Journal of Bodywork & Movement Therapies xxx (xxxx) xxx

Contents lists available at ScienceDirect

Journal of Bodywork & Movement Therapies

journal homepage: www.elsevier.com/jbmt

Self-Care Management

Athletic development - Part 2: The foundational stage of development

1. Introduction

One shared goal amongst practitioners is to have a player-centered model with a system in place to establish a well-rounded base that serves as the framework for the development of new and future motor skills. The first step towards the proper development of an athlete is the foundational stage, where we identify the starting point for positional awareness, physical literacy and strive to provide opportunities to engage young athletes in the process. The second stage is the developmental stage, where the goal is to identify the maturation process, teach fundamental movement skills (acceleration, deceleration, agility), emphasize suppleness during the Peak Height Velocity (PHV) phase and introduce basic strength movements. The third stage is the performance stage, where the focus is on improving performance by identifying specific needs of the athletes and teaching the athletes how to rest and recover. As practitioners, we have observed that we don't have to teach good athletes how to work hard, but instead, we have to teach good athletes how to rest. We do this by teaching targeted methods such as physiological unloading strategies, sleep strategies, nutritional strategies and teaching self-awareness. In this article, we will focus on the first stage: Foundation.

2. Multilateral development and specialized training

The foundation of long-term, self-regulated involvement in elite sport is the development of a solid foundation of intrinsic motivation at early stages (Deci and Ryan, 2000; Côté et al., 2007; Côté et al., 2009). Early diversification or sampling and late specialization facilitate this process (Lidor and Lavyan, 2002; Barynina and Vaitsekhovskii, 1992). Positive reinforcement enhances intrinsic motivation (Badami et al., 2011; Liebenson, 2018; Seirul-lo Vargas, 2003). The power of positive thinking (and coaching!) goes against the grain of much traditional "boot camp" styles of organizing practices and training sessions. However, positive feedback has been shown to work best. Participants who received feedback after their best trials learned more effectively than those who were "corrected" after mistakes (Chiviacowsky and Wulf, 2007).

The development of youth athletes involves reaching a balance between multilateral development and specialized training. "In general, the early development of athletes should focus on multilateral development, which targets the overall physical development of the athletes …. The temptation to deviate from a multilateral development plan and begin specialized training too soon can be very great, especially when a young athlete demonstrates rapid development in a sporting activity" (Bompa and Haff 2009).

Many youth athletes lack the quantity, quality, and variety of movement skills as a result of over and/or early specialization. This often results in repetitive strain injuries. The question of when to train specific motor skills is a "holy grail" in the early training of youth athletes. However, according to Anderson et al. (2012) "our understanding of when children are best prepared to profit from specific experiences and how to create that preparation is poor." Nonetheless, the authors state, "motor skill learning must ultimately be considered within a developmental context if it is to be fully understood." Sampling is proposed to build Fundamental Movement Skills. This provides a foundation for future movement prowess (Baker et al., 2003):

- Locomotor skills (running, jumping, etc.)
- Object control skills (throwing, catching, striking, etc.)

3. Programming for foundational athletes

When designing programs for the foundational athlete the first step is to engage athletes through gamification, create a clear athlete orientation model, and identify how much time we have with the athletes.

"Gamification is an example of creating a problem-solving environment with camaraderie where tasks can be explored and enhanced in a goal-oriented manner. They are generally partner based with the emphasis being on novel environmental constraints, safety, and fun. The constraints can be altered based on dynamic system theory (DST) by modifying the environment, task, or individual" (Seirul-lo Vargas, 2003·Liebenson, 2018).

