"Age means nothing, attitude is everything.
I live by that every day and I think that came through today,"
Bourgonje.
Life is a Sport: Everyday is Game Day

- Plan for your day
- Train for your day
- Eat for your day
- Recover from your day
- Have FUN during your day
Life is a Sport: Everyday is Game Day

Remember in this game the goal is not to get to the finish line first!

I know her mind had gone, but at least she kept her figure.
Life is a Sport: Everyday is Game Day

What is the Goal?

Active Canadians
or
Canadian Olympians
or
Olympic Medalists
Life is a Sport: Everyday is Game Day

What are you coaching?

The GAME

The PLAYER

“Invest for the long range. Make today pay off tomorrow”

Pat Williams, The Magic of Team Work
PLAN for your day

TRAIN for your day
Yearly Training Plan
Training bias to improve endurance performance

- Training volume
- Endurance
- Strength & Strength Endurance
- Intervals
- Performance Level
- Competitive exercises
S.W.O.T. Analysis

GAP Analysis:
Where are we?
Where do we want to be?

- Sport Physiotherapy
- Orthopaedic Rehabilitation
- Training
What are the Pieces of the Puzzle
The Sport Puzzle

Technical

Tactical

Physical

Mental

Game Day
Putting it all Together - Tactical
Putting it all Together - Tactical

"If you can't explain it simply, you don't understand it well enough.”

Albert Einstein

Keep it Simple and SMART!

XOXOXOXO
Putting it all Together - Technical
RELEARNING OR CHANGING

- initial conditions
- desired outcome
- motor program
- Images
  - act
  - action
- output
- feedback
- error labeling
- self reinforce

Feels right might be wrong
Feels wrong might be right

Knowledge of Results + Knowledge of Performance + Kinesthesia =
RELEARNING or CHANGING

Dr. Jim McClements
Putting it all Together - Technical

• Relate technical needs to gap analysis and **physical** and **mental** requirements
• Determine the Foundational elements for your technical requirements
• Build a strong foundation for long term development and success
Putting it all Together - Mental
Mental Skills: Implementation – Education / Refinement

1. Self-Awareness
2. Goal-Setting
3. Mental Imagery
4. Arousal Control
5. Emotional Control
6. Attentional Control
7. Confidence
8. Positive self-talk and Negative thought-stopping
9. Ideal Performance State
10. Pre-Competition and Competition Plans
Putting it all Together - Physical

Game Day

Physical
Health Management of our Athletes

- **Optimizing Training and Technique / Mechanics**
- **Removing Barriers to Performance / Optimizing Recovery**
- **Prevention of Overtraining / Illness / Injury**
- **Access to care for illness / injury**

Screens allow us to quickly monitor the optimizing of training technique/mechanics.
High Performance Sport is Precision Performance on a Given Day

Precision Performance

Performance Planning

Precision Technical Skill

Physical – Psychological - Nutritional

Precision Movement

Motor Control – Mobility – Stability & Strength – Alignment

** Efficiency **
Development of Movement

**Mobility** - Ensure normal structural mobility
**Stability** - Proximal Stability
**Mobility on Stability** - Ensure Movement control
**Skill** - Exploration and manipulation

Taxonomy of Movement by Rood

Four Basic Laws of Strength Training

Before developing muscle strength:

- Develop joint flexibility
- Develop tendon and ligament
- Develop core strength and stability
- Develop limb stabilizers before prime movers

Dr. Tudor Bompa
Posture

Posture follows movement like a shadow (Sherrington)

The position the body assumes in preparation for the next movement (Roaf)

Trunk stability relates to maintaining an optimal posture
- Neutral Spine and Pelvis
- Neutral Spine and Shoulder Girdle
Maintaining Neutral

- Energy Conservation
- Force Generation of trunk musculature
- Injury Potential
  - Consequences of non-neutral posture
- Enhanced Co-contraction
Core Stability Definition

Core Stability is defined as dynamic musculoskeletal control which allows for production, transfer, and control of force and motion to distal segments of the kinetic chain.

