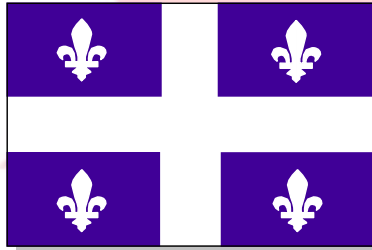


# **IV International Forum on Elite Sport**

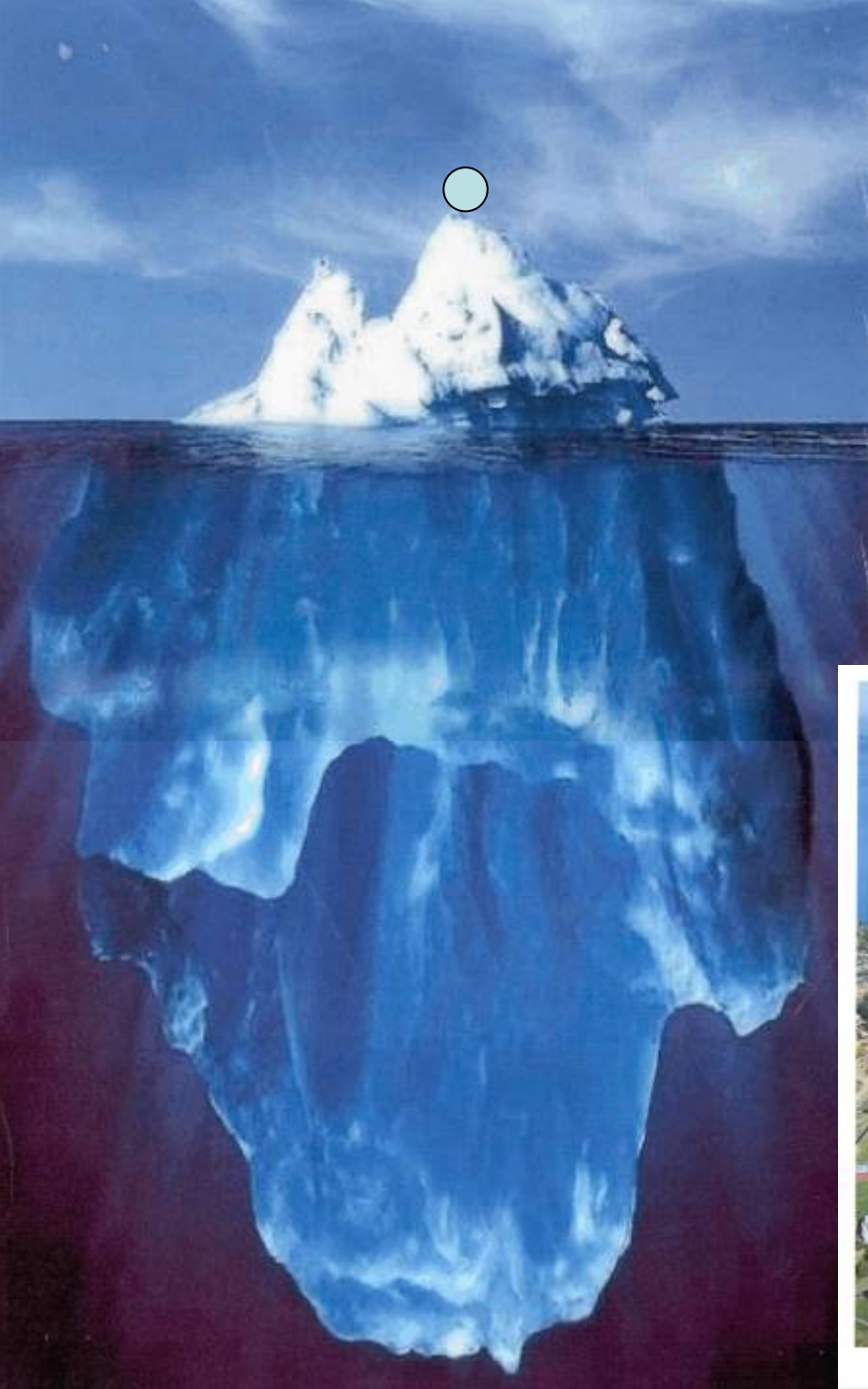
## **The Role of LTAD in Elite Sport**

**Montreal, PQ, July 26, 2005**



**Dr. Istvan Balyi**  
National Coaching Institute BC, Canada  
Canadian Sport Centre - Vancouver  
LTAD Advisor for  
Sport England, Irish Sports Council, Sports  
Council for Northern Ireland,  
sportscotland, The Sports Council for  
Wales and Sport Canada





# **The University of Victoria National Coaching Institute 45 hours**





# System Alignment

- Sport system alignment 1
  - Clubs
  - Regions
  - Provincial
  - National / Federal
- Sport system alignment 2
  - Physical education and school sports
  - Recreation
  - High performance sport





**High Performance Sport**

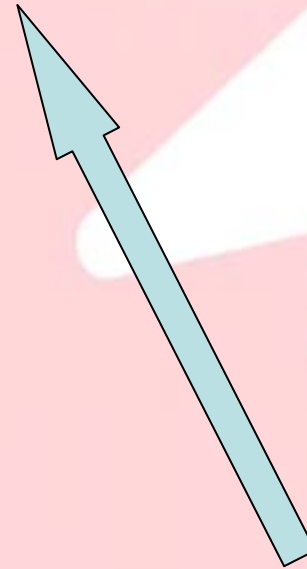
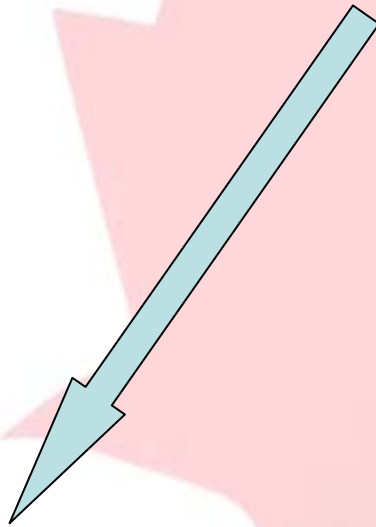
- **THESE THREE FACTORS ARE MUTUALLY INTERDEPENDENT**
- **SEPARATE DEVELOPMENT IS INEFFECTIVE AND VERY EXPENSIVE**

**Recreation**

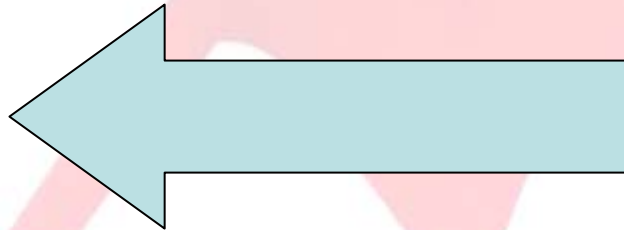
**Physical Education  
School Sports**



**High Performance Sport**



**Recreation**

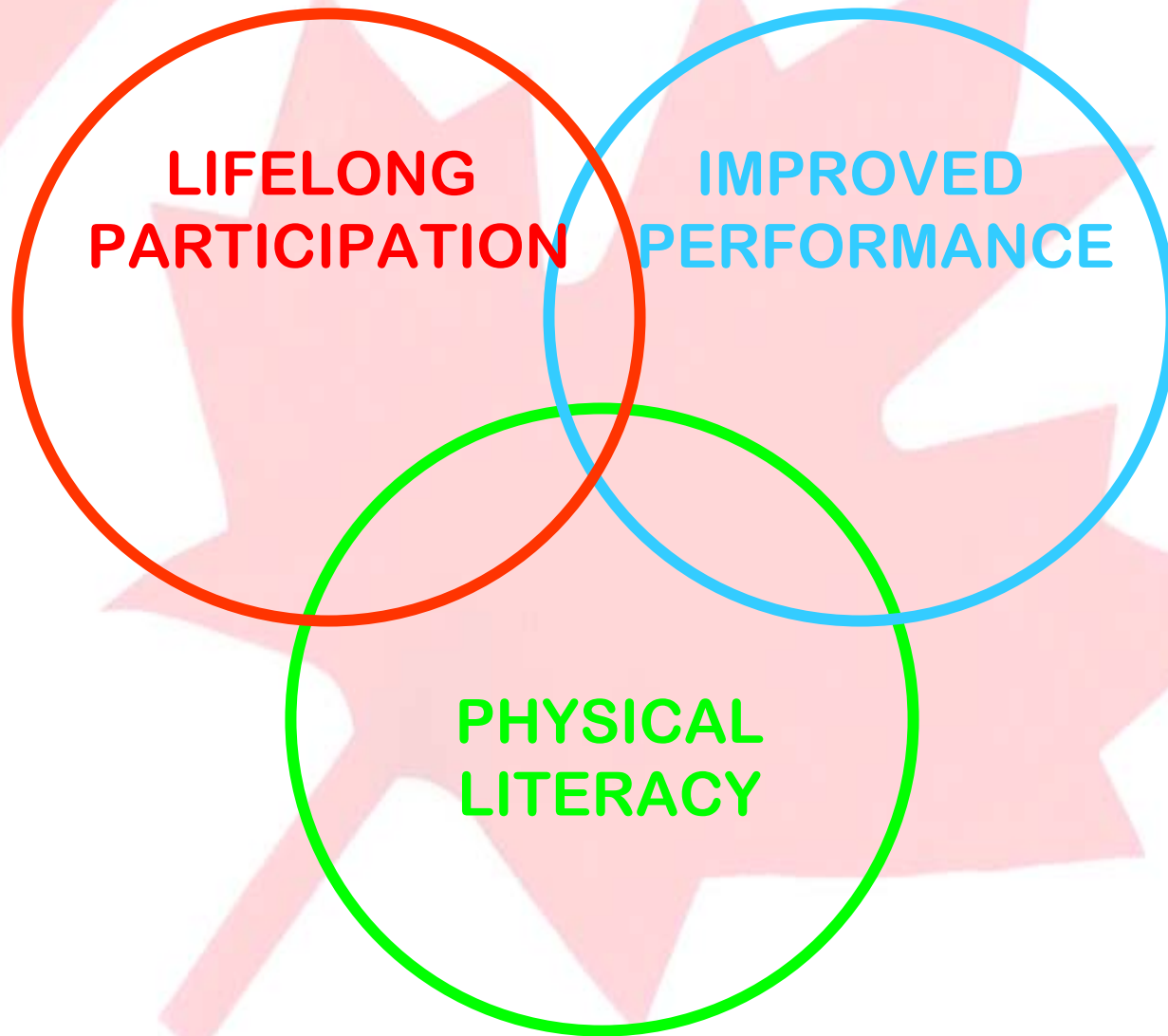


**Physical Education  
School Sports**

**Knowledge Base = Physical Literacy**



# THE THREE KEY OUTCOMES





# Another Level of Integration

- Political system alignment - provincial and federal levels
  - Sport
  - Health
  - Education
- Long-term Athlete Development (LTAD) is a tool for all the alignments