When designing programs for this stage, we seek to understand the amount of contact time we have weekly. Depending on the structure of the organization (professional club, private facility or grassroots/community programs), contact time usually falls between two to three times per week. Time ranges from 15 minutes upwards to 60 minutes, including one match per week. Quality over quantity is essential, so based on the allotted time we recommend tackling global movement patterns early and often. When working with U9 through U12 age groups, the maturity level or attention capabilities will be the limiting factor. This calls for adaptable and dynamic coaching in order to manage a semi-structured setting while trying to provide a positive coaching environment. This is where the art and science of coaching comes into play by creating small wins in every training session through a clear organizational structure (Fig. 1) that players can progress through. Creating a fun training environment starts and finishes with the ability to have a clear orientation of players (Figs. 2–4), methods to re-focus players when they become disengaged (Table 1), and providing sensory enriching movements such as rolling patterns and open skill games.

https://doi.org/10.1016/j.jbmt.2019.10.011

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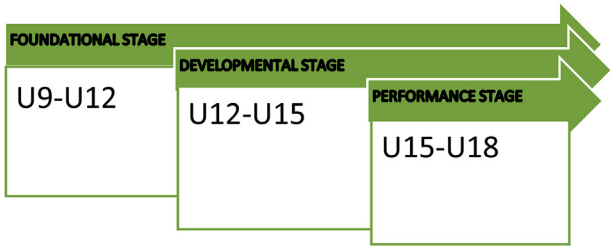

Fig. 1. Organizational structure.

Fig. 2. Vertical (overhead)Orientation.

Fig. 3. Circle orientation.

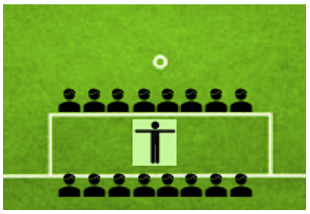

Fig. 4. Split orientation.

3.1. Functional competence: position

When identifying the starting point, functional competence is the first box we want to check. This highlights the importance placed on building the basics of athletic development. This is an opportunity for coaches to expose athletes to basic movement patterns and establish ways to assess muscle flexibility and strength imbalances in a range of performance tests or movement programming to identify deficits related to proprioception, mobility, stability, and pain. In short, this can be recognized as training position (mobility, stability, low center of mass). Creating a point system (Table 2) with the movement patterns that a coach is interested in teaching can help create standards for their team or club.

Various ranges of motion can be implemented in the warm-up and during physical literacy training methods, such as animal movements. Teaching positions in the warm-up will include bottom-up movements, starting from being seated on the ground and working up towards standing on their feet. Challenges such as cross-legged sit-to-run (Fig. 5), cross-body balancing with Lateral Crawling (Fig. 6), and bottom-up half-kneel-to-run movements (Fig. 7) can serve as ways to identify deficits related to proprioception, mobility, and stability.

Additionally, the athlete needs to be introduced to the athletic base position (Fig. 8). This movement is the foundation for teaching all triple flexed movement such as landing, deceleration when running, and squatting. Gaining confidence in this critical position in a playful way will ensure the athlete will be able to transition in and out of the base position.

Superior movement proficiency is key for safe and effective long-term development and performance in youth athletes (Lloyd and Oliver, 2012; Valovich-McLeod et al., 2011) and potentially for reducing injury risk (Hewett et al., 2005; Myer et al., 2009). Once the athlete's functional competence and movement proficiency have reached an acceptable level, they can then progress into more advanced training strategies (e.g., strength and power) with the certainty that they can cope with the increased demands.

3.2. Coordination & locomotion: Introduction to physical literacy

Athletes in the foundational stage of athletic development are generally categorized as being “before” the growth phase of maturation, which is an opportunity to focus on physical literacy involving coordination and locomotion. Research on Long-Term Athlete Development (LTAD) maturation found that girls will generally enter the Peak Height Velocity (PHV) phase around the chronological age of 11 years, and boys will enter it around the age of 12 Lloyd et al. (2009). Identifying these phases of growth can be estimated with more precision using invasive and non-invasive testing means. While chronological ages are mentioned, it is the biological age that is paramount. In the context of youth athletic development, the period before the PHV spike is the key determining factor. Unfortunately, most youth sport organizations are not prepared to divide youth in this way. We will expand on this concept in part 3 when we discuss the developmental stage and PHV.

We introduce the concept of phases of growth because this will influence the coordination abilities of the athlete, especially during the growth phase. If athletes have access to a physical development system during the foundational stage, they have the opportunity to make a head start on developing basic coordination movements that can stimulate a young athlete's brain, vestibular system, musculoskeletal system, and neuromuscular system. From the player's perspective, we want these outcomes to be the building blocks for self-confidence in their bio-motor abilities by

Table 1
Methods to capture attention.

