



Needs and demands of the youth athlete



Overview

- OTU Coaching Model
- International L.T.A.D Model (Balyi & Hamilton, 2005)
- Implications of these stages for resistance training
- Peak height velocity
- Functional competence and movement efficiency
- Functional competence limitations of the G.A.A. youth athlete

OTú GAA coaching model



3 T's & 3 P's

Technical proficiency

Psychological focus

Tactical awareness

Physical fitness

Team play

Playing facts

Physical fitness

There is a specific list of player capacities highlighted that need to be developed at

Child

Youth (12-16 and 16- 18 years old)

Adult



P1 – Physical Fitness aged 12-16 years old

Emphasis on general and balanced physical conditioning

Develop an aerobic base through increased training load and game based intensity patterns. Aerobic base development prioritised after onset of Peak Height Velocity (PHV)

Develop linear, lateral, multi-directional and segmental (leg/arm) speed (through activities of 5 - 20 seconds in duration with appropriate recovery)

Develop functional strength through body resistance/load bearing exercises, emphasising technique (Pre PHV)

Develop absolute strength through specific strength training programme (prioritised 12 – 18 months after PHV)

Maintain flexibility through static stretching and dynamic mobility activities (Pre PHV, PNF exercises recommended during and post PHV)

Develop shoulder, elbow, core, spine and ankle stability



P1 – Physical Fitness aged 16-18 years old

Physical conditioning of a high generic standard with extra focus appropriate to position requirements (informed by individual standards and testing)

Shoulder, elbow, core, spine and ankle stability

Identify the need to taper and peak performance at appropriate times

Otú Coaching Model (Player capacities 12-16 years old)

Role of Resistance Training (R.T.)

Appropriate resistance training plays a significant role in the development of shoulder, elbow, core, spinal and ankle stability

Resistance training is essential to the development of functional and absolute strength at the appropriate stages in development



L.T.A.D.



LTAD

Fundamentals	age 6-9
Learning to train	age 9-12
Training to train	age 12-16
Training to compete	age 16-18
Training to win	age 18+
Retirement/ retainment	

(Balyi and Hamilton, 2005)

Fundamental Stage

Objective: Learn all fundamental movement skills

Emphasis is placed on the development of the athlete's physical capacities, fundamental movement skills, and the ABC's - Agility, Balance, Coordination and Speed.

Participation in as many sports as possible is encouraged. Speed, power and endurance are developed using FUN games.

(Balyi and Hamilton, 2005)

Fundamental Stage

The first opportunity for accelerated adaptation to speed training occurs during this phase

Speed and agility development should have a large emphasis with short duration repetitions (less than 5 seconds).

Resistance training during this phase should include exercises using the child's own body weight; medicine ball and Swiss ball exercises.

(Balyi and Hamilton, 2005)

Learning to train Stage

Objective: Learn all fundamental sports skills

Specialised movement skills and specialized sports skills should be the focus of the training programme

The opportunity for accelerated adaptation to motor coordination' occurs during this stage.

Resistance training should be developed by medicine ball, Swiss ball and own body-weight exercises as well as hopping-bounding exercises (or routines).

(Balyi and Hamilton, 2005)

Learning to train Stage

Training to develop endurance should be achieved by fun games and relays

Flexibility training should be introduced during this phase

Speed should be developed with the use of fun games, and the use of specific activities during the warm-up

A 70:30 training to competition-ratio is recommended.

(Balyi and Hamilton, 2005)

Training to train Stage

Objectives: Build the aerobic base, build strength and further develop sport-specific skills

This is where the opportunity for accelerated adaptation to aerobic and strength training occurs

Optimal aerobic trainability begins with the onset of Peak Height Velocity (PHV) or the major growth spurt during maturation

(Balyi and Hamilton, 2005)

Training to train Stage

There are two windows of accelerated adaptation to strength training one is immediately after PHV and window two begins 12 – 18 months after PHV.