# Universal Sport System Gaps

( “Mind the gap ! “)





# Selected Universal Sport System Gaps

- Young developmental athletes undertrain and overcompete
- Adult competition schedule is superimposed on young athletes (the system of competition)
- Adult training programmes are superimposed on young athletes
- Male programmes are superimposed on females



# Selected Universal Sport System Gaps

- Chronological age versus biological age (or maturation level) dominates training and competition designs from ages 11 to 16
- The "critical" or "sensitive" periods of accelerated adaptation to training are not utilized by coaches at the Learning to Train or Training to Train stage



# Universal sport system gaps

- The most knowledgeable coaches are coaching at elite level, notwithstanding the most knowledgeable coaches should work at the developmental level (FUNdamental, Learning to Train and Training to Train Stages)
- Coaching education marginally covers the basic issues of growth and development, maturation



# Universal sport system gaps

- Parent's education is neglected with regards to long-term athlete development (nutrition, regeneration, maturation and psycho-social development, etc...)
- Administrators education is neglected with regards to some of the essentials of technical programmes (The Big Picture)
- Lack of the integration of sport science, sport medicine and sport-specific technical-tactical activities



# Universal sport system gaps

## Consequences

- Overcompetition and undertraining\*
- Damage done between age 6-10 and 10-16 cannot be fully corrected (players / athletes will never reach genetical potential)
- General motor skills are not learned before age 11 for females and 12 for males



# Universal sport system gaps

## Consequences

- Training is geared for "outcome" and not for "process" for the developmental athlete
- National Training or Sport Centres receiving mediocre athletes - regardless of money and expertise, cannot recover from the "damages" of earlier training
- Feeding systems - with Screening, Talent ID and Selection are lacking



# Why LTAD ?



Kate Pace World - Champion – Downhill  
Kerrin-Lee Gartner – Olympic Gold - Downhill



# What is LTAD ?

- LTAD is not just another **plan** (for the files)
- LTAD is a **philosophy**
- LTAD is a vehicle for **change**, culture change in sport





# LTAD...



- Identifies the current **gaps** in the sport system and provides guidelines for problem **solving**
- Is a guide for **planning** for optimal performance for **all stages** of athlete development
- Is a framework for full sport **system** alignment and **integration**
- It is designed on empirical / practical coaching experiences and on scientific principles

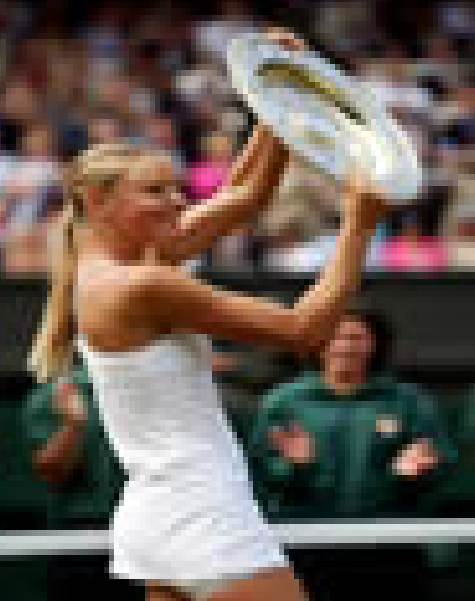


# LTAD is

- Optimal training, competition and recovery programming with relation to biological development and maturation
- Equal opportunity for recreation and competition
- Athlete centred, coach driven and administration, sport science and sponsor supported

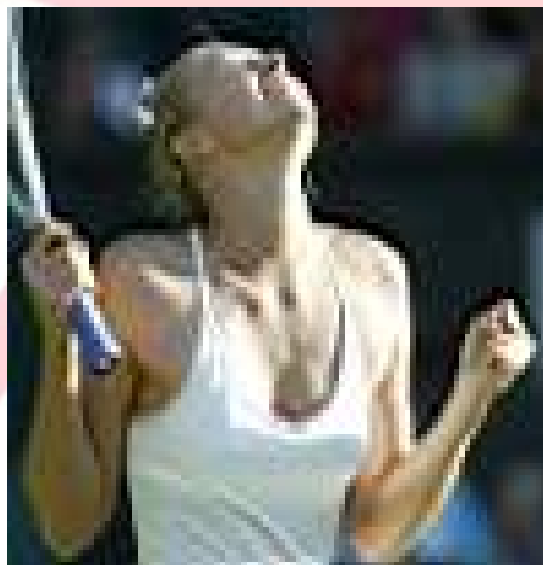






**Maria**

# Wimbledon 2004



**Sharapova**

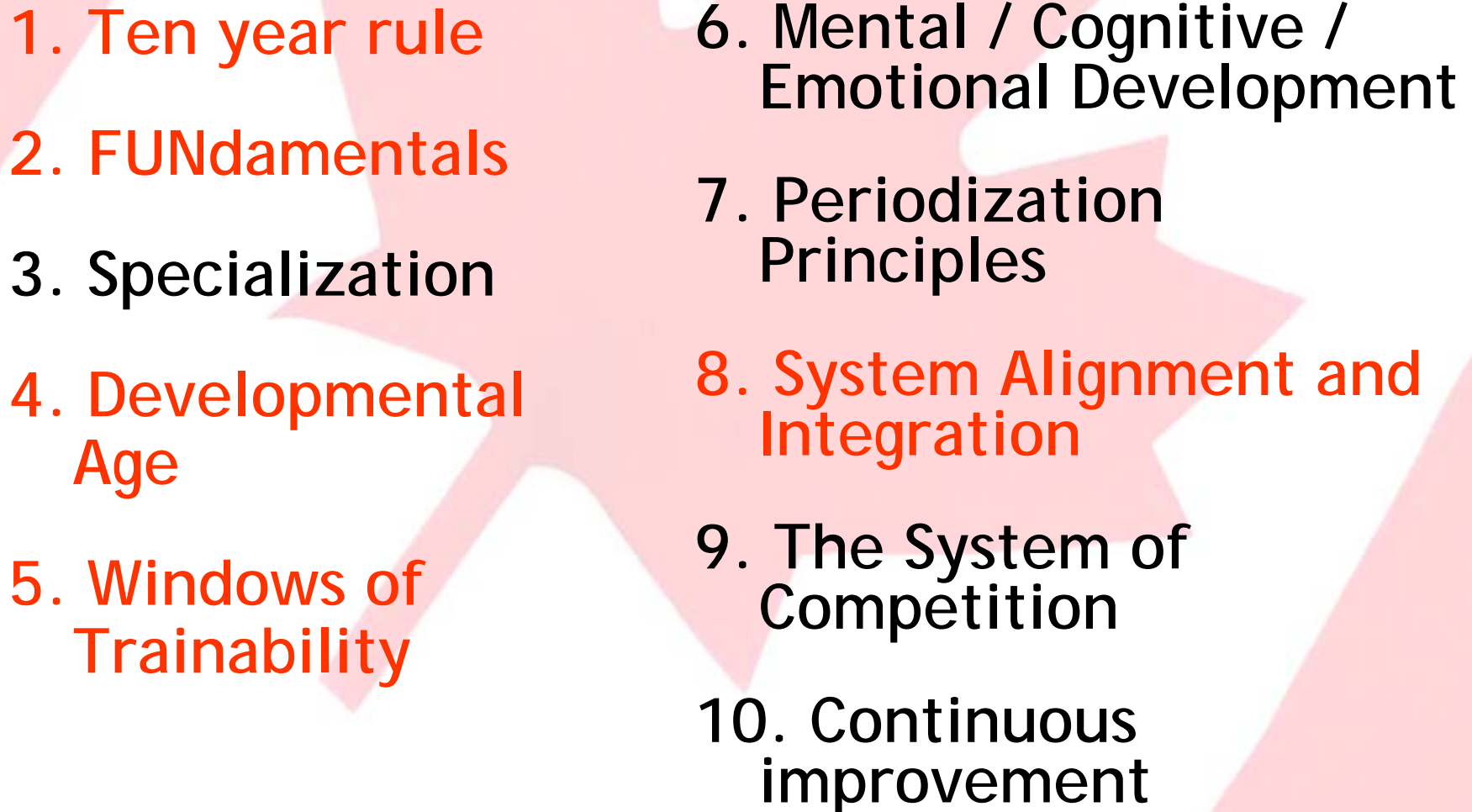






# 10 Key Factors Influencing LTAD

(Balyi, Cardinal, Higgs, Norris & Way - 2005)

- 
- 
1. Ten year rule
  2. FUNdamentals
  3. Specialization
  4. Developmental Age
  5. Windows of Trainability
  6. Mental / Cognitive / Emotional Development
  7. Periodization Principles
  8. System Alignment and Integration
  9. The System of Competition
  10. Continuous improvement