Methods to capture attention	Examples
Open Skills	Games & challenges, obstacle courses (races), gymnastics, rolling/animal patterns
Hand Signals (Non-verbal Communication)	Circle, Vertical Parallel Lines, Split Orientation (horizontal lines)
Visual Stimulus	Identify colored cones, lights, hand signs while in motion, letters, numbers

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Table 2
Point system (5 Movements = 15 points).

Movements	5 Points	4 Points	3 Points	2 Points	1 Point	0 Points
Split Squat Hold (s)	30s	20s	15s	10s	5s	0
Push-Ups	20 +	15–19	10–14	5–9	1–4	0
Push Up Hold (bottom)	30s	20s	15s	10s	5s	0
Inverted Row	10+	8	6	4	2	0
Single Leg Balance	25s	20s	15s	10s	5s	0
BW Squat	20 +	15–19	10–14	5–9	1–4	0

Fig. 5. Cross-legged sit to run.

Fig. 6. Lateral crawl.

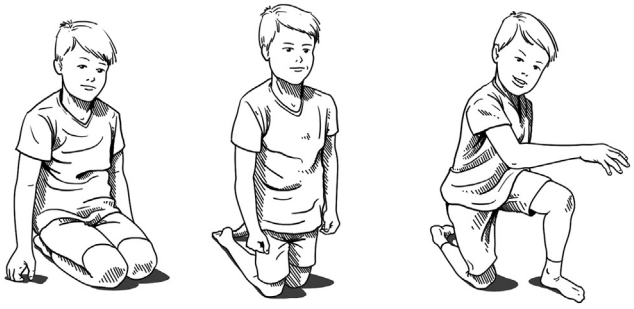

Fig. 7. Half kneel to run.

introducing a good routine of locomotion and coordination drills early and often, especially before entering puberty, which is a challenging phase of an athlete's development. The one constant in all sporting activities is the warm-up period before the start of practice, training, or game. The “warm-up” period is a time when we can insert purposeful movements to help prepare the body for the positions, angles, patterns, and force demands we will expose the players to that day or across the training cycle. Coordination and locomotion drills (Table 4) can be performed from simple to complex, low velocity to high velocity, and multi-planar, to challenge the range of motion and ground reaction forces. Table 3 offers an example of purposeful warm-up categories that can be performed in 10 minutes through selecting 1–2 movements from each section.

Coordination is an important physical quality that indicates how key areas of the brain are operating. The cerebellum controls coordination and natural reflexes in the body. From a training perspective, this trains dissociation of the lower body from the upper body through various marching/skipping and crawling/walking patterns. If the aim is to try to improve these patterns, start by giving the athlete a tempo or rhythm to follow, because tempo can help teach movement patterns.

3.3. Fundamental movement skills

The foundational stage of an athlete's journey will need to have basic movement patterns such as running, kicking, jumping, throwing, crawling, and stopping. These fundamental movement skills (Table 5) will equate to performing three global patterns: flexion, extension, and rotation. Being able to kick and throw, which may or may not be sport specific, will require a combination of all three global movements. For example, kicking and throwing movements can start to teach movement efficiency, influencing force generation and the transfer of force starting at the hip, transferring through the trunk, and exiting through the limbs.

Balance is a key physical development quality that is used to create a foundation for the many kilometers (miles) to come. The goal is to teach young athletes to feel balanced and aware on one leg, in split position, and in the base position through various speeds and forces they will experience when playing. Ultimately, we are teaching how to feel a balanced center of mass (COM).

When training balance, we program 360 degrees of balance by designing simple plyometric drills with the key emphasis on drop landings (Table 6), programming jumps, leaps and hops on various surfaces to enhance proprioception. As the player moves around the ball or their opponents, their COM is constantly being changed and challenged. This is why it is important to teach what a balanced base position feels like so they can learn to return to this equilibrium and try to replicate it on one leg or in a split position. In the foundational stage of development, we are focused on exposing athletes to various positions and landing mechanics to assist with running, jumping and stopping.

3.4. Summary

Identifying the starting point for the foundational stage of athletic development consists of finding ways to keep players engaged in the process when teaching functional competency, physical

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Fig. 8. Athletic base position (credit: @scienceofsport).