A 60 percent training to 40 percent competition ratio is recommended (40 percent refers to competition and competition specific training prep

(Balyi and Hamilton, 2005)

Training to compete Stage

Objectives: Optimize fitness preparation and sport, individual and position specific skills as well as performance

The training to competition and competition-specific training ratio now changes to 50:50. Fifty percent of available time is devoted to the development of technical and tactical skills and fitness improvements, and fifty percent is devoted to competition and competition-specific training.

(Balyi and Hamilton, 2005)

Training to win stage

Objectives: Maximize fitness preparation and sport, individual and position specific skills as well as performance

All of the athlete's physical, technical, tactical, mental, personal and lifestyle capacities are now fully established and the focus of training has shifted to the maximization of performance.

(Balyi and Hamilton, 2005)

Training to win stage

Athletes are trained to peak for major competitions. Training is characterised by high intensity and high volume.

Training to competition ratio in this phase is 25:75, with the competition percentage including competition-specific training activities

(Balyi and Hamilton, 2005)

Retirement/ retainment Stage

This phase refers to the activities performed after an athlete has retired from competition permanently.

During this final phase, some ex-athletes move into sport-related careers that may include coaching, officiating, sport administration, small business enterprises, master's competition, media, etc.

(Balyi and Hamilton, 2005)

LTAD

Fundamentals age 6-9

Learning to train age 9-12

Training to train age 12-16 *

Training to compete age 16-18 *

Training to win age 18+

Retirement/ retainment

Implications of learning to train stage for resistance training

Significant growth

Importance of carefully monitoring and individualising the programme

Already learned skills may have to be re-learned

Young players eager to perfect their skills

Positive re-enforcement is crucial to provide an optimal effective learning environment

Implications of training to train stage for resistance training

Increase in height and weight reduces and stability of muscular system improves-

Opportunity to maximise strength development. Improving neural recruitment should be emphasis of the training

Skeletal maturation continues-

Progressive overloading should continue with vigilance



Peak Height Velocity



Peak height velocity

A normal growth rate of ~5cm per year rapidly increases to ~9cm per year and lasts between 6-18 months

(Philipaerts et al, 2006)