# Factor 1 10 Year Rule



10 years

10 thousand hours

10 %

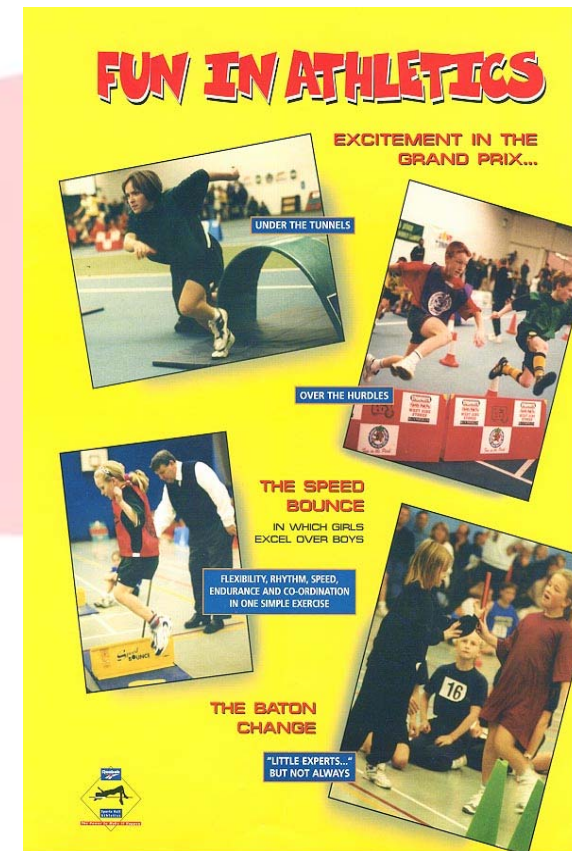
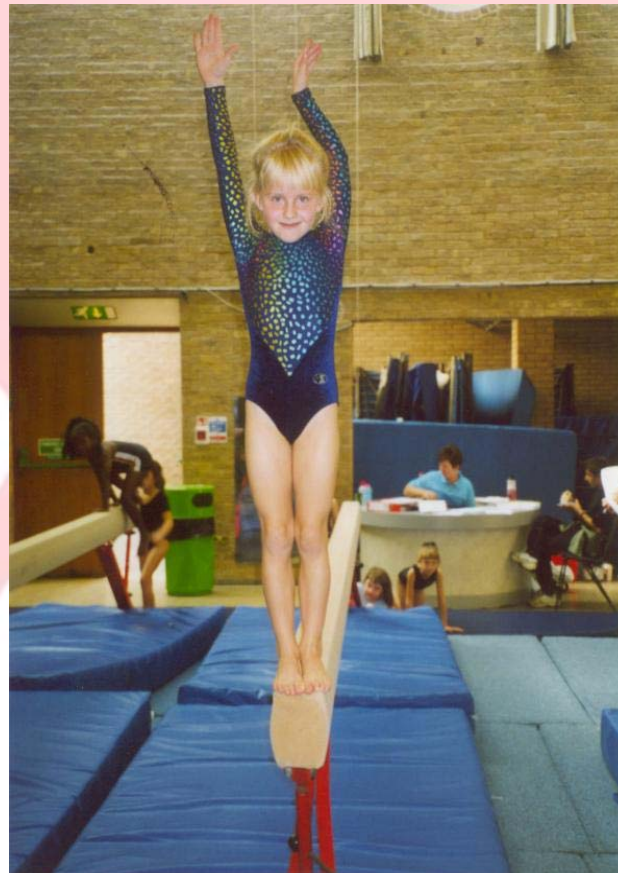


## 10 - 10 - 10

- 10 year or 10 000 hour rule (Ericsson and Charness, 1994 and Salmela et al., 1999)
- For the athlete and coach this translates as slightly more than three hours of deliberate practice daily for 10 years
- 10 %
- 90 % ???



# Factor 2 FUNdamentals





- FUNdamental movement skills (FMS)
- FUNdamental sports skills (FSS)
- FMS+ FSS = Physical literacy
- Before age 11 for females and 12 for males





# What Fundamentals?



*Fundamental Movement Skills*



## Factor # 4. Developmental Age or G & D

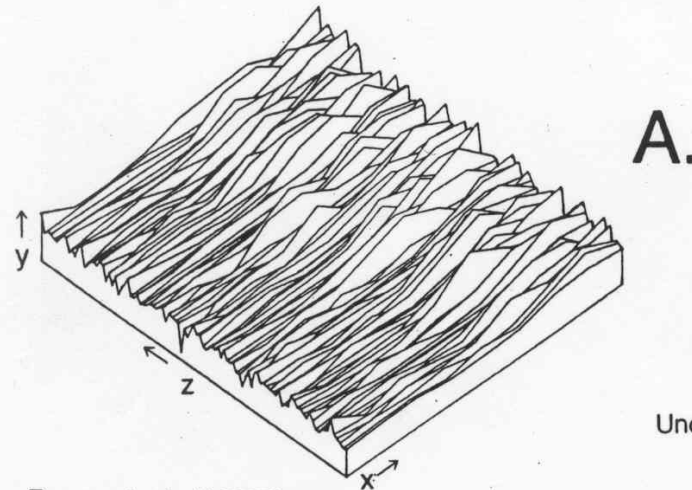




## STANDING HEIGHT VELOCITY

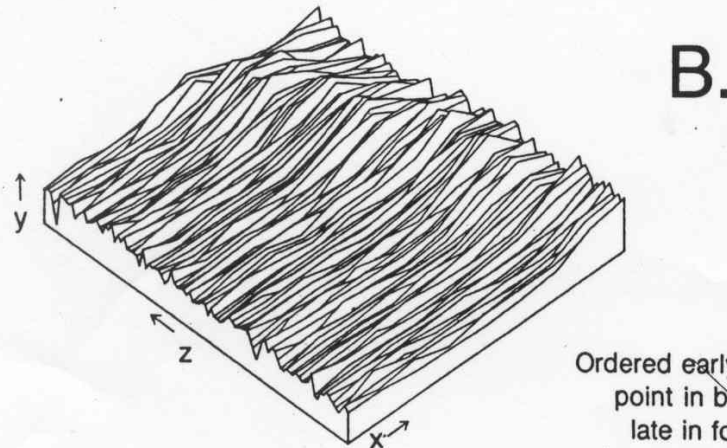
### SASKATCHEWAN BOYS

Age 7 to 16 years on X axis, cm per year on Y axis, and subjects on Z axis.



Unordered.

Ross et al. (1977)



Ordered early peak velocity  
point in background,  
late in foreground.

Fig. 6.21 Tri-dimensional graph of 100 boys from Saskatchewan Growth Study. (Leahy et al., 1980)



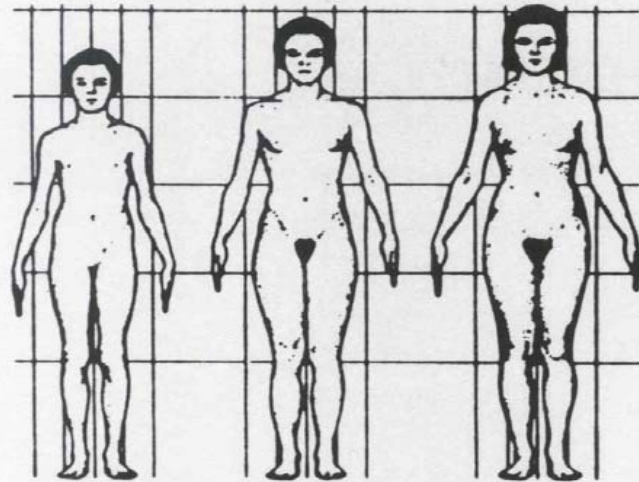
# Choosing early, average or late maturers?

Figure 1

Age: 12.75 Years

12.75 Years

12.75 Years



Pre-puberty  
Late maturer

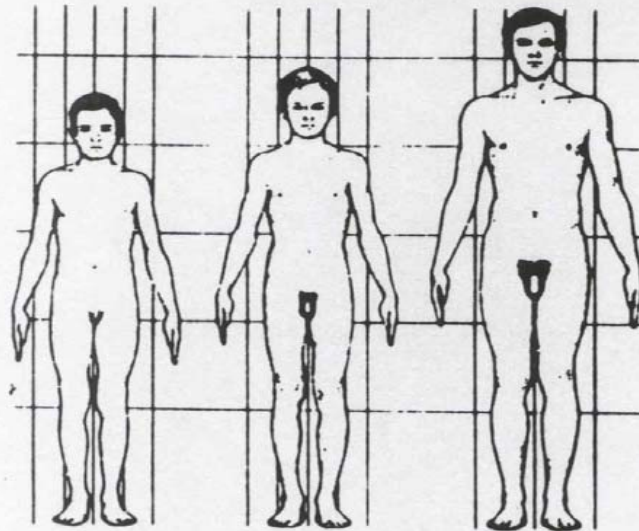
Mid-puberty  
"Average" maturer

Post-puberty  
Early maturer

Age: 14.75 Years

14.75 Years

14.75 Years



From "Growing Up" by J.M. Tanner. Copyright © 1973 by SCIENTIFIC AMERICAN, Inc. All rights reserved.



How old is a 13 year old ?





How old is a 14 year old ?