Table 3
10 minute warm up.

Engage & Play 2–3 minutes	Functional Competence 2–3 minutes	Physical Literacy 2–3 minutes	Movement Skills 2–3 minutes
Partner Tug of War	Cross-Body Balance	Bear Crawl	Skipping/Running Patterns
Reactive Ball/Cone Snatch	½ Kneeling Walks	Forward/Bear Roll	Throwing, Catching
Movements with the Ball	Inchworms	Transverse Pogo to Drop Squat	Jump, Bound, Hop (Landing Focus)

Table 4
Coordination and Locomotion.

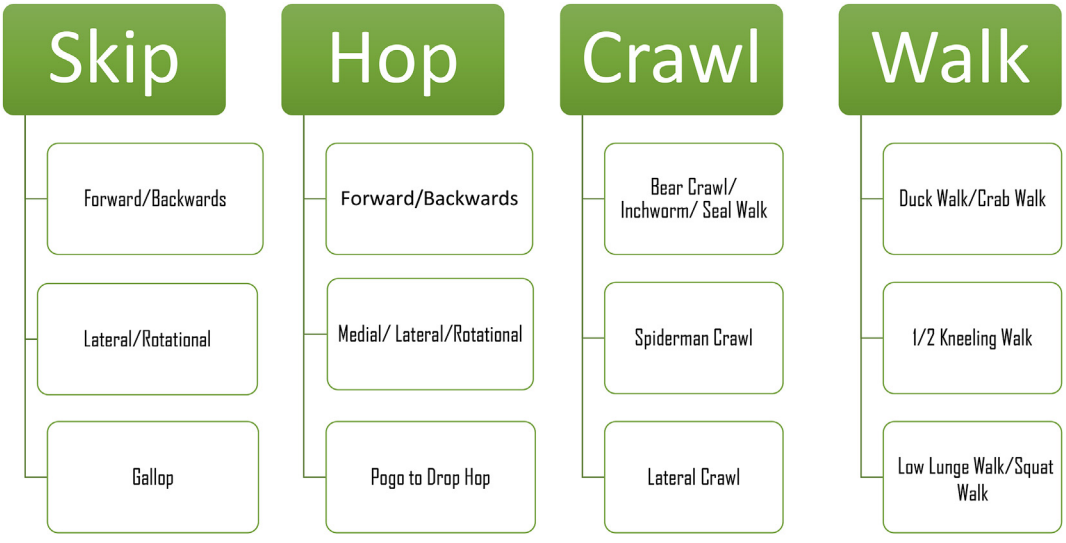

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Table 5
Fundamental Movement Skill Examples.

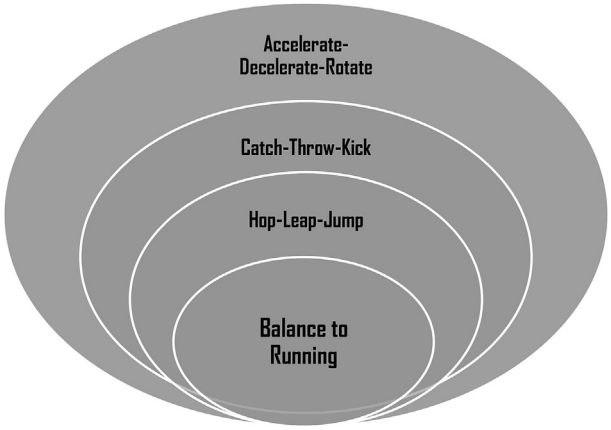

Table 6
Drop Landings.

literacy, and exposures of fundamental movement skills. The goal is to properly use the minimal time designated for this training age by creating engaging sessions, teaching global movement patterns and providing sensory-rich environments to introduce movement variability before entering the Developmental Stage of athletic development. The next article in this series will highlight the key aspects of the developmental stage, where the goal is to identify the maturation process, expand on teaching fundamental movement skills (acceleration, deceleration, agility), understand the role of suppleness during the PHV period, and introduce basic strength movements with the goal of establishing a well-rounded base that serves as the framework for the development of new and future motor skills.

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