specific timelines of the applicable periodization plan.

## **Periodization**

As our players progress through the stages of play in the Long-Term Player Development model, ASA will apply a well-defined and articulated periodization plan for high performing athletes (BCSPL) to ensure off-season, pre-season, competition phase and a transition phase are clearly defined and followed. This approach will be invaluable to prevent injury, fatigue, overtraining and provide optimum performance results in competition phase of high performing athletes.

## **Injury Prevention**

In grassroots soccer, players have varying levels of skill and experience, and therefore, injuries can be a concern. ASA team coaches are educated (via in club workshops and NCCP certification) and encouraged to be fully cognizant of Injury prevention strategies such as warm-up routines, stretching exercises, execution of technique and proper use of equipment and clothing by players, which will all help to minimize the risk of injuries during training and matches.

As the age and competitive level increases, so does the risk of injury. Coaches and players need to be fully engaged with the importance of implementing and maintaining injury prevention techniques and protocols.

## **Performance Training**

Often referred to as Strength & Conditioning, the ASA Performance Training program is both a stand-alone program including speed and agility drills, endurance training, and sport-specific drills, along with elements which are integrated into regular team training and Development Academy sessions.

With the oversight and implementation of ASA's IST member, **Jeff Huynh**, ASA will provide our athletes with excellent supplementary training opportunities.

## **Recovery & Rehabilitation**

In line with the importance of periodization, athletes, coaches and parents need to ensure the development of a recovery plan that includes proper rest, hydration, and nutrition to promote optimal recovery and reduce the risk of injury.

For the times when injuries do occur, and our athletes need to seek professional assessment and/or treatment, the ASA's IST member, **Todd McGladdery**, will be able to provide all physiotherapy needs to our members.

For any major medical needs, and especially for those families who are without their own GP, **Dr. Reg Peters**, has graciously offered his services, as part of the ASA's IST, and will make himself available to families in need.

## **Athlete Nutrition**

An important, and often overlooked, component of youth sports participation is the lack of a nutrition plan that emphasizes the importance of healthy eating habits, hydration, and fueling the body for optimal performance. Pre & post-activity food intake is of particular importance.

With the help of ASA's IST member, **Vanessa Brown** (RD), ASA will be providing a series of opportunities via virtual webinars and in-person workshops to assist our members with their healthy meal choices and the development of individual nutrition plans.

## **Mental Skills Training**

The psychological aspects of sport, and more specifically that of the athletes that participate, is a major factor in coaching in today's sporting arena. Techniques such as goal setting, visualization, concentration, and stress management can be applied to grassroots soccer (as much as in the professional environment), to help players develop mental resilience, confidence, and focus on the field.

At higher levels of soccer competition, when physical skills and tactics of players are more comparable, psychological skills take on even greater importance. However, despite widespread agreement regarding the importance of psychological factors such as intensity, confidence, and concentration to successful soccer play, coaches often fail to make mental skills training part of the daily practice schedule. There are many reasons for this, including lack of sports psychology knowledge, misconceptions about mental skills, perceived lack of time, and personal coaching habits. However, mental skills should not be treated casually. Rather, just as technique, tactics, and physical skills are addressed at every training session, mental skills training needs to be integrated into the training schedule and practiced on a regular basis.

From Fall 2023, and with the assistance of ASA's IST member, **Dr. Carl Nienhuis**, ASA will be implementing a series of workshops and/or virtual webinars for all club members: coaches, players and parents, to learn more about the importance of developing an understanding of creating, and the implementation of a mental skills framework and training plan.

### **What Are Mental Skills?**

Mental skills are internal capabilities that help athletes control their minds efficiently and consistently as they execute sport-related goals. Mental skills training provides the methods and techniques to not only develop skills such as concentration and positive body language, but also to foster personal characteristics such as self-esteem and positive competitive skills and behaviors.

Mental skills techniques help athletes adjust their actions, thoughts, feelings, and physical sensations to improve their games. Mental skills techniques do this by helping the player to:

- ✓ Develop self-confidence.
- ✓ Set goals and create a positive long-term vision.
- ✓ Use imagery and visualization to work on competitive skills.
- ✓ Focus concentration and attention.
- ✓ Deal with adversity

- ✓ Improve error management.
- ✓ Develop a positive approach to competition.
- ✓ Create on-field routines.
- ✓ Negotiate off-field Issues.