# Irish boxers – 14 years old 60kg., 40 kg., and 50 kg.





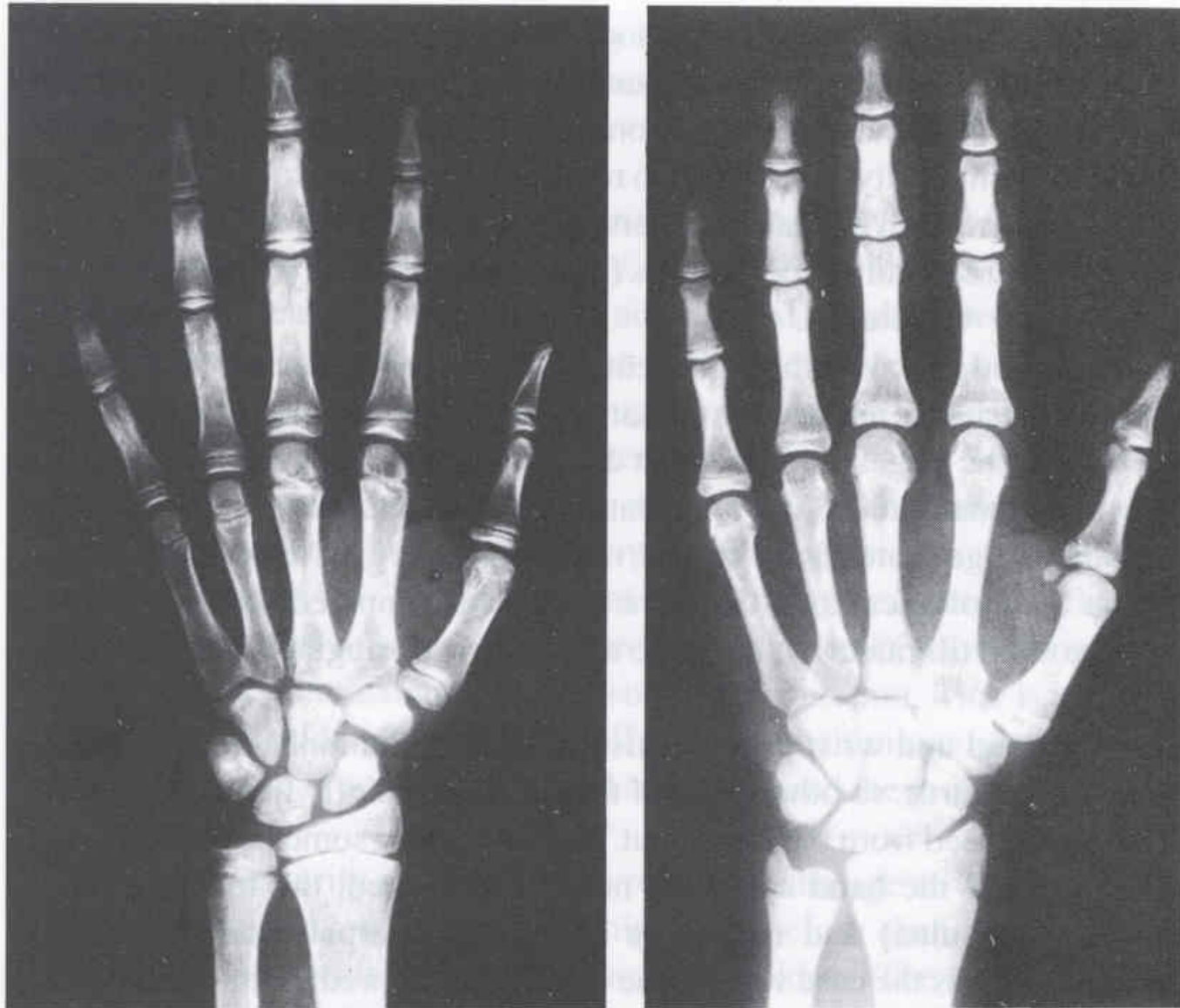


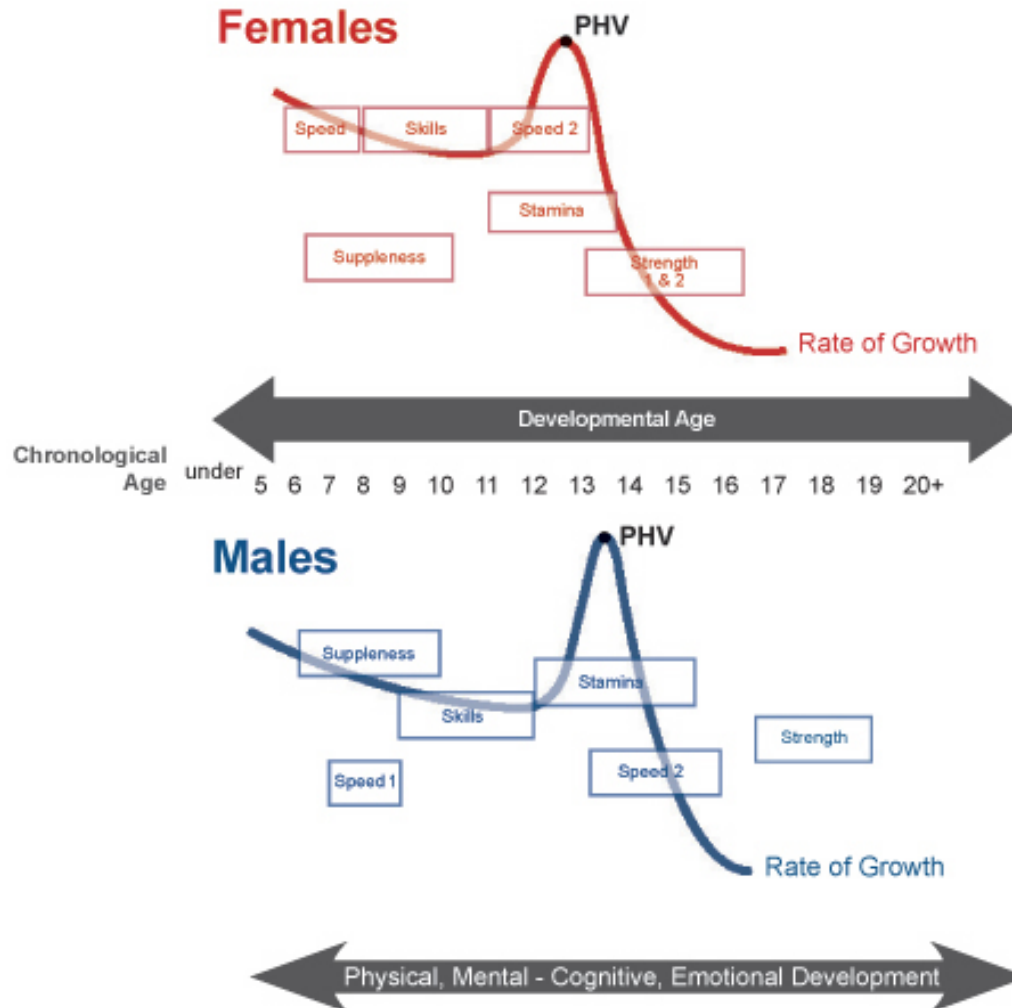
Figure 29 Radiographs of two boys both aged 14.0 years: (left) bone age 12.0 'years'; (right) bone age 16.0 'years'



# Factor 5.

## Windows of Trainability

Pacific Sport - Optimal Windows of Trainability (Balyi and Way 2005)





# System Alignment - Integration

## *Performance Priorities*

- Athlete  
Performance & Support
- Coach  
Education & Support
- Competition
- Equipment
- Facility Access
- Sport Medicine
- Sport Science
- Talent ID - Scouting
- Teams  
Nat. Prov. Club
- Training
- Research



## *System Development*

- Clubs
- Community Initiatives
- Communications
- Facilities Plans
- Financial Sustainability
- Governance
- Games (Intl. Nat. Prov.)
- Event Hosting
- Human Resource
- Marketing
- Organizational
- School Sport Academies
- Risk Management
- Sport Sector
- Technology
- Volunteers

**Playground to Podium**



# Coaching certification and long term athlete development

## Long Term Athlete Development



Canada's Long Term Athlete Development process is designed to maximize sport performance and contribute to the long-term health of Canadians. For greater detail see the document, "Canadian Sport for Life".

Based on an idea from S. Norris, (2005)

## New Coaching Certification Program



## Where sport takes place



The new National Coaching Certification Program is a program of the Coaching Association of Canada who can be contacted for additional details

There are many contributors to the Canadian sport system and the above list is designed to provide examples only