How to determine peak height velocity



- Measure every 3 months
- Same time of day
- Stocking feet

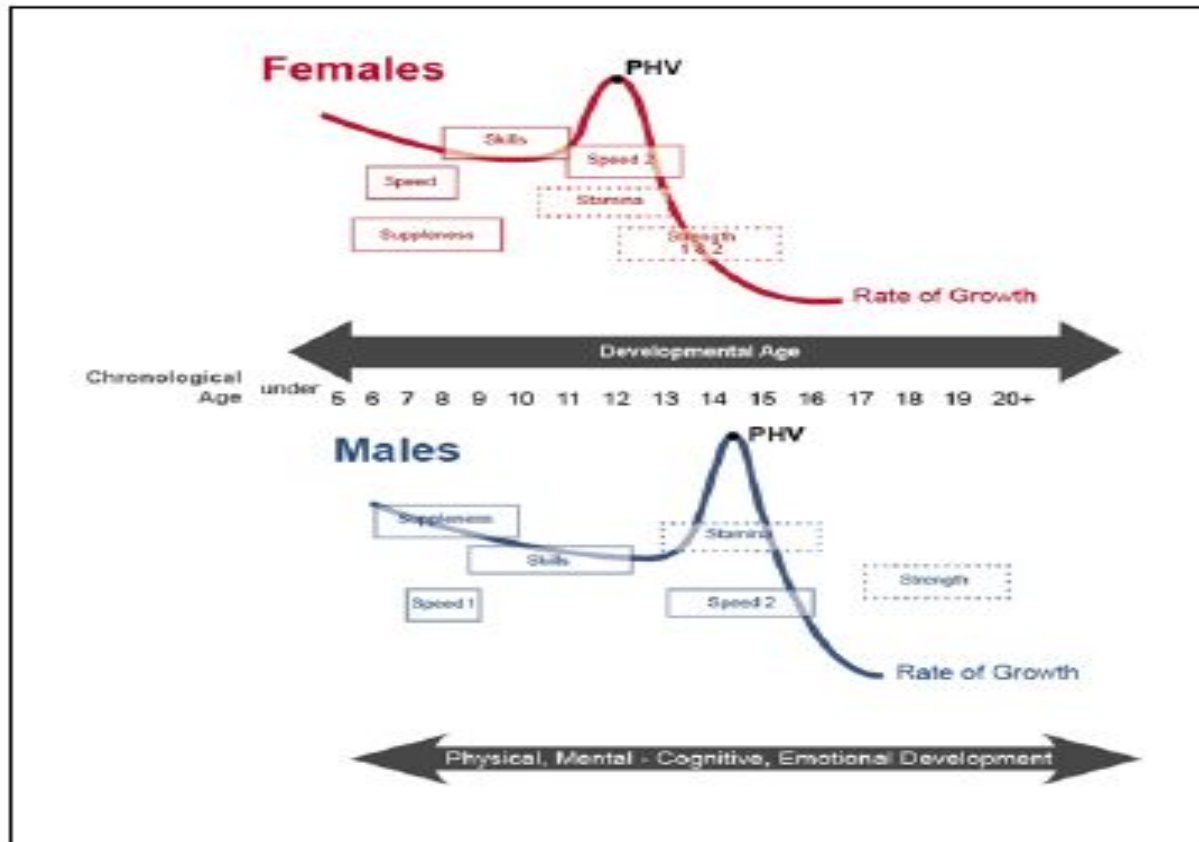
What occurs around peak height velocity ?

Rapid increase in height and weight as a result of major hormonal changes

Change in centre of mass of levers (arms and legs) and systems

Rapid increase in leg and arm length due to growth of long bones

Windows of trainability



Balyi and Hamilton, 2005

Windows of trainability

- There is a window of trainability (a period with accelerated adaptability to training) to strength training immediately following PHV (Balyi and Hamilton, 2005).
- This provides an opportunity for accelerated gains in strength development providing the physical competency and movement efficiency are developed.

Implications of peak height velocity for resistance training

Rapid increase in height and weight

Effect of this rapid growth on movement quality. Players may have to re-learn previously mature movement patterns, importance of continually assessing and observing around this crucial period

Window of opportunity for strength development

There is an opportunity for accelerated strength adaptation following peak height velocity provided the stimulus is appropriate and functional competencies are present

Implications of peak height velocity for resistance training

Decrease in flexibility

Emphasis must be placed on maintaining functional mobility

Rapid growth of long bones at faster rate than small bones

Exercises should not involve heavy spinal loading due to the continued slower growth of the small bones of the trunk

What to look out for?

- Decrease in co-ordination
- Inability to perform exercises that were once mastered
- Decrease in performance

What should you do?

- Have good open communication with players and parents
- Technique may need to be re-enforced
- Introduce a more basic exercise



Functional competence



What is functional competence?

Functional competence is the complex interaction of stability and mobility in multiple joints during motion or when resisting motion

Functional competence and performance

Functional competence essential to produce and be able to repeat high quality efficient sporting movement.

Deficiency in functional competence limits potential for sporting performance and skill acquisition and pre-disposes athlete to risk of injury

