Paradigm Shifts in Sport and Coaching

Vancouver, November 14, 2009

Istvan Balyi
National Coaching Institute BC
Sport Canada LTAD
Once a sprinter always a sprinter ...
NCI BC 35-40 hours
insanity

doing the same thing over and over and expecting different results
“The definition of insanity is doing the same thing over and over again and expecting different results.”

Albert Einstein
What is a Paradigm?

• An assumption
• A pattern
• An example
• Worthy of imitation
But what is a paradigm?

• Thomas Kuhn in his book “The Structure of Scientific Revolutions” (1996) describes paradigms as “the overall framework of basic assumptions used by scientists when they analyze and interpret their data.”
• The approach to athletic training has undergone radical changes over the last few decade.

• These changes are sometimes referred to as paradigm shifts.

• New paradigms for short and long-term athlete preparation, planning and periodisation are challenging coaches and sport administrators to rethink and restructure training, competition and recovery programmes
• Every coach has his / her paradigm of athletic preparation — as they plan and implement short and long-term programs
• Coaches often evaluate the value of their coaching paradigms based on athlete performance.

• If a coaching paradigm has been successful in the past, there is a tendency for the coach to continue to use it.

• However, history has shown that past success doesn’t guarantee future success.
Paradigm Shifts

- Paradigm # 1: Change: Constant Change!
- Paradigm # 2: Long-Term Athlete Development
- Paradigm # 3: Modern Periodization
- Paradigm # 4: Planning and Periodization for the Pubertal Athlete
- Paradigm # 5: The “Diminishing Returns” Phase
- Paradigm # 6: Modelling Quadrennial Plans
- Paradigm # 7: Taper and Peak
Paradigm Shifts

- Paradigm # 8. Female Athlete and Hormonal Adaptations
- Paradigm # 9: Stretching and Warm Up
- Paradigm # 10: Prehabilitation
- Paradigm # 11. Speed Training All Year Round
- Paradigm # 12: The Myth of the Aerobic Base
- Paradigm # 13: Ultra Short Interval Training
- Paradigm # 14: The Myth of Strength Training
Paradigm Shifts

- Paradigm # 15: Transfer of Strength – Complex training
- Paradigm # 16: Sustenance
- Paradigm # 17: Over-training or Under-recovery?
- Paradigm # 18: Hygiene – Immuno Reaction
- Paradigm # 19: Mental Preparation
- Paradigm # 20: The Eye of the Coach – “Blink” or Rapid Cognition
Paradigm Shifts

- Paradigm # 21: Ancillary Capacities
- Paradigm # 22: Parent’s Education
- Paradigm # 23: LTAD and NCCP Alignment
- Paradigm # 24: Integrated Sport Science Team
- Paradigm # 25: Kaizen – Continuous Improvement
Paradigm Shifts in Coaching # 1

Change – Constant Change
• Constant change
• Change is not easy
• We resist change
• Therefore mostly, we like to do what we are doing... “comfort zone”
• “Change is inevitable, progress is optional....”
• Change is a four letter word, change is FEAR!

• Organizations and individuals resisting change!

• Your past success guaranties nothing!
Paradigm Shifts in Coaching # 2

Long-Term Athlete Development
What is LTAD?

- 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
Au Canada le sport c’est pour la vie
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
10 Key Factors Influencing LTAD

1. Ten year rule
2. FUNdamentals / Physical Literacy
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

(Balyi, Ross & Way - 2005)
LTAD as a Paradigm Shift

- LTAD is optimal training, competition and recovery programming with regard to developmental age; LTAD takes into consideration early, average and late maturing athletes as well as Relative Age.

- Easily measurable Biological Markers helping decision making about the optimal content of training during puberty.

- LTAD exploits the sensitive periods of accelerated adaptation to training during pre-puberty, puberty and early post-puberty.
• LTAD is based on the concept of Physical Literacy, which provides the foundation for Life-long Physical Activity and High Performance Sports.

• LTAD programmes are characterized by developmentally appropriate training programmes and developmentally appropriate competition programmes by using “meaningful competitions”.

• LTAD uses adapted adult periodization principles and programmes to suit the need of developmental athletes thus provides for “proper pubertal periodization” (PPP).
• LTAD aims for full sport system alignment and aligns School Sport and Physical Education programmes with Recreational Physical Activity Programmes and with High Performance Programmes.

• LTAD aims for full system alignment and integration and aims to align the Health Sector and the Education Sector with the Sport Section.

• LTAD is a tool for change.
“Henry! Our party’s total chaos! No one knows when to eat, where to stand, what to . . . . Oh, thank God! Here comes a border collie!”
LTAD is the border collie of sport system building!

“Henry! Our party’s total chaos! No one knows when to eat, where to stand, what to . . . . Oh, thank God! Here comes a border collie!”
تطوير اللاعبين طويلاً المدى

الرياضة البحرينية من أجل الحياة

Bahrain Sport for Life
الرياضة البحرينية من أجل الحياة

Bahrain Sport for Life
تطوير اللاعبين طويل المدى

الرياضة البحرينية من أجل الحياة

Bahrain Sport for Life
JOIN US
The success of this new model depends on every stakeholder's commitment to making it work. Continued discussions and learning from one another as we put Utah Sport for Life strategies into practice can only strengthen the overall system. We hope that you will join UAF in using this guide as a tool for creating a better long-term athlete.
Paradigm Shifts in Coaching # 3

Modern Periodization

Integration and Sequencing of Sport Science, Sport Medicine and Sport-Specific Technical-Tactical Activities
"We should write that spot down."
• Literature: all “What is Periodization?”
  – Periods, Phases, Mesocycles and Microcycles..

• How to? Practically NOTHING on it!!!
  – Actually how compile and quantify an annual plan?

• Periodization is not a science but mostly and ART!
Paradigm Shifts in Coaching #4.

Planning and Periodization for the Pubertal Athlete
• Literature: “What is Periodization for the Pubertal Athlete?” – Missing or non-existent!

• “How to Periodize for the Pubertal Athlete?”
  – Missing or non-existent!

• Foundation of future excellence???

• Superimposing adult programs???
Influence of maturation:

Different patterns of system growth during childhood

Adapted from Scammon, 1930
Reactive Periodization

• Biological markers
• Monitoring the onset of the growth spurt, PHV and deceleration of growth is a must to design/adjust the plan
• Reacting to the velocity of growth
• Adjusting training, competition and recovery program designs and activities
• “Adolescent maintenance”
• Viru = “If there is a conflict between the long-term plan and competition demands, the first must take priority!”
“Adolescent maintenance”
• “develop children for and through sport must make the most efficient use of the most important development phases, which are pre-puberty, puberty and post-puberty”

• I would say “early post-puberty”

• (Albeit, 1998)
AGE

- Chronological age
- Skeletal age
- Developmental age
- Relative age
- Training age
- Sport-specific training age
Early, Average and Late maturers

Maturation de l’individu (hâtive, normale ou tardive)
There is an advantage and a disadvantage to be an early or late maturer!

Why?
About 30% of the population is early or late maturer.

About 5% of the population is very early or very late maturer!
Maturation de l’individu (hâtive, normale ou tardive)
Early, Average and Late Maturers
13 year old boys – Swimming Canada
Trainability:

- Based on chronological age:
  - Speed
  - Suppleness

- Based on developmental age
  - Skill
  - Stamina
  - Strength

- Biological markers
  - onset of PHV
  - PHV
  - onset of menarche
Critical Periods in the Development of Performance Capacity During Childhood and Adolescence

Atko Viru; Jaan Loko; Maarike Harro; Anne Volver; Livian Laaneots; Mehis Viru

Online Publication Date: 01 January 1999

To cite this Article: Viru, Atko, Loko, Jaan, Harro, Maarike, Volver, Anne, Laaneots, Livian and Viru, Mehis (1999) 'Critical Periods in the Development of Performance Capacity During Childhood and Adolescence', Physical Education & Sport Pedagogy, 4:1, 75 — 119

To link to this article: DOI: 10.1080/1740898990040106

URL: http://dx.doi.org/10.1080/1740898990040106
Maturity Events in Females

Rate of Height Growth (cm/year)

Age (years)

PHV

Onset of PHV

Menarche

Pubic hair

Breast

4  6  8  10  12  14  16  18
Developmental age - PHV

- How to measure?
- What to measure?
- When to measure?
- What tools to use for the measurements?
- Who should measure?
- How to administer measurement data?
The orbitale (O) is located on the lower or most inferior margin of the eye socket. The tragion (T) is the notch above or superior to the tragus or flap of the ear, at the superior aspect of the zygomatic bone. This position corresponds almost exactly to the visual axis when the subject is looking directly ahead.
www.ltad.ca

Over 700 download in one week

The Role of Monitoring Growth in Long-Term Athlete Development

Istvan Balyi & Richard Way

A Supplement to: Canadian Sport for Life
Paradigm Shifts in Coaching #5.

The Diminishing Returns Phase
(The power of law of practice)
• 12-15 weeks for senior top athletes (P. Tschene)
• 3 x 15 weeks or microcycle periods or “macrocycles”
• International swimming calendar 3 X 15 or 2 X 24
Delayed Onset of Training Effect

Diminishing Returns / Adaptation Reserves
(Balyi, 1997)

Schematical Illustration of Long-term Adaptation to Training

Training Age

Shorter delay

Longer delay
Diminishing Returns in Adaptation

Genetic Ceiling

Ancillary Capacities

Training Age
Planning...
12 Week Program - Traditional

- Rest
- Competition
- Taper
- Downloading
- Loading
12 Week Program - Mixed

- Rest
- Competition
- Taper
- Downloading
- Loading
12 Week Program - Downloading
(Only for Power Sports)

- Rest
- Competition
- Taper
- Downloading
- Loading
12 Week Program
Accumulation - Intensification

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NCI BC - Victoria

You taught me how to do it.
Thank you, Istvan so much!
Marek.
Dear [Name],

I salute the good work you've done. You have passed on invaluable instruction and key to success. I couldn't do it without you. Thank you so much.

-Marek Ploch
Two Macro Cycles of A Three Cycle Annual Plan

Macro 1 Dryland - Macro 2 Dryland and On-Water

Meso and Micro Cycle Distribution

- Build-Up
- Peak
- Taper
- Intensification
- Accumulation
Two Macro Cycles of A Three Cycle Annual Plan
Macro 1 Dryland - Macro 2 Dryland and On-Water

Volume and Intensity of Training
Third Macro of the 1997-98 Annual Cycle
Competitive Season

Meso and Micro Cycles

Acclimatization
Restoration
Intensification
Accumulation
Build Up
Peak
Taper
Third Macro of the 1997-98 Annual Cycle
Competitive Season

Volume and Intensity of Training and Competition
Paradigm Shifts in Coaching # 6.

Modelling Quadrennial Plans
% Contribution of the 5 S's
% Contribution of the 5 S's
Peak - Peak
Download - Model
Peak in Beijing and London
Experience in Beijing Peak in London
Peak
Build - Model
2004 - 2012

[Bar chart showing the peak years from 2004 to 2012 for London, Model, and Build with specific years and values.]
Paradigm Shifts in Coaching # 7.
Taper and Peak
• Taper – maximize fitness and fatigue differences (Bannister SFU, 1985).
• Very poorly understood by coaches and athletes.
Definition of taper

“A progressive, nonlinear reduction of the training load during a variable period of time, in an attempt to reduce the physiological and psychological stress of daily training* and optimize sports performance”


Mujika & Padilla, Sports Med. 30: 79-87, 2000
Summary of optimal tapering strategies

- Minimise fatigue AND IMPROVE fitness
- Maintain training intensity
- Reduce training volume by 60–90%
- Maintain training frequency at >80%
- Individualise taper duration between 4 and 28 days
- Use progressive, nonlinear tapering designs
- Expect performance improvements of ≈3% (range 0.5-6.0%)

What is a taper?

- **Expontential Taper (Fast Decay)**
- **Linear Taper**
- **Step Taper (Reduced Training)**
- **Expontential Taper (Slow Decay)**

Paradigm Shifts in Coaching # 8.

Female Athletes and Hormonal Adaptations

- Menstrual cycle
- Follicular phase
- Luteal phase

www.ltad.ca Dr. Vicki Harber
The Female Athlete Perspective
Summary of physiological and psychological fluctuations across the menstrual cycle.

**STRENGTH**
- **HIGH** Increased abdominal grip & long jump performance
- **LOW** Increased muscle endurance

**IMMUNE RESPONSE**
- **HIGH** Rapid decrease in immune cell populations following menstruation
- **LOW** Increased Monocyte & Lymphocyte cell populations

**WATER & ELECTROLYTE RETENTION**
- **HIGH** Electrolyte & water retention
- **LOW** Oestrogen stimulated increased Electrolyte & water retention

**SKILL LEVEL**
- **Oestrogen** enhances / maintains verbal memory
- **Progesterone** increased visual & spatial skills

**STRESS INDEX**
- Oestrogen & Progesterone mood deterioration / increased stress

**FAT**
- **Relative** Increased CHO metabolism
- **Metabolism** Decreased glycogen storage & depletion
- **Increased metabolic rate** Increased calorie intake

**CARBOHYDRATE**
- Increased FAT metabolism
- Increased glycogen storage & depletion
- Decreased metabolic rate
- Decreased calorie intake

**By Sue Robson : Southern Cross University, 1995.**
• Australian Sport Commission
  “Hormones”
Paradigm Shifts in Coaching # 9

Warm Up and Stretching

• Objectives of warm up?

• Flexibility / Stretching (static, ballistic, PNF, dynamic mobility)
The Vikings, of course, knew the importance of stretching before an attack.
• Stretching practice

• Current research demonstrates that static stretching prior to dynamic activity decreases motor unit recruitment, motor unit synchronization and rate of force production.

• Thus, no static stretching during warm up

• Do it after cool down or as part of cooling down

• Or 2 hours prior or after training and/or competition activities.

• Why?
The significance of stretching in the warm-up before maximum performance

By Klaus Wiemann and Andreas Klee


Drawing on new research and knowledge about the anatomy of muscle fibres, the authors describe, in detail, the cause/s of injuries and the benefits of stretching in preparation for vigorous physical activity. They point out that the amount of passive tension the elastic elements of the muscle must bear is by no means smaller during extreme stretching than during active tension in voluntary maximal isometric contractions. Indeed, the passive tension from stretching can be much higher. Consequently, the forces applied during contractions and stretching in training should have the same or similar effects. The authors conclude that the perceived benefits of intense static stretching before a maximum performance have not been proven. On the contrary, intense static stretching prior to vigorous physical activity is responsible for reduced performance and creates a higher risk of injury. This is not to say that regular stretch training will not improve performance by increasing joint flexibility. The issue is when to use static stretching sessions. The authors argue that static stretching should be performed in separate training sessions. In the warm up phase immediately before maximal performances only submaximal stretching should be used. Five light, but dynamic, stretches, sufficient to prepare the body for action are described.
Overall, an acute bout of dynamic stretching may be less detrimental to muscle strength than static stretching for the hamstrings.
Overall, an acute bout of dynamic stretching may be less detrimental to muscle strength than static stretching for the hamstrings.
Practical Applications

This study was designed to test isolated muscular strength after dynamic stretching in the same manner as previous studies that first reported the stretching-induced force deficit after static stretching (3,9,12,16,19,27,29,44,66). The results of this study have implications for strength and conditioning coaches and men who perform stretching before performance events. The decreases in strength as a result of the static stretching may adversely affect the performance of athletes in sports that require high levels of force production, and these findings are consistent with previous studies (29,43,45,48,66,67). The dynamic stretching, however, did not have a detrimental effect on hamstring strength in the present study. Previous studies (17,18,32,45,65) have reported increases in power output after dynamic stretching. Therefore, our findings, in conjunction with previous studies (17,18,32,45,65), suggest that
Paradigm Shifts in Coaching # 10.

Prehabilitation versus rehabilitation
Implications

- Rehabilitation - well done
- Pre-habilitation - prevention?
- Huge implication - immediate action needed!
- Preventative sport medicine?
- Musculo-skeletal screening
- Body alignment (foot, ankle, knee, hip, vertebrae, shoulder)
- Muscle imbalances
- Optimal flexibility ranges (ROM)
- Regular and frequent screening before and during maturation
- Regular yearly screening after maturation
LTAD is pre-habilitation and minimizes rehabilitation!
Paradigm Shifts in Coaching # 11.

Speed Training All Year Round!

Speed training - all year round?

• When and how?

• Block loading - periodized during SPP, PCP and sometimes during the CP
Block Loading

- Sequencing specialized mesocycle blocks with highly concentrated workloads focusing on a limited number of skill or fitness elements.
- Priorities… (see the Coach's Eye later)
- One of the Five S’s is prioritize and the others are maintained or slightly improved (interference)
Paradigm Shifts in Coaching # 12.

The Myth of the Aerobic Base in Power Sports
• In the past, the role of the aerobic system has been overestimated in power sports.

• Of course the aerobic system plays a crucial role in recovery and in other important functions. However, in power sports, priority should be given to anaerobic training to ensure that optimal anaerobic power is improved or maintained.
• Elite power athletes training with high intensity and frequency could maintain their aerobic base with recovery work after workouts and matches/competitions by a half-an-hour low quality of aerobic work (70% max heart rate) 2 to 4 times per micro cycle.

• Recent research
• This will facilitate recovery and will contribute to aerobic maintenance. Since the athletes are training and competing at high intensities and frequencies, this will contribute to the maintenance of established capacities.

• The question is how much endurance is enough for the sport?
Paradigm Shifts in Coaching # 13.

Ultra Short Interval Training

• Train the anaerobic system parallel with the aerobic system???
• Very popular during the 1980’s
• It is a resurging new training method!
Effects of High-Intensity Intermittent Training on Endurance Performance: Christian Finn
Sportscience 5(1), sportsci.org/jour/0101/cf.html, 2001 (1715 words)

High-intensity intermittent training is a form of interval training consisting of short bouts of all-out activity separated by rest periods of between 20 s and 5 min.

It is a low-volume strategy for producing gains in aerobic power and endurance normally associated with longer training bouts.

Endurance athletes should gradually phase in bouts of high-intensity intermittent training in the build-up to competitions.
ULTRA-SHORT INTERVAL TRAINING THE BEST FORM OF COMPETITION-SPECIFIC AEROBIC ADAPTATION AND NEUROMUSCULAR PATTERNING

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<td>fly</td>
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<td>float</td>
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TRAIN BOTH ANAEROBIC AND AEROBIC ENERGY SYSTEMS MAXIMALLY AT THE SAME TIME

Paradigm Shifts in Coaching # 14.

The Myth of Strength Training (or skill, or endurance, or speed or flexibility)
• Interference

• Research isolates single factor, i.e., endurance, or strength, or speed, or skill or suppleness

• Interference between strength and endurance training?
Horizontal and Vertical Integration
The Art and Science of Coaching
(Balyi, 1995)
Paradigm Shifts in Coaching # 15.

Transfer of strength and power

- Little research and knowledge on transfer
- Greg Wilson, 1995 Northern Star University
- Daniel Baker, ARL
- Ian King, Brisbane
- Complex training
Complex training

• Improved performance may require 3 to 4 min between weight training and plyometrics and the use of heavy weight training loads (best suited for highly trained athletes)

Paradigm Shifts in Coaching 16.

**SUSTENANCE**
Recovery, Regeneration

- Nutrition
- Hydration
- Rest
- Sleep
- Regeneration
• Chrono-nutrition

• Chrono-hydration
  • Timing of the nutritional intake regarding the beginning of the training session or competition and at the training session or competition.
Sleep Thieves
An Eye-opening Exploration Into the Science & Mysteries of Sleep
STANLEY COREN
Author of the Best-Selling The Intelligence of Dogs
Sleep, Recovery, and Performance: The New Frontier in High-Performance Athletics

Charles Samuels, MD, CCFP, DABSM\textsuperscript{a,b,*}

\textsuperscript{a}Centre for Sleep and Human Performance, \#106, 51 Sunpark Drive SE, Calgary, Alberta, Canada T2X 3V4

\textsuperscript{b}Department of Family Medicine, Faculty of Medicine, University of Calgary Health Sciences Centre, 3330 Hospital Drive NW, Calgary, Canada AB T2N 4N1
**SLEEP LOGS**

(1) With a black marker, fill in time slept.  
(2) Fill in all nap times during the day.  
(3) Rate your sleep.

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0 (very poor) – 10 (very good) sleep was rated 7

0 (exhausted) – 10 (refreshed), this morning I felt 6

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0 (very poor) – 10 (very good) sleep was rated 4

0 (exhausted) – 10 (refreshed), this morning I felt 3

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Patient Name: ___________________________  
Week Beginning: ________________________

| Date       | PM | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | AM | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 |
|------------|----|----|----|----|----|----|----|----|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|

0 (very poor) – 10 (very good) sleep was rated ____________  
0 (exhausted) – 10 (refreshed), this morning I felt ____________

| Date       | PM | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | AM | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 |
|------------|----|----|----|----|----|----|----|----|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|

0 (very poor) – 10 (very good) sleep was rated ____________  
0 (exhausted) – 10 (refreshed), this morning I felt ____________

| Date       | PM | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | AM | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 |
|------------|----|----|----|----|----|----|----|----|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|

0 (very poor) – 10 (very good) sleep was rated ____________  
0 (exhausted) – 10 (refreshed), this morning I felt ____________
Hydrotherapy and cryotherapy
Cold water immersion
Contrast water therapy

- Used commonly as a recovery strategy in sports medicine (Cochrane, 2004; Higgins & Kaminski, 1998)
- Athletes alternate between heat exposure (thermotherapy) and cold exposure (cryotherapy) by alternative immersion in warm (120” at 39-40°C) and cold (60” at 10-12°C) water
- Limited research
- Physiological mechanisms unclear
Paradigm Shifts in Coaching 17.

Overtraining or Under-recovery?
• Overtraining
• Overstress
• Overreaching
• Under-Recovery
• Unexplained Under-Performance Syndrome (UPS)
• Overtraining is defined as excessive training characterized by long-lasting fatigue and worsening of competitive performance.

• Overstress is a combination of excessive training overload and/or extensive stresses of everyday life.

• Over-reaching is the term used to describe short term overtraining
• Under-recovery occurs when not enough time is provided for an athlete to recover from the training load (volume and intensity) and/or too high a frequency of training.

• UPS is a condition of under-performance which manifests itself as persistent fatigue and causes an increase in the number of infections experienced by the athlete.
Paradigm Shifts in Coaching 18.

Hygiene and Immuno-reaction

- Fatigue and immuno reaction
- US army study
Paradigm Shifts in Coaching 19.

Mental Preparation through the LTAD Stages
England Badminton:

- Fundamental
- Learn to Train
- Train to Train
- Train to Compete
- Train to Win

Forthcoming:
Generic Mental Skills for LTAD Stages
www.ltad.ca
Paradigm Shifts in Coaching 20.
The Coach’s Eye – Rapid Cognition
• When less is more
• “Paralysis by analysis” ...
• Taking too much information into account...
• Think in priorities...
• “…truly successful decision making relies on a balance between deliberate and instinctive thinking…”
• “… in good decision making frugality matter…”
• Malcolm Gladwell: Blink 2005
Paradigm Shifts in Coaching 21.

Ancillary Capacities

The graph shows the relationship between Training Age and two key metrics: Diminishing Returns in Adaptation and Genetic Ceiling. The yellow area represents Diminishing Returns in Adaptation, while the blue area indicates Genetic Ceiling. Ancillary Capacities can be visualized as the overlap between these two metrics as Training Age increases.
Improvements after reaching genetic ceiling limits

- Warm up and cool down
- Stretching
- Nutrition / hydration
- Regeneration
- Mental training
- Taper and Peak
- Environment
- Life-style (24/7 athlete)
Paradigm Shifts in Coaching 22.

Parent’s Education
Paradigm Shifts in Coaching 22.

Parent’s Education

Ideal coaching job?
Orphanage...
No parental involvement!
Figure 2 LTAD and Parent Involvement

Child athlete's satisfaction with parental involvement

Parent "No-go" Zone

High satisfaction

Child athlete's satisfaction with parental involvement

Inactive

Reactive

Active

Proactive

Hyperactive

Parent "No-go" Zone

Opposed

Parent Optimal Zone

Redrawn from Engaging Parents, Callie Brackenridge Ltd. 2005
Paradigm Shifts in Coaching 23.

LTAD and Coach Education
Alignment
Long-Term Athlete Development “CS4L”

- Active Start
- FUNdamentals
- Learning to Train
- Training to Train
- Training to Compete
- Training to Win
- Active for Life

Chronological Age:
- Under 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24+

Developmental Age ±

Specific Training Age ±

Training Age:
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16+

Initiation
- Introduction
- Development
- HP

Beginners
- Intermediate
- Advanced

Not necessarily determined by age of participant/athlete

Ongoing

Community Sport
Competition
Instruction

National Coaching Certification Program (NCCP)

D & NCCP
Paradigm Shifts in Coaching 24.

Integrated Sport Science and Medicine Team
COMPETITION PLAN FOR CURLING
TWO GAME DAY #1: 8:00 a.m. & 2:30 p.m.

Pre-Competition Routine:
- Warm up
- Psychological prep.
- Hydrate and Snack

Post-Comp. Routine:
- Cool down
- Rehab/ Recovery/Ice
- Light Stretch
- Snack

Recommend leaving the building

Notes:
- Snack (reload) within 20 minutes of end of each Game
- Even if you are going for dinner.

Dagg-Jackson; Way; Balyi; Comartin; Parsons; Cox; Farres; 2005
COMPETITION PLAN FOR CURLING
3 GAME DAY #1 - 9 am; 4 pm; 8 pm

Pre-Competition Routine:
Warm up
Psychological prep.
Hydrate and Snack

Post-Comp. Routine
Cool down
Rehab/ Recovery/Ice
Light Stretch Snack
Leave the building

Pre-Competition Routine:
Warm up
Psychological prep.

Post-Comp. Routine
Cool down
Rehab/ Recovery/Ice
Light Stretch
Bigger Snack

Notes:
• If the Game is short modify times.
• If the Game goes into extra end again modifications need to be made.

Abbreviated Post-Comp. Routine
Cool down
Rehab/ Recovery/Ice
Light Stretch/Snack

Dagg-Jackson; Way; Balyi; Comartin; Parsons; Cox; Farres; 2005
COMPETITION PLAN FOR CURLING
3 GAME DAY #2 - 8 am; 11:30 pm; 3 pm

Wake-up
Light aerobic stretching

Breakfast

Hydrate and snack throughout day - games and breaks

Mental Recovery

Debrief
Reload

Debrief
Reload

Meal

Travel or Sleep

5 6 7 8 9 10 11 12
GAME 1

GAME 2

GAME 3

Modified Pre-Competition Routine:
Warm up
Psychological prep.
Hydrate and Snack

Post-Comp. Routine
Cool down
Rehab/ Recovery/Ice
Light Stretch/Snack
Leave the building

Post-Comp. Routine
Cool down
Rehab/ Recovery/Ice
Light Stretch/Snack

Notes:
• If the Game is short modify times.
• If the Game goes into extra end again modifications need to be made.
• Benefits of fitness enable coping with this schedule
• Meal evening before is essential

Dagg-Jackson; Way; Balyi; Comartin; Parsons; Cox; Farres; 2005
Paradigm Shifts in Coaching # 25

Kaizen
Paradigm Shifts in Coaching # 25

Kaizen
Continuous Improvement
Kaizen

• Your past success guarantees NOTHING!
• Think outside of the box!
• Do not have a tunnel vision of your own sport!
• Study other sports:
  – Athletics
  – Gymnastics
  – Swimming
Kaizen

• Be open minded!

• “The mind works like a parachute, it works when it is open!”

• If you do not make mistakes you do not learn!
New drug! (4 all ages)

- Enhances:
  - VO2max
  - Increases blood volume
  - Increases bone density
  - Fight cancer
  - Fight heart disease
  - Produces euphoria (endorphins)
  - Well being

- It is undetectable and cheap!

- EXERCISE
Overview

• Your past success guarantees nothing!!!
• Constant change…
• LTAD
  – A tool for change
  – Pubertal periodization - REACTIVE
  – Trainability
  – Age – relative / developmental
  – Monitoring growth
  – Developmentally appropriate training
  – Developmentally appropriate competitions
• Periodization / Quadrennial planning
  – Diminishing returns
• Program design
  – Pre-pubertal
  – Pubertal
  – Early post-pubertal
  – Adult
• Pre-pubertal – follow windows (Speed, Skill & Suppleness)
• Pubertal and early post-pubertal athletes “reactive periodization”
• Adult – all systems are fully trainable (easy)
• Female athletes and hormones
• The myths of adaptation
  – Endurance, Strength, Speed, Skill and Suppleness
• Sustenance – new technologies
• Hygiene
• IST programs
• Kaizen
Panel Discussion

• Cathy Haines – Gymnastics Canada
  LTAD and NCCP integration

• Christian Hrab – Snowboarding
  High Performance Director