# Seven Stages of Long-Term Athlete Development

Active Start

FUNDamental

Learning to Train

Training to Train

Training to Compete

Training to Win

Active for Life





# Active Start Stage

Chronological Age  
Males and Females: 0-6

## *Fundamental Movements*

*Gymnastics*  
*Swimming*  
*Running*  
*(Wheeling)*





# FUNdamental Stage

Chronological/ Developmental Age

Males 6-9 and Females: 6-8

## *Fundamental Movements Skills +*





# Learning to Train Stage

Chronological/ Developmental Age

Males: 9-12 Females: 8-11

## *Fundamental Sport Skills*





# Physical Literacy

*First 3 stages of LTAD*

Developmental Age - before onset of PHV

*Fundamental Movement skill*

+

*Fundamental Sport Skills*

=

*Physical Literacy*

=

*Excellence & Participation*

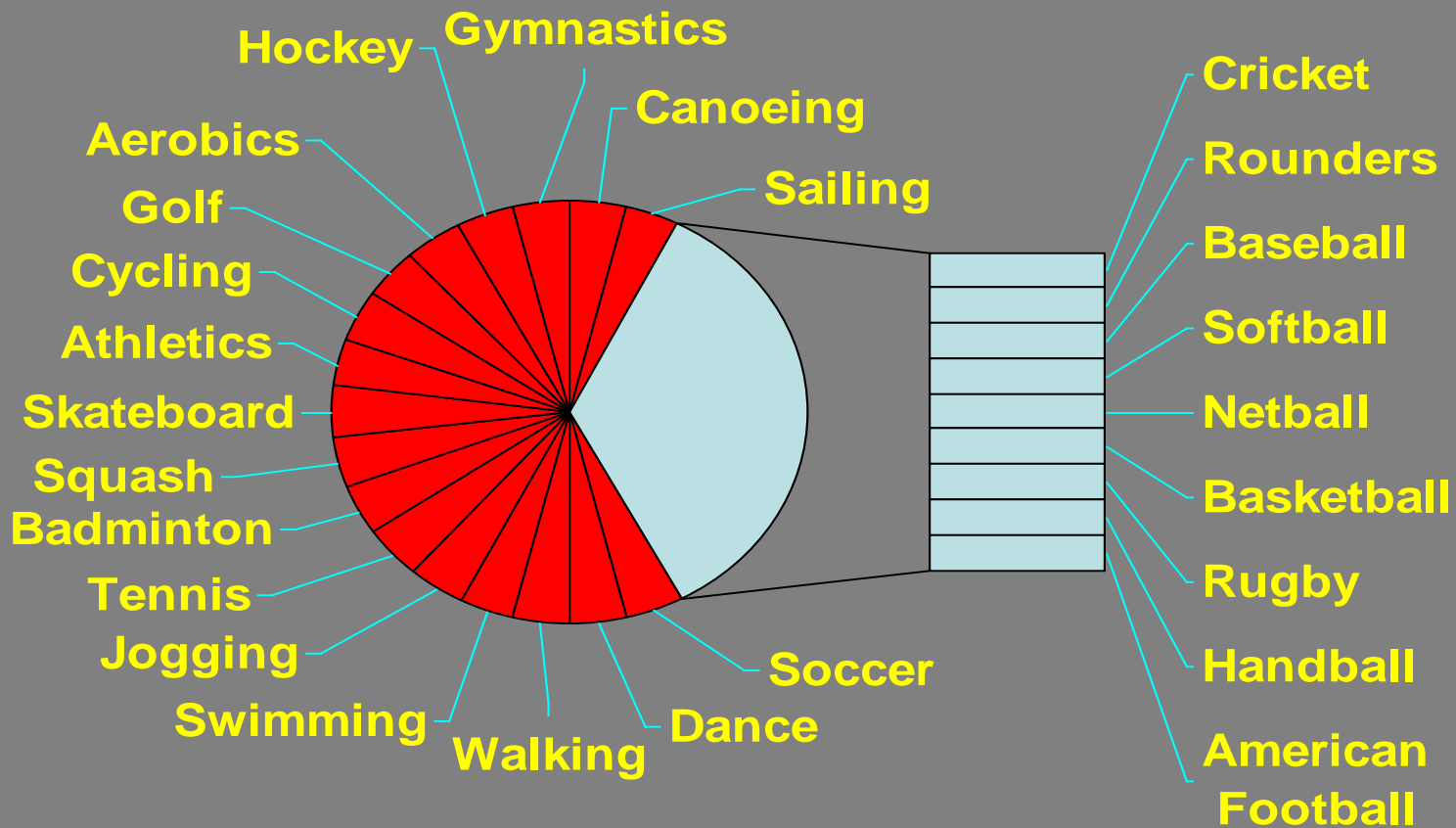


# CAN'T CATCH?

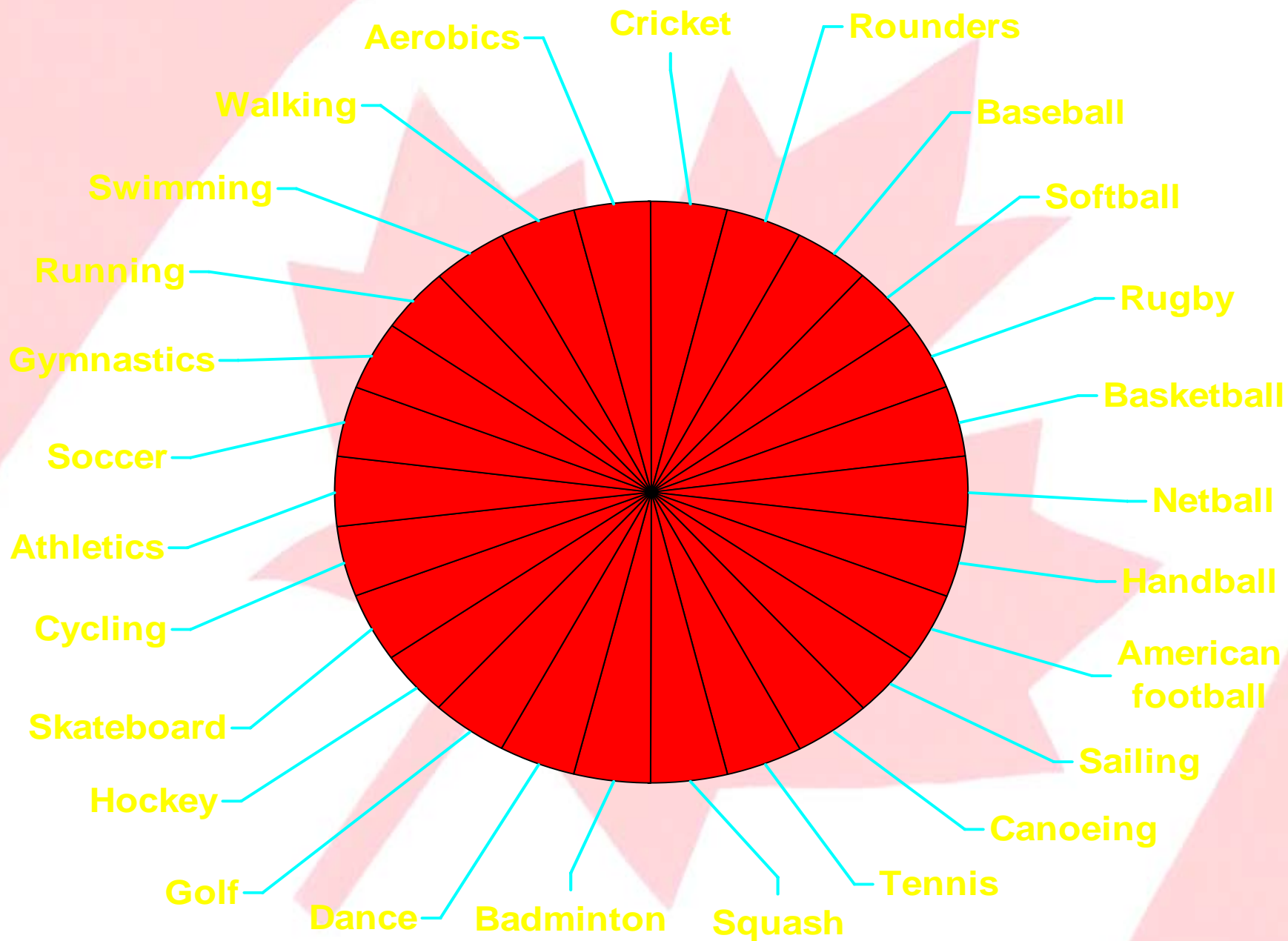




# Can't Catch? – Won't play!













# Training to Train

Developmental Age - onset of PHV

Males: 12-16 Females: 11-15

*Building engine  
and  
sport specific skills*





# Training to Compete

Chronological Age

Males: 16-23 +/- Females: 15-21 +/-

*Optimizing engine  
and  
sport / event /  
position skills*





# Training to Win

Chronological Age

Males: 19 +/- Females: 18 +/-

*Maximizing engine  
and  
event / position  
skills*

**PODIUMS**





# Active for Life

Enter at any age

*Healthy  
Life-long  
Physical  
Activity*





# Active for Life



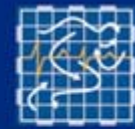


**insanity**

doing the same  
thing over and  
over and expecting  
different results



# The Long-Term Player/Athlete Development Model (LTPAD)



NATIONAL  
COACHING & TRAINING  
CENTRE



## The six phases of LTPAD

- 1. FUNdamental** - build overall motor skills
- 2. Learning to Train** - learn all fundamental sports skills
- 3. Training to Train** - build 'the engine' and consolidate sport-specific skills
- 4. Training to Compete** - fine-tune 'the engine', skills and performance
- 5. Training to Win** - maximise performance, skills and 'engine'
- 6. Retirement / Retainment** - adjustment/retain players/athletes for coaching/ administration





Figure 2.

**The LTPAD Model  
within the Irish Sport System**





# Basketball Long-term Player/Athlete Development Model



## The six phases of LTPAD in Basketball

- 1. FUNDamental** - build overall motor skills
- 2. Learning to Train** - learn all fundamental sports skills, including basketball skills
- 3. Training to Train** - build 'the engine' and consolidate basketball-specific skills
- 4. Training to Compete** - fine-tune 'the engine', position-specific skills and performance
- 5. Training to Win** - maximise performance, position-specific skills and 'engine'
- 6. Retirement / Retainment** - adjustment/retain players/athletes for coaching/ administration



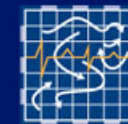
# Soccer Long-term Player/Athlete Development Model