The use of sports psychology may extend far beyond mental skills training. For example, problems related to growth and development issues, academic stress, strained relationships, time management, family conflicts, and financial concerns affect everyone at one time or another. These issues may easily compromise a young player's soccer performance. When such problems arise, it is important to establish open lines of communication, discuss them with your players and parents, and seek professional assistance when needed. It is important to remember that as coaches you are called upon not only to guide our athletes as competitors, but also to help them develop positive personal life skills.

### **Factors That Influence Mental Skills Training**

Mental skills training for soccer does not occur in isolation, but rather takes place in a dynamic environment that is influenced by the core beliefs and values of coaches, players, and parents.

### **Philosophy of Coaching**

A strong philosophy of coaching lies at the core of every great coach. It consists of principles and beliefs that guide actions and decision making in dealing with players. A philosophy is not acquired from any one source, but rather from a compilation of experiences. These beliefs about life, coaching, and sports guide and impact us as we coach, teach, and motivate our athletes both on and off the field. It is difficult to discuss mental skills training effectively without a clear understanding of one's philosophy of coaching and how it impacts implementation.

ASA coaches are encouraged to apply their philosophy of coaching within the context of three broad perspectives: coaching to help athletes develop physically, psychologically, and socially; coaching to have fun; and coaching to win. These three converging perspectives are complex and unique to each person. In addressing these three areas, coaches integrate their knowledge with experience to bring out the best in their athletes.

### **Love of the Game**

At the cornerstone of soccer development lies a common thread, which perhaps stands out as the most important ingredient to success. This is the development and maintenance of a love and joy for the game (Bloom, 1985 and Saviano, 2001). Research shows that athletes who develop a deep love for a sport and are not pushed into serious and heavy competitive environments too early have the proper basis to excel later in their careers (Gibbons, 1998). A player's love of soccer must be consistently nurtured within the framework of mental training.

### **Role of the Family**

The family is a very important part of the support team for a developing player. In today's game, the role of family members varies tremendously from that of active on-field coach to that of supportive sidelines spectator. The evidence is quite clear that for a young athlete to have a healthy approach to competition and training, a parent or significant individual must help create an environment that is both supportive and conducive to excellence.

### **Planning Skills**

"Success is peace of mind, which is the direct result of the self-satisfaction in knowing that you did your best to become the best that you are capable of becoming." John Wooden

Success is the direct result of doing one's best. However, in addition to this obvious fact, having a vision and a plan can bring life to an athlete's hard work and commitment. Many things have been written about the importance of planning. Individuals attend seminars and purchase videotapes and books to become more proficient at planning and more effective in their work. What is the basis for the importance of planning, and how can the planning process help coaches become more effective on field?

A developmental plan is one way to bring structure and life to a player's quest for success (Saviano, 2000). This plan is a blueprint for the long-term development of a player that provides focus and clarity to the coach and the athlete on what needs to be addressed and how it is to be accomplished. A developmental plan should include the following:

- *A long-term, comprehensive vision of the type of player the athlete wants to become (style of play, weapons, conduct, physical conditioning, etc.)*
- *The strategies and patterns that need to be mastered and the 'weapons' that need to be developed.*
- *The training needed to make sound basic tactical adjustments and good decision making.*
- *The techniques to be developed.*
- *The emotional/psychological approach the player will take to competition.*
- *Scheduling and periodization.*
- *Physical development.*
- *Goal setting.*

### **Evaluation of Mental Skills**

One benefit of a mental skills training program is that it enhances performance on the field. Winning is one of the objectives in soccer, and winning requires consistent performance at a high level. One way to better ensure consistent performance is to individualize the mental skills training program to the athlete. Individualizing a mental skills training program can be accomplished by evaluating an athlete's mental skills set within the framework developed by Gould (2001). According to Gould, some of the areas that coaches need to analyze and evaluate include:

- Goal setting
- Personal motivation
- Practice intensity
- Imagery skills
- Error management
- Positive self-talk
- Positive body language
- Confidence and composure
- Concentration
- Routines
- Stress management and arousal control
- Sportsmanship
- Pre-match preparation
- Competitive skills