Functional competence is not just

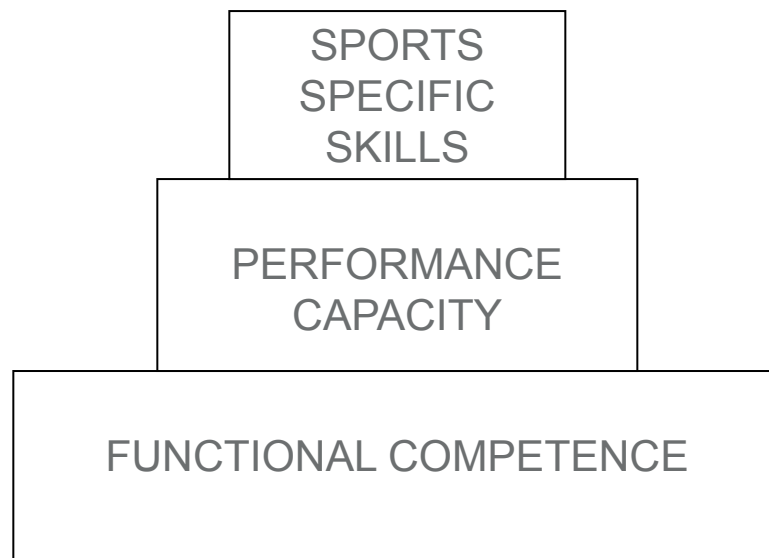


Remember sport is multi-planar, multi-joint, multi-directional and as such the functional competencies must be acquired in these areas

Functional Movement patterns

- Squatting
- Lunging
- Upper extremity pushing/ pulling
- Hinging
- Rotating/ Anti- rotation
- Jumping/ landing
- Bracing
- Single leg stability

BALANCED PERFORMANCE PYRAMID

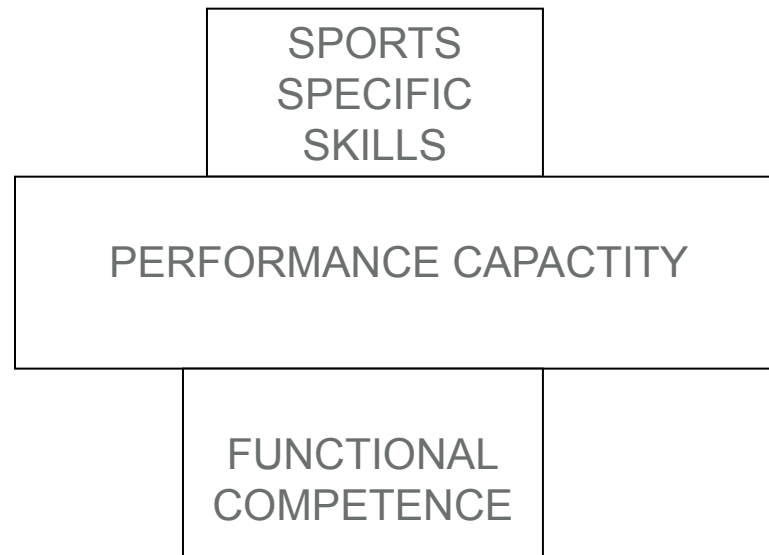


Balanced performance pyramid

Functional competence is optimally developed to provide a supporting structure to the attainment of physical capacities which in turn provides a supporting structure for the attainment of optimal sport specific skill performance

Functional competence provides a buffer zone which creates the opportunity for repeated performance with less likelihood of movement breakdown leading to injury

Unbalanced performance pyramid



Unbalanced performance pyramid

Functional competence is not optimally developed as the athlete is not equipped with the movement efficiency to optimally develop physical capacities which in turn provides difficulties in attaining of optimal sport specific skill performance

Lack of functional competence pre-disposes athlete to injury due to limitations in movement efficiency and repetitive loading of poor movement patterns



Common deficiencies in functional competence in the G.A.A. youth athlete



Functional competency limitations

1. Poor functional hip mobility
2. Inefficient core control
3. Inadequate single leg stability
4. Poor force stabilising abilities
5. Anterior dominance in lower and upper extremities

Poor functional hip mobility

Limitations in hip flexion and extension exercises squatting, lunging and hinging

Implications

Effects running mechanics and change of direction mechanics

Increase in injury risk due to body compensating for lack of hip mobility in other areas