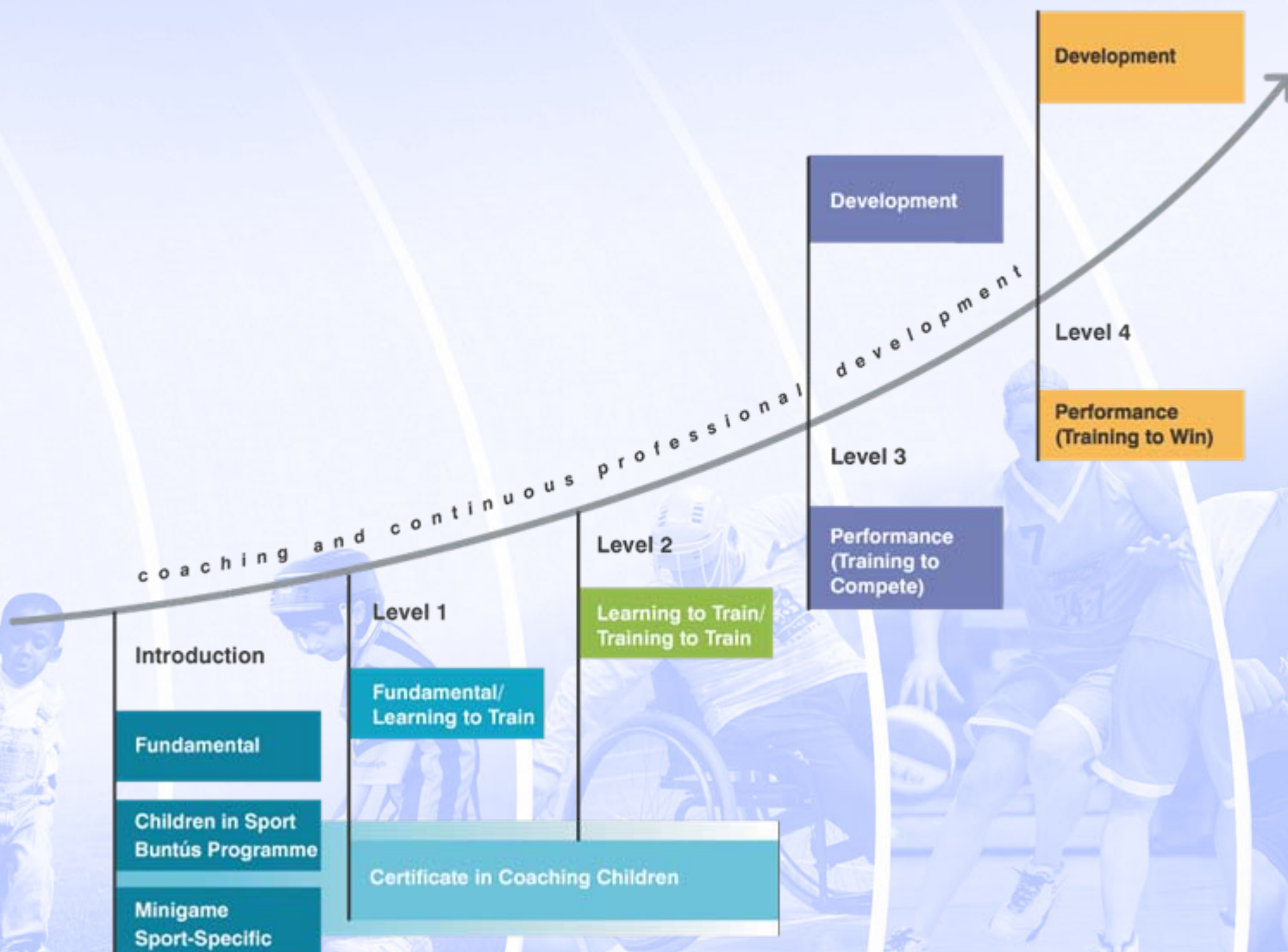
## The six phases of LTPAD in Soccer

- 1. FUNdamental** - build overall motor skills
- 2. Learning to Train** - learn all fundamental sports skills, including soccer skills
- 3. Training to Train** - build 'the engine' and consolidate soccer-specific skills
- 4. Training to Compete** - fine-tune 'the engine', position-specific skills and performance
- 5. Training to Win** - maximise performance, position-specific skills and 'engine'
- 6. Retirement / Retainment** - adjustment/retain players/athletes for coaching/ administration





# NATIONAL COACHING & TRAINING CENTRE







**SPORT**  
**ENGLAND**



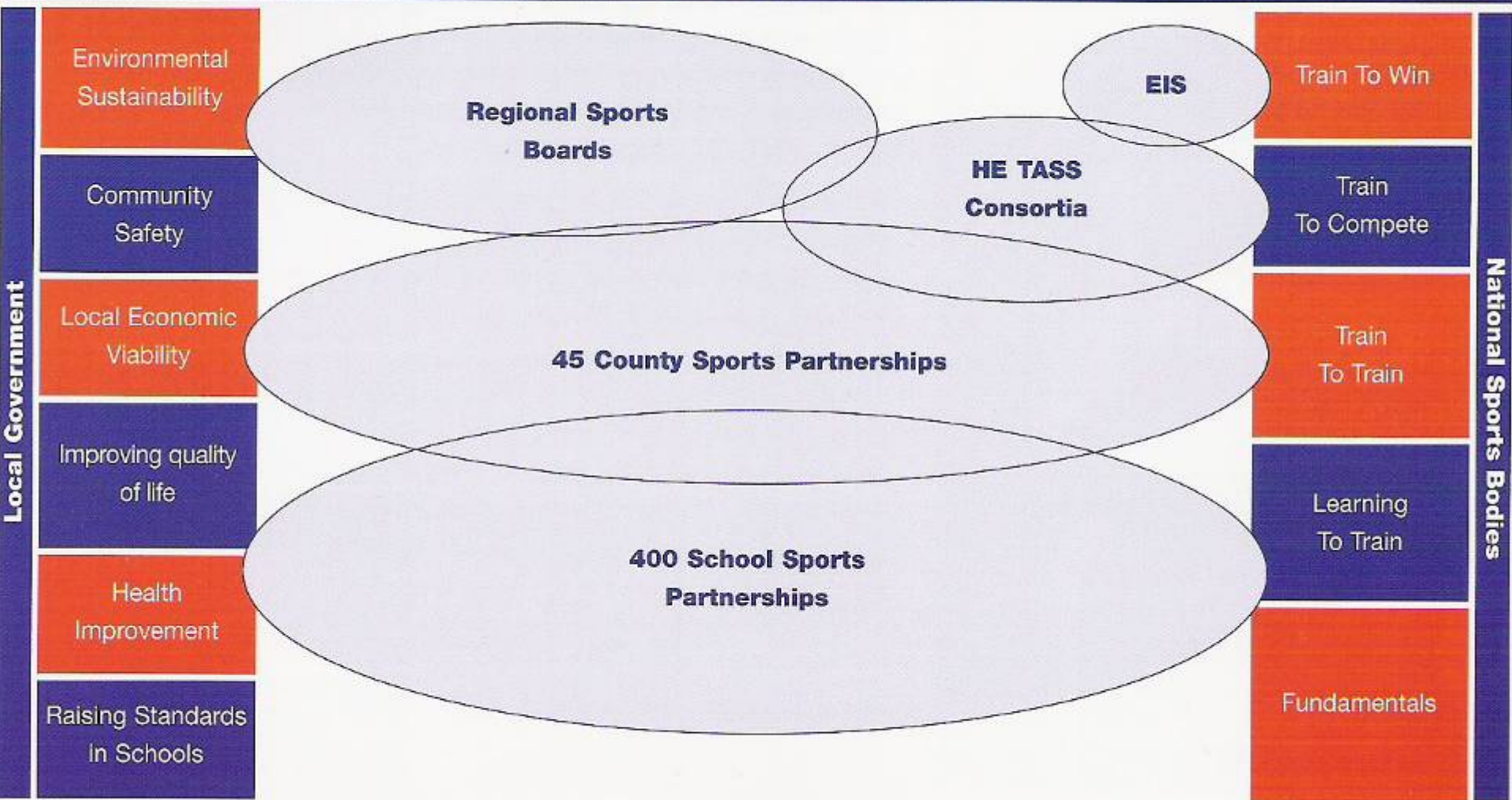


## **THE FRAMEWORK FOR SPORT IN ENGLAND**

MAKING ENGLAND AN ACTIVE AND  
SUCCESSFUL SPORTING NATION:  
A VISION FOR 2020



## Sport England: Strategic leadership for sport



**Figure 16** Bridging the gap between national and local



# LTAD Delivery Framework

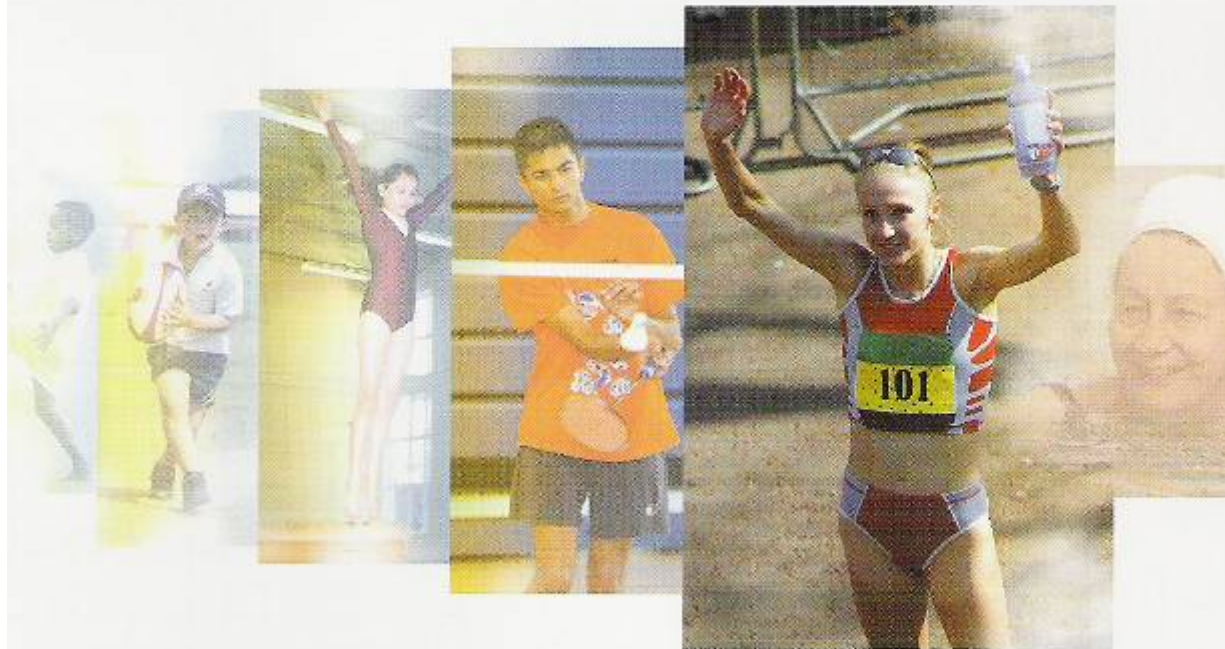




# PREPARING FOR A LIFE IN SPORT

A GUIDE TO GOOD PRACTICE FOR ALL PEOPLE INVOLVED IN SPORT

Administrators • Athletes • Coaches • Officials • Parents • Performers • Players • Teachers



Fundamentals • Learning to Train • Training to Train • Training to Compete • Training to Win • Retainment

LONG-TERM ATHLETE DEVELOPMENT (LTAD)



# COACHING FOR LONG-TERM ATHLETE DEVELOPMENT:

TO IMPROVE PARTICIPATION AND PERFORMANCE IN SPORT



IAN STAFFORD



# Player Improvement

A consultation paper on the introduction of a Long-term Player Development pathway, and its implications for strengthening the infrastructure of Scottish sport.