Adapted from Kibler et al., Sports Med. 2006;36:189-198
Regional Interdependence Model

Stability and Mobility

Gleno-humeral = Mobility
Scapula = Stability
Tx Spine = Mobility
Pelvis/Lx Spine = Stability
Hip = Mobility
Knee = Stability
Ankle = Mobility
Foot = Stability

A body lacking mobility somewhere will find it elsewhere

Cook and Kiesel
Path of Least Resistance
True vs. Apparent Flexibility
“DO NOT let training compromise your movement”
Training Specificity

- In many sports, **FORCE** application is a primary limitation to successful performance.
- Training shouldn’t compromise skill.
Athletes should develop strength to serve the specific needs of their sport in order to increase athletic performance, and not simply develop strength to get strong.

Silver by 0.08 seconds
Angle Specificity Example

- Adaptation is specific to the Joint Angle used in training (ISO)
- Little transfer to dynamic movement (CON)

From Sale & MacDougall, 1981 based on Lindh (1979)
Velocity Specificity Example

From Sale & MacDougall, 1981 based on Lindh (1979)
Movement Pattern Example

- Train in the Squat for 12 weeks
- Increase Squat strength but not Leg Press

Speed & Agility Specificity

- Train either straight speed or agility (30m) for 6 wks
- Speed improved speed, agility improved agility

Young, McDowell & Scarlett JSCR 15(3), 315-319, 2001
Training Specificity for Sport

• Training should be specific to the forces, joint angles, actions & movement patterns;
• ‘Transfer’ from standard conditioning to the specific skills of the sport
• Movement is a skill …

TRAIN THE MOVEMENT REQUIRED, NOT THE MUSCLE USED!
Exercise Intervention Model

Therapeutic Exercise: Moving Toward Function 2nd Ed. Hall and Brody
Elements of Movement…How do we assess status or screen for dysfunction?

Support Elements:
• The functional status of the cardiac, pulmonary and metabolic systems

Base Elements:
• The functional status of the muscular and skeletal system:

Module Elements:
• The physiological status of the neuromuscular system

Biomechanical Element:
• The functional status of static and dynamic kinetics and kinematics

Cognitive/Affective Elements:
• The functional status of the psychological system as it relates to movement
Training aspects & sequencing

Specifically referring to same day training:

• Technical skill work before all other forms of training (i.e. no neuromuscular fatigue present!)
• Pure speed before any other physical quality
• ATP-PC before the lactate system
• ATP-PC before the aerobic system
• Lactate system before the aerobic system
• Higher quality aerobic (i.e., VO2max) before lower quality aerobic (i.e., aerobic endurance)
“There are no bad exercises... Just Bad Technique.”
Training & performance

Training bias for athletes in power events

Verhoshansky, 1985
High-level athletes can sufficiently cope with 18-22 weeks of continual progressive training, at which point a change of training content and extensive restoration phase are required.
Between every peak lies a valley

Before climbing to new heights you must first return to the valley to work your way back up to a higher peak
EAT for your day

RECOVER from your day
Importance of:

- Knowing the training stimulus and other training/life stresses
- Knowing the recovery time for that training stimulus within a work-out and between work-outs

Adapted from NCCP Task #6 readings
RECOVERY is the most important part of training

Drugs in Sport … Focus on Recovery
Physical Activity

↓

Muscle Fatigue

↓

Altered Movement Patterns
Altered Recruitment Patterns
Altered proprioception

↓

Abnormal Loading

↓

Altered Stress Distribution

↓

Increase in Compressive Forces
Increase in Tensile Forces

↓

Tissue Stress/Strain

Modified from Reed
Recovery Points out of /20

- **Nutrition and Hydration**: 10 pts
  - 8 for nutrition and 2 for Hydration

- **Sleep and Rest**: 4 pts (1 is for napping)

- **Relaxation and Emotional Support**: 3 pts

- **Stretching and Warm-down**: 3 pts
Performance Nutrition

Three Key Principles:

1. **Quantity**: Daily amount of food/fluid required to meet the athlete’s optimal performance needs

2. **Mix**: The right combination of CHO, protein, fat and fluids based on the individual’s current body weight

3. **Timing**: Eating and drinking at the appropriate time to optimize training and recovery
Performance Nutrition

- Post-Exercise – a high-carbohydrate diet (10g/kg/d) is essential for glycogen resynthesis
- Short-term – Greater recovery with 1.2 g/kg/30min over 5 hr period
- Better glycogen recovery = better performance in both ST and LT activities

- Protein is essential for muscle anabolism post exercise – as little as 6g will boost synthesis
- Protein does not further glycogen re-synthesis
Hydration
# Hydration