Inefficient core control

Inability to maintain lumbo-pelvic control statically and dynamically

Implications

Decrease in performance inability to stabilise and transmit force

Increase in injury risk due to poor postures and ability to stabilise

Functional competency limitations

Single leg instability

Poor static and dynamic single leg balance

Implications

Impaired sprinting performance due to loss of stability

Increased risk of injury due to instability in the system

Poor force stabilising abilities

Inability to decelerate and maintain movement quality (poor ability to stop)

Implications

Decrease in performance as athletes must stabilise prior to changing direction, landing, twisting, cutting and taking contact

Increase in injury risk due to poor movement quality

Anterior dominant

Imbalance present between muscles at front and rear

Implications

Decrease in hip function impacting on sprinting and jumping performance

Increase in injury risk

Limitations in overhead fielding



Tailoring the resistance training programme for the youth athlete



Tailoring the resistance training programme for the youth athlete

“Bodyweight resistance training should be emphasised with the aim of increasing strength via improvements in neural recruitment”

(N.S.C.A. Position statement 2009)

Tailoring the resistance training programme for the youth athlete

“Strength training with maximal weights is not recommended because of the potential for possible injuries related to the long bones, growth plates, and back.”

(Faighenbaum & Micheli, 1998).

Tailoring the resistance training programme for the youth athlete

“All exercises must be performed with the emphasis on teaching movement quality before loading (volume or intensity)”

(N.S.C.A. Position statement 2009)

Tailoring the resistance training programme for the youth athlete

“Emphasis should be placing on improving functional competency (body/limb control and stability)”

(A.S.C.A. Position stand 2007)

Tailoring the resistance training programme for the youth athlete

“Effect of Peak height velocity and growth and maturation on movement skills increases importance of continually assessing functional competence and ensuring movement quality”

(Giles, 2011)

Tailoring the resistance training programme for the youth athlete

“The guiding principle for any conditioning programme is individualisation “

(A.S.C.A. Position stand, 2007)

Individual functional competency limitations lead the adaptation of exercises to ensure optimal movement quality

Individualising the programme provides the appropriate stimulus for development

Tailoring the resistance training programme for the youth athlete

“When basic functional competency achieved improve strength and power in conjunction with the further development of functional competence. Proceed with extra vigilance around Peak height velocity.”

(A.S.C.A Position stand 2007)

References and readings

Readings and references

Balyi and Hamilton L.T.A.D.

Balyi I., Hamilton A. (2004) Long-Term Athlete Development: Trainability in Childhood and Adolescence. Windows of Opportunity. Optimal Trainability. Victoria: National Coaching Institute British Columbia & Advanced Training and Performance Ltd.

A.S.C.A. Position statement on child and youth resistance training

<http://www.strengthandconditioning.org/images/PositionStand/asca%20position%20stand%20resistance%20training%20for%20children%20and%20youth%20nov%202007%20-%20final.pdf>

N.S.C.A. Position statement on youth resistance training

http://www.nscs-lift.org/youthpositionpaper/Youth_Pos_Paper_200902.pdf

Contd.

UKSCA Position statement

<http://www.ukzca.org.uk/ukzca/RelatedFiles/Youth%20resistance%20training.pdf>

Giles, Kelvin (2011). Physical Competence Assessment Manual. Movement Dynamics UK Ltd, United Kingdom

Giles, Kelvin (2012). An Introduction to Athlete Development. Movement Dynamics UK Ltd, United Kingdom

GAA Otú Coaching Model

<http://www.gaa.ie/coaching-and-games-development/coaching/otu-coaching-model/>

Key take home messages

Key take home messages

- Monitoring and observing your athletes is crucial especially around PHV
- Adjusting the programme for the individual is key especially around PHV
- Developing functional competence and improving movement quality should be the aim of the youth RT programme
- Remember multi-directional, multi-planar functional competence



Benefits of RT to the youth athlete

Thank you