**sport**scotland



**INTERNATIONAL WORKSHOP**  
**INTERNATIONAL ATHLETIC FOUNDATION**



**The Future of Youth Athletics**

Madrid, Spain  
22/23 September 2002



**AGES: 16/17 onwards**  
**PRIORITY: WINNING**



### WHAT TO LEARN WINDOWS OF OPPORTUNITY

#### PHYSICAL (DEPENDENT ON MATURITY)

- individual programmes for speed, endurance, power, strength, flexibility, core stability

#### TECHNICAL

- all shots with power and spin as appropriate
- full use of variation and different strokes

#### TACTICAL

- using strengths
- controlling points
- able to adjust tactics

#### MENTAL

- fully independent
- positive and disciplined
- self responsible

#### OTHER SPORTS FOR RECREATION, MAINTENANCE etc.

- hockey, basketball, soccer, swimming etc.

#### TYPE OF COMPETITION

- club, league, county and national

#### NUMBER OF TOURNAMENT MATCHES PER YEAR

- at age 16 maximum of 90 individual matches

#### PLANNING (ANNUAL)

- 3 periods of training with 3 periods of competition
- 30 hours of activity in a training week at age 16, to include 17 hours of tennis

## General information

Our primary concern must be to give each young player the best possible chance of reaching their potential at whatever level that might be – club, county, national or even international standard. We know that developing that potential takes a long time – this is why we need the Long Term Player Development Programme. The Space Between 6 AND 16 is a critical time because it sets the base for the adult player.

This leaflet identifies what is important for young players to learn at different ages and stages of their tennis development. It gives the skills that should be learned at the prime learning times – the Windows of Opportunity. We know that using these Windows accelerates learning. We also know that if the Windows are missed, it is then more difficult for players to extend their skill base as they mature, because simple skills are not in place.

In addition, this leaflet identifies:

- other sports which contribute to the skill base
- the most suitable type of competition for each age
- how many tournament matches should be played each year
- how each year should be structured between training and competition

The training programme in this leaflet is based on a sound understanding of the principles of child and tennis development. If we use the information well, every young player stands a chance of reaching his or her potential.

Parents are so important in the development of the young tennis player. We hope that the information given in this leaflet will help your understanding and ability to guide the players of the future.

Anne Pankhurst  
LTA Coach Education Director

# THE SPACE BETWEEN 6 AND 16 PLAYER DEVELOPMENT



Guidance notes for  
parents of young  
tennis players between  
the ages of 6 and 16

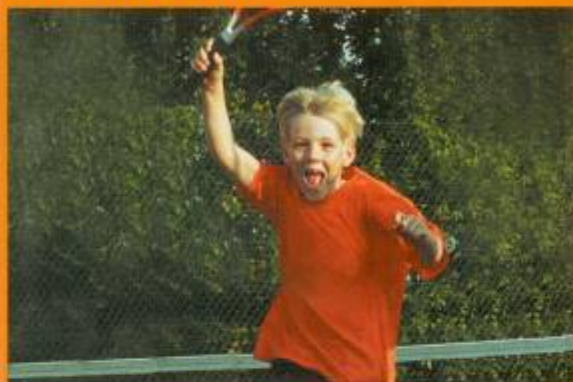


The Lawn Tennis Association



# AGES: 5/6 - 9/10

PRIORITY: FUN



## WHAT TO LEARN WINDOWS OF OPPORTUNITY

### PHYSICAL

- co-ordination
- movement and balance
- throwing, jumping, running

### TECHNICAL

- basic shapes forming

### TACTICAL

- serving, returning and playing from back of court
- accuracy and consistency

### MENTAL

- how to score
- winning and losing
- respecting other players

### OTHER SPORTS FOR CO-ORDINATION etc.

- swimming, cycling, dancing
- soccer, netball etc.

### TYPE OF COMPETITION

- fun, teams, local, Mini Tennis
- tie breaks and short sets

### NUMBER OF TOURNAMENT MATCHES PER YEAR

- at age 8/9 maximum of 20 individual matches

### PLANNING (WEEKLY)

- 5 hours of activity at 6/7
- 9 hours of activity at age 9
- structured programme of 2 - 4 tennis sessions

# AGES: 9/10 - 12/13

PRIORITY: TRAINING



## WHAT TO LEARN WINDOWS OF OPPORTUNITY

### PHYSICAL

- complex co-ordination
- speed, strength, flexibility, core stability

### TECHNICAL

- basic strokes sound with racket head speed

### TACTICAL

- all games situations and doubles

### MENTAL

- understanding ability and effort
- more independent
- able to concentrate
- working with others in practice
- coping with winning and losing

### OTHER SPORTS FOR CO-ORDINATION etc.

- swimming, cycling, dancing
- soccer, netball, basketball, hockey etc.

### TYPE OF COMPETITION

- full sets
- club, league, county and national

### NUMBER OF TOURNAMENT MATCHES PER YEAR

- at age 11 maximum of 40 individual matches

### PLANNING (ANNUAL)

- 2 periods of training with 2 periods of competition
- 12 hours of activity in a training week at age 11, to include 5 hours of tennis

# AGES: 12/13-16/17

PRIORITY: COMPETING



## WHAT TO LEARN WINDOWS OF OPPORTUNITY

### PHYSICAL (DEPENDENT ON MATURITY)

- speed, strength, flexibility, endurance, core stability

### TECHNICAL

- developing power and use of spin
- different additional strokes

### TACTICAL

- playing offensively
- own games style
- tactics on different surfaces

### MENTAL

- able to set goals
- self-disciplined
- concentrates well
- pride in performance

### OTHER SPORTS TO HELP SPEED AND ENDURANCE etc.

- swimming, cycling, dancing
- soccer, netball, basketball, hockey etc.

### TYPE OF COMPETITION

- club, league, county and national

### NUMBER OF TOURNAMENT MATCHES PER YEAR

- at age 14 maximum of 70 individual matches

### PLANNING (ANNUAL)

- 3 periods of training with 3 periods of competition
- 24 hours of activity in a training week at age 14, to include 12 hours of tennis



# The Swimmer Pathway

LONG TERM ATHLETE DEVELOPMENT

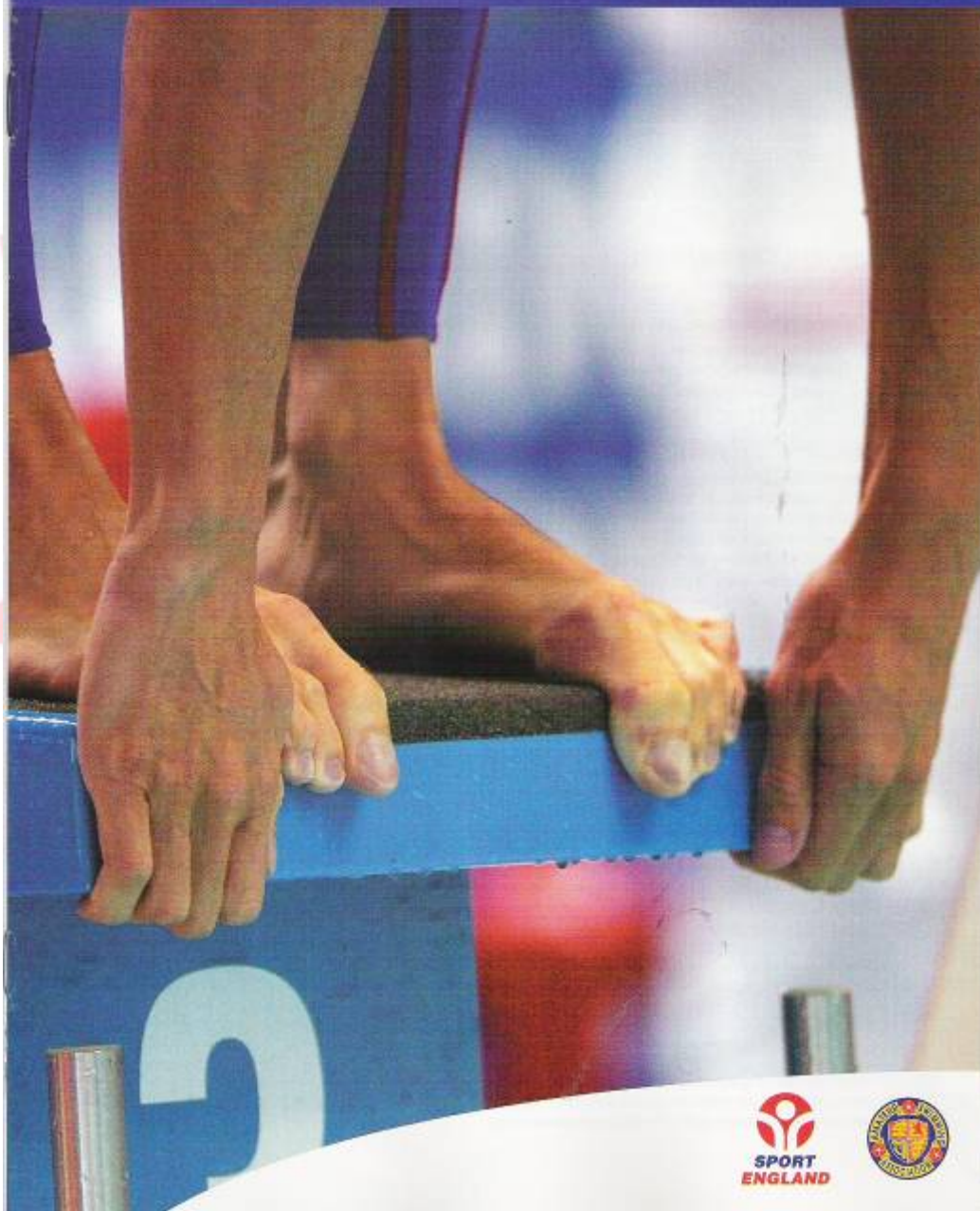


Endorsed by British Swimming  
[www.britishswimming.org](http://www.britishswimming.org)