<table>
<thead>
<tr>
<th></th>
<th>Sedentary Daily Allowance</th>
<th>Sedentary Upper Limit</th>
<th>Active/Athlete Daily Allowance</th>
<th>Active/Athlete Upper Limit</th>
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<tbody>
<tr>
<td><strong>Water</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Male</td>
<td>3.7 L/day</td>
<td>None</td>
<td>3.7 L/day</td>
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<td>2.7 L/day</td>
<td>None</td>
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<td>None</td>
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<tr>
<td><strong>Sodium</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.5 g/day (3.8 g/day salt)</td>
<td>2.3 g/day (5.8 g/day salt)</td>
<td>&gt;1.5 g/day (&gt;10 g/day salt)</td>
<td>None</td>
</tr>
<tr>
<td>Female</td>
<td></td>
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<td></td>
<td>None</td>
</tr>
<tr>
<td><strong>Potassium</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>4.7 g/day</td>
<td>None</td>
<td>4.7 g/day</td>
<td>None</td>
</tr>
</tbody>
</table>

*IOM Guidelines, (2004)*
Sleep: Are you getting enough?
# Sleep

## Timing
- maximum [melatonin]
- minimum core body temperature

## Stages
- REM
- NREM = 75-80% of cycle
- 1 cycle = 90-110 minutes

## Function
- Restoration
- Growth Hormone in Stage 3 & 4
- Anabolic
- Ontogenesis
- Memory processing
- Preservation

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Sleep Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-12 months</td>
<td>14-18 hours</td>
</tr>
<tr>
<td>1-3 years</td>
<td>12-15 hours</td>
</tr>
<tr>
<td>3-5 years</td>
<td>11-13 hours</td>
</tr>
<tr>
<td>5-12 years</td>
<td>9-11 hours</td>
</tr>
<tr>
<td>Adolescents</td>
<td>9-10 hours</td>
</tr>
<tr>
<td>Adults</td>
<td>7-8(+) hours</td>
</tr>
<tr>
<td>Pregnant</td>
<td>8 (+) hours</td>
</tr>
</tbody>
</table>
Rest...
Don’t forget the importance of a good NAP!
“It is ironic that despite the wonders of modern medicine, REST and NUTRITION may be the most potent healing agents.”

Smith, MSSE, 1999

Remember: Everything you really needed to know you learnt in Kindergarten!
Mental Skills:
Implementation – Education / Refinement

1. Self-Awareness
2. Goal-Setting
3. Mental Imagery
4. Arousal Control
5. Emotional Control
6. Attentional Control
7. Confidence
8. Positive self-talk and Negative thought-stopping
9. Ideal Performance State
10. Pre-Competition and Competition Plans
Stretching

- Pre-exercise stretching has little effect on Performance or Injury Prevention
- Regular stretching – post activity improves flexibility and performance
Cool-down
Active Recovery

• 10-20 minutes @ 40-60% VO2max
  • Increased blood flow
    – Resynthesizes high-energy phosphates
    – Replenishes oxygen in the blood and muscle
    – Restores body fluid homeostasis
    – Limits the harmful effects of immunosuppression

Wigernaes et al., (2001)
Wigernaes et al., (2000)
Bangsbo et al., (1996)
The Importance of the Cool-down

- Keep Active to maintain metabolic activity
- Refuel ASAP
- Minimize passive stretching during cool-down period

Refueling Muscle Glycogen

Lactate Removal as a % of VO₂ Max in Active Recovery (Bike)

Adapted from Costill and Miller 1980.
Over-use or Under-recovery Injuries
Definitions of recovery

- The compensation of deficit states of an organism
- The reestablishment of the initial state of homeostasis
- Recovery encompasses active processes of re-establishing psychological and physiological resources and states that allow the athlete to tax theses resources.

The stress really started to get to me during the first month of my freshman year. Every morning I was up at 5:30 a.m. to lift weights and go for a one-hour training run. After that I showered, wolfed down some breakfast, and headed to morning classes. Sometimes I’d eat a quick lunch and then take a nap. Other times I was so exhausted that I’d skip lunch and spend the whole time sleeping. Track practice was from 3:00 to 5:00 p.m. and after that I’d sometimes be so sore I’d have ice therapy and whirlpool treatments. Then I’d get a quick shower, and have some dinner, and go to mandatory study hall, where I tried to complete my class readings and network assignments. By 11:00 p.m. I was “brain dead” and could not wait to get to bed. Sometimes I’d fall asleep right away, but other times I had trouble turning my mind off…worrying about classes, wondering what the coach was thinking, asking myself whether I belonged here or not. The next thing I knew, the alarm clock was buzzing and it was time to get up and do it all over again. I had no social life, nothing was any fun, and I was not doing anything very well – classes, weightlifting, practice, meets – I felt that I was just barely getting by.
Under-Recovery