This analysis and evaluation of a player's mental skills set can prove to be difficult due to the many variables that affect on-field performance. For example, Loehr (2001) states that it is important to note that emotional problems during match play can just as readily be caused by physical deficiencies as by emotional ones. Lack of physical recovery due to inadequate sleep, rest, nutrition, or hydration can completely derail a player's ability to summon the right emotions at the right time. This is particularly evident in player breakdowns. Just as poor fitness can lead to mental and emotional problems, excessive anger, frustration, or nerves can undermine both mental focus and biomechanical efficiency. Due to these many factors, coaches should take great care when identifying and evaluating a player's mental capacities and be aware of the integrated nature of performance.

### **Implementation of a Mental Training Program**

The 18-and-under high-performance competitor should have tactical understanding of his or her key patterns of play and game style. In addition, at this age players should be technically sound and possess a wide array of skills and abilities.

However, what is often lacking in their program at this stage of development is a well-developed daily practice and competitive mental skills training program.

Coaches need to be aware of the importance of creating an environment where there is purpose to practice. Players need to understand the link between quality training and peak performance—that is, not just to train, but to train with intentionality and purpose. A culture of excellence must be communicated to the athlete where quality training is rewarded. Mental skills like match and practice preparedness, sportsmanship, on-field routines, error management, positive body language, and positive self-talk can and should be addressed both off field and on field.

### **Conclusion**

In coaching young athletes, coaches need to apply science-based content knowledge as well as practical experiential knowledge to address the many factors that are at work. This is in essence both the art and science of coaching.

The process of implementing a Mental Skills Training Program requires a personal understanding of both who you are as a coach and who your players are as young people. This provides a starting point for both coach and athlete in the quest to learn, develop, and strive for excellence. Acquiring positive mental skills is important for all players, regardless of level or age of development. However, for younger players, it is of utmost importance to establish a base of fundamentals related to practice and competition that will serve as a springboard for continued growth as healthy competitors.

From Fall 2023, and with the assistance of ASA's IST member, **Dr. Carl Nienhuis**, ASA will be implementing a series of workshops and/or virtual webinars for all club members: coaches, players and parents, to learn more about the importance of developing an understanding of creating, and the implementation of a mental skills framework and training plan.

### **Video/Match Analysis**

Match analysis is the process of reviewing and evaluating game footage and statistics to identify areas for improvement, strengths, and weaknesses in the performance of individual players and the team. At ASA we understand there are many benefits match analysis can offer:

#### **Identifying areas for improvement**

Match analysis can help coaches identify specific areas of weakness in their team's performance, such as ineffective passing, lack of defensive pressure, or poor decision-making. This information can then be used to develop targeted training sessions to improve these areas.

#### **Developing individual player feedback**

By analyzing individual player performances, coaches can provide specific feedback and guidance to each player on their strengths and areas for improvement. This can help players develop their skills more effectively and can increase their overall confidence and motivation.

#### **Improving tactical knowledge**

Match analysis can help coaches identify patterns and tendencies in their team's play and the opposition's play, leading to the development of more effective tactics and game plans.

#### **Enhancing team cohesion**

Match analysis can also help to foster a sense of teamwork and unity by encouraging players to work together to identify areas for improvement and develop strategies to address them.

#### **Tracking progress**

By tracking statistics and performance metrics over time, coaches and players can monitor progress and evaluate the effectiveness of their training and game plans. This can help to build confidence and motivation and can serve as a positive reinforcement for continued improvement.

Overall, match analysis is an essential tool for grassroots soccer coaches who are looking to improve their team's performance, develop individual players, and build a cohesive and successful team. By leveraging the benefits of match analysis, coaches can help their players reach their full potential and create a positive and enjoyable soccer experience.

With the purchase of a Pixellot Air camera, ASA can now offer teams the opportunity to have their games recorded, on a pay-per-use basis. However, we are offering at least one game per season for free, to most if not all youth teams, so that members can gain a valuable insight into the benefits of match analysis. Each of these games will be presented back to the respective teams at a presentation and review meeting with the Club's Technical Director.

In addition, ASA has teamed up with professional analyst. Andrew Peat (Applied Winning Practices), as our preferred performance analyst, who will edit and present video footage for any/all teams interested in his service.