# Success is Long Term

Long Term Athlete Development related to the Journey through Swimming





# Badminton for Life!

*- from basics  
to brilliance*



**Long Term Athlete  
Development  
(LTAD) for Teachers**





# LONG TERM ATHELETE DEVELOPMENT



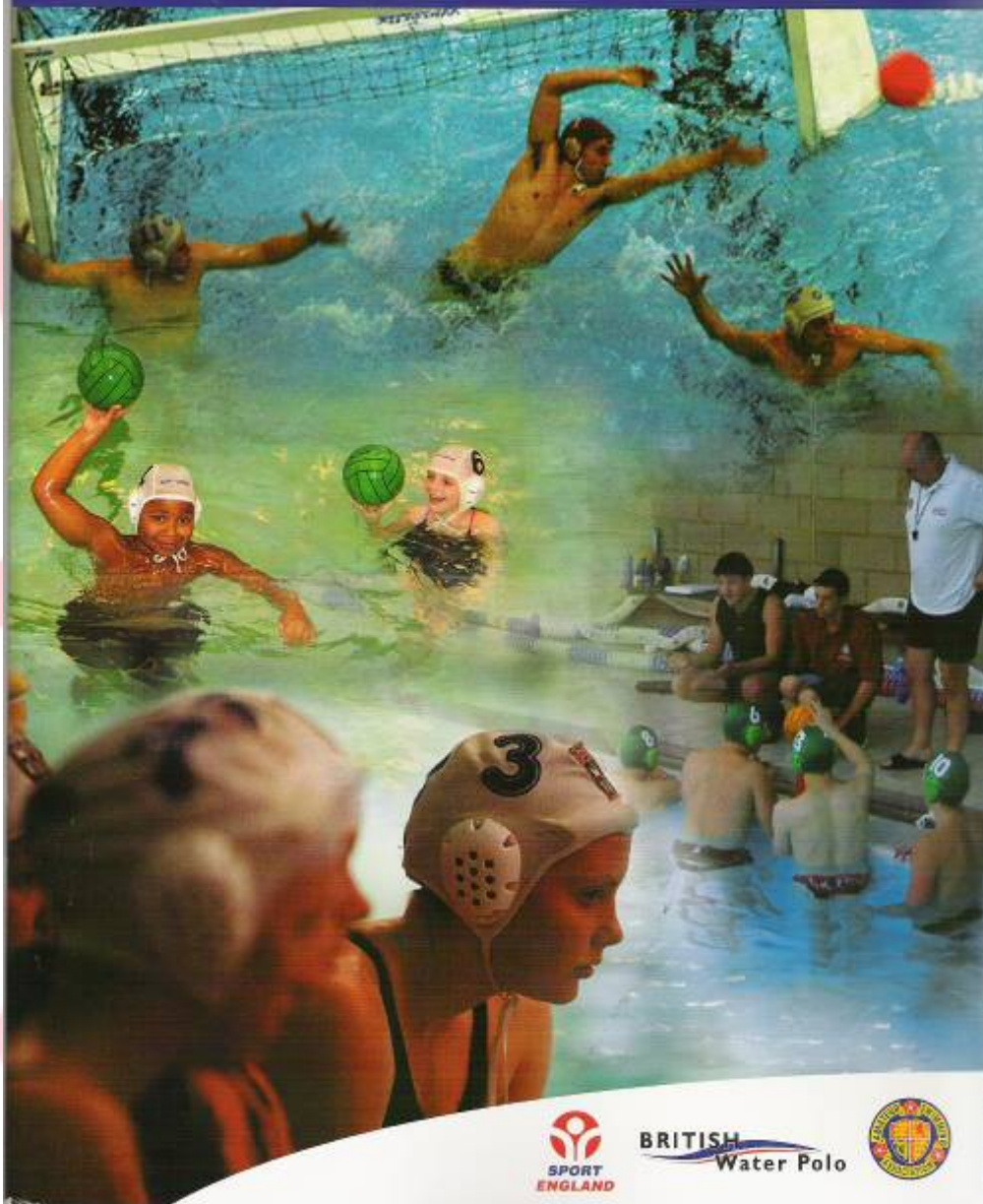
BRITISH  
Diving

FINAL DRAFT - APRIL 2005



# The Player Pathway

The ASA Long Term Athlete Development (LTAD) framework for Water Polo



BRITISH  
Water Polo







**Canadian Sport  
for Life**



développement à long terme de l'athlète

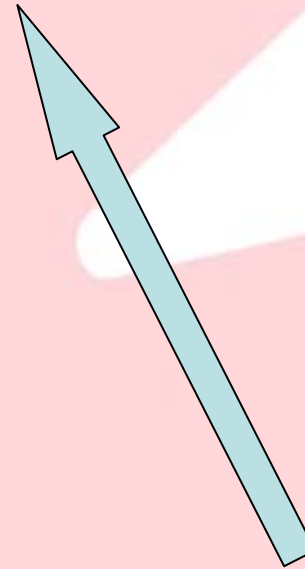
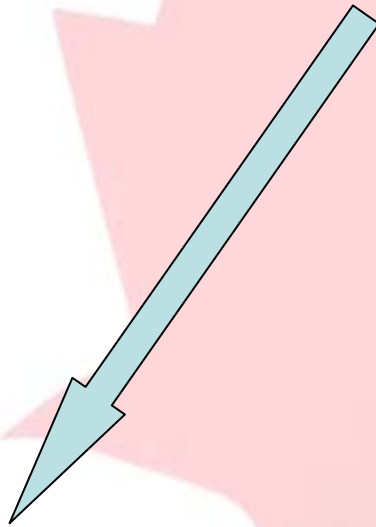


# Au Canada le sport c'est pour la vie

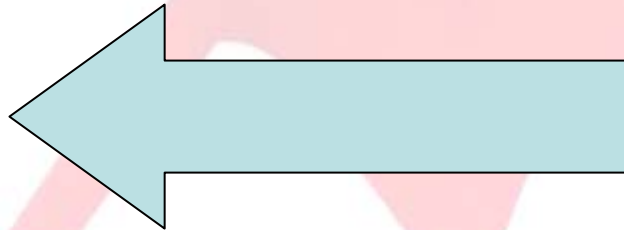
Publié par les Centres canadiens multisports



**High Performance Sport**



**Recreation**



**Physical Education  
School Sports**

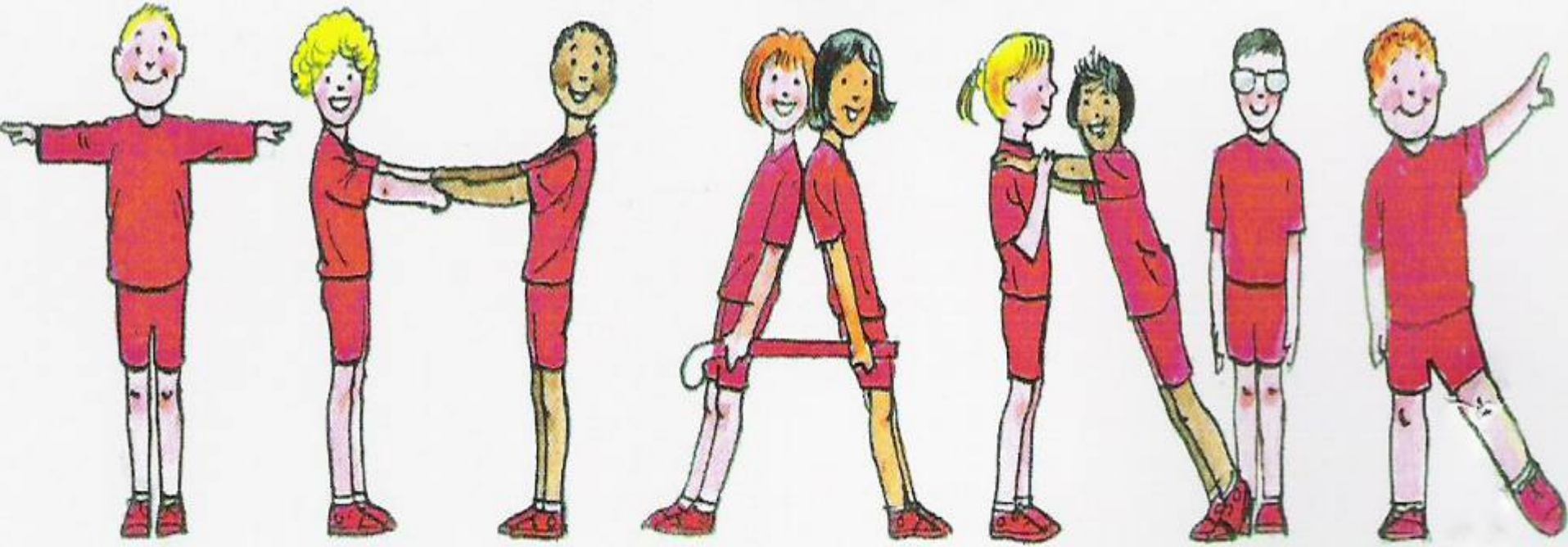
**Knowledge Base = Physical Literacy**



# Conclusion

- The first 4 stages of LTAD are as important as the Training Compete and Training to Win stage.
- If training, competition and recovery are not optimized at the early stages the “deficit” created by this shortcoming is such - that athlete will never reach genetic potential
- A feeding system should be developed by Elite Training Centers, or Sport Centers
- Screening, Talent ID and Selection is an integral part of the Elite Centers
- A generic and sport-specific pathway should be developed by sports to enhance athlete development





W. RUDLING