• Failure to fulfill current recovery demands

• Result of excessive/prolonged/intense exercise, stressful competition or other stressors

• May not lead to overtraining but will lead to progressive fatigue and under performance

(Budgett, 1998)
Overtraining and Overreaching

- An advanced expression of athletic fatigue
- Characterized by a decline/stagnation in performance
- Accompanied by a set of physiological, psychological and biochemical signs and symptoms.
Monitoring Training: Considerations

- **Stimulus**
  - Development of the “perfect training program”

- **Perception of the stimulus**
  - Refers to factors such as frequency, duration, work/rest ratio and actual intensity
  - Need to evaluate objective measures and subjective measures

Objective measures: HR, [LA], speed, etc.

Subjective measures: RPE, perception, etc.

Foster et al. 1999, Kentta & Hassmen 1998
Monitoring Training

• **RPE**: Rate of Perceived Exertion
• **TQR**: Total Quality Recovery
  – TQR – Perceived: How does it feel?
  – TQR – Action: What did you do?
  – Are you asking the correct questions?
    • Nutrition, Sleep, Lifestyle and Psychological, Cool-down and Stretching
## Staging of Under-Recovery Syndrome

<table>
<thead>
<tr>
<th>Stage</th>
<th>Symptoms</th>
<th>Treatment</th>
</tr>
</thead>
</table>
| I     | Pain only after activity.  
No interference with performance  
Generalized tenderness  
Disappears before next exercise session | Modification of activity  
Assessment of training pattern  
1-3 Days of modified program  
RECOVERYONLY |
| II    | Minimal pain with activity  
Does not interfere with intensity or distance  
Usually localized tenderness | Modification of activity  
Assess training schedule  
Medical Intervention  
3-7 Days of modified program  
RECOVERY and VOLUME |
| III   | Pain interferes with activity  
Usually disappears between sessions  
Definite local tenderness | Significant modifications  
Assess training schedule  
Medical Intervention  
1-3 Weeks of modified program  
RECOVERY/VOLUME/INTENSITY |
# Staging of Under-Recovery Syndrome

<table>
<thead>
<tr>
<th>Stage</th>
<th>Symptoms</th>
<th>Treatment</th>
</tr>
</thead>
</table>
| IV    | Pain doesn’t disappear between training  
Seriously interferes with intensity of training  
Significant local signs of pain, tenderness, crepitus, swelling | Usually need to temporarily discontinue aggravating motion.  
Design alternate program.  
May require splinting.  
Physical therapy.  
3-6 Weeks of modified program RECOVERY/VOLUME/INTENSITY |
| V     | Pain interferes with sport and activities of daily living  
Symptoms often chronic or recurrent  
Signs of tissue changes and altered associated muscle function | Prolonged rest from activity  
Consider splint  
Physical therapy  
6-12 Weeks of modified program RECOVERY/VOLUME/INTENSITY |

Modified from Reid, 1992
Preventing Overtraining

- Set realistic and flexible training and racing goals
- Practice quality not quantity
- Keep program flexible
- Allow for rest and recovery
- Relieve Stress
Preventing Overtraining

- Decrease training load every 3-5 weeks
- Allow for extra days off every 12 weeks
- Have hard days and easy days
- Take one day off every week
- Schedule time off regardless of training consistency
- Better to do 2 short than 1 hard work-out in a day

Diet and Hydration

Recovery Techniques
- Active Rest, Relaxation, Massage, Hot/Cold etc.
Recovery/Fatigue Questions:

1) Very little effort was required to complete my training over the past few days

2) I felt completely recovered prior to my training over the past few days

3) I was very successful at my rest and recovery activities over the past few days

4) I was satisfied and relaxed before sleep over the past few days

5) I felt physically recovered over the past few days

6) I had lots of fun over the past few days

7) I felt very confident over the past few days

Rate each question on 1-5 scale (disagree – agree)
Training for Life: “The Game”

In this training paradigm, the more practices you miss the more game you are playing … so do not get frustrated with more game time!

All I can say about life is... enjoy